



Agrohomeopathy Studies by Date of Publication

Homeopathy. 2014 Jan;103(1):92-93.

Effects of homeopathic treatments on strawberry plants in field.

[Grazia Trebbi](#), [Giovanni Dinelli](#), [Ilaria Marotti](#), [Valeria Bregola](#), [Alessandro Benni](#), [Lucietta Betti](#).

Link to abstract/paper: <http://www.homeopathyjournal.net/article/S1475-4916%2813%2900153-7/fulltext>

Homeopathy. 2014 Jan;103(1):91-92.

Homeopathic potencies alter photosynthesis of cowpea.

[Anirban Sukul](#), [N.C. Sukul](#), [P. Sen](#), [A. Bhattacharya](#), [Soma Sukul](#).

Link to abstract/paper: <http://www.homeopathyjournal.net/article/S1475-4916%2813%2900151-3/fulltext>

Homeopathy. 2014 Jan;103(1):73-74.

Might evaporation-induced droplet patterns serve in agro-homeopathic research and support experimental trials?

[Maria Olga Kokornaczyk](#), [Giovanni Dinelli](#), [Lucietta Betti](#).

Link to abstract/paper: <http://www.homeopathyjournal.net/article/S1475-4916%2813%2900116-1/fulltext>

Homeopathy. 2014 Jan;103(1):71.

Comparative study of two bioassays with weakened duckweed and yeast treated with homeopathic preparations.

[Tim Jäger](#), [Claudia Scherr](#), [Meinhard Simon](#), [Peter Heusser](#), [Ursula Wolf](#), [Stephan Baumgartner](#).

Link to abstract/paper: <http://www.homeopathyjournal.net/article/S1475-4916%2813%2900111-2/fulltext>

Homeopathy. 2014 Jan;103(1):66.

Effects of homeopathic treatments on the cellular metabolism of wheat: validation of microarrays data by quantitative real-time PCR (qPCR).

[Giovanni Dinelli](#), [Ilaria Marotti](#), [Valeria Bregola](#), [Sara Bosi](#), [Grazia Trebbi](#), [Francesco Borghini](#), [Daniele Nani](#), [Lucietta Betti](#).

Link to abstract/paper: <http://www.homeopathyjournal.net/article/S1475-4916%2813%2900103-3/fulltext>

Int J High Dilution Res. 2013;12(44):137-138.

Potentized Sucrose alters growth, sugar, protein and chlorophyll content in cowpea seedlings.

Dutta S, Chakraborty I, Sukul NC, Sukul A, Chakravarty R.

Abstract

Background: Plants produce sugars through photosynthesis. Sugars influence many vital functions like embryogenesis, seedling development, root and leaf morphogenesis, flowering and stress responses in plants. Sugars act as signalling molecules which control gene expression and development in plants in a way similar to plant hormones [1]. The most abundant disaccharide in plants is sucrose. Altering sucrose levels affect plant growth, development, sucrose-derived metabolites and sucrose-specific signalling [2].

Objectives: To see whether potentized Sucrose influence the development of cowpea seedlings in terms of morphology and such biochemical changes as chlorophyll, sugar and protein content in the embryos.

Materials and methods: Cowpea seeds were surface sterilized and allowed to germinate in petri dishes over moist filter papers. Immediately after germination they were divided into two groups. While one group was treated with Sucrose 30CH diluted with distilled water 1:500, the other group was treated with Ethanol 30CH, diluted with water 1:500. After treatment the seedlings were transferred to separate petri dishes and allowed to grow for 72 hours. Samples of seedlings from each treatment group were weighed, kept at 70°C for 24 hours and weighed again. Another sample from each group was analysed for their sugar content and protein content following Anthrone and Lowry's method, respectively [3]. Chlorophyll content was measured in situ by a chlorophyll-meter. Leaf and cotyledon sections were examined under a scanning electron microscope to see any changes in the epidermal cells of cotyledons and density and morphology of stomata.

Results : Data between the treatment groups were compared by the student t-test. Sucrose 30CH induced significant changes in water content, chlorophyll, sugar and protein content in the seedlings as compared to Ethanol 30CH ($p < 0.05$). Sucrose 30CH increased stomata density in the leaves significantly as compared to the Ethanol 30CH control ($p < 0.05$). There was a marked change in the structure of epidermal cells of cotyledons following treatment with Sucrose 30CH.

Discussion: Sucrose 30CH might have interfered with the signalling process of sucrose in seedlings and thus produced the observed effect. Increase in stomata density indicates higher transpiration rate in the leaves of sucrose-treated seedlings. Water content in the seedling was higher with Sucrose 30CH than with Ethanol 30CH.

Conclusion: Potentized Sucrose altered growth in the cowpea seedlings and their sugar, protein, water and chlorophyll content. The drug also changed the morphology of epidermal cells of cotyledons and increased the density of stomata in the seedlings.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/645/669>

Int J High Dilution Res. 2013;12(44):133-134.

Potentized Cina reduces root-knot nematode in infestation of cucumber and the antinematode effect is transmitted through water.

Sukul NC, Chakraborty I, Sukul A.

Abstract

Background: Root-knot nematodes belonging to *Meloidogyne incognita* are responsible for substantial loss in yield of vegetable crops all over the world. Chemical nematicides are expensive, cause environmental pollution and leave toxic residues in crops. Plant substances provide safe alternative [1, 2]. Cina is a plant origin. In a series of experiments we have demonstrated that potentized Cina, a homeopathic remedy for worm or nematode infection in man, could significantly reduced root-knot nematode infection in several species of crops [3, 4]. We have also demonstrated that the effect of a homeopathic potency could be transferred from one plant to another through water [5].

Objectives: (i) To see whether Cina 200 CH could reduce root-knot disease of cucumber; (ii) To see whether the antinematode effect of Cina could be transferred from one plant to another through water.

Materials and methods: Aseptically germinated seeds of cucumber, *Cucumis sativus* L were grown in earthen pots at one seed per pot containing a mixture of clay soil and composed manure (2:1, w/w), which was treated previously with boiling water to remove any plant pathogens. The pots were divided into groups (10 pots per group): (i) uninoculated untreated, (ii) inoculated untreated, (iii) inoculated and treated with Cina 200 CH, (iv) inoculated and treated indirectly by connection with wet cotton threads to group (iii) and (v) inoculated and treated with Ethanol 200 CH. Groups (ii), (iii), (iv) and (v) were inoculated with the second stage larvae of *Meloidogyne incognita* when the plants were at six leave stage. Just before inoculation plants of group (iii) and (iv) were connected leaf by leaf by wet cotton threads encased in polythene tubes. Then plants of group (iii) were directly pretreated by foliar spray with Cina 200 CH diluted with distilled water (1:500). Two days after inoculation plants of group (iii) were treated again with Cina 200 CH in a similar way. After a couple of weeks all the plants were harvested and the following parameters were measured: shoot length, shoot weight, root length, root weight, numbers of leaves per plant, leaf area, root gall number per plant, nematode population in roots and rhizospheric soil, leaf chlorophyll content, leaf sugar, protein content and root protein content.

Results: All the data were statistically analyzed by ANOVA followed by t-test. Leaf area and chlorophyll content were significantly higher ($p < 0.01$) with the treated groups direct and connected, than with the inoculated untreated group. Root gall number, nematode population in roots and root protein content were significantly lower ($p < 0.01$) with the treated groups than with the inoculated untreated group. Ethanol 200 CH treated group did not show any significant difference from the inoculated untreated group.

Discussion: Nematode parasites are highly resistant to many chemicals. Potentized Cina did not affect the parasites directly. The drug might have induced natural defence responses in the treated plants. The work further demonstrates that water could carry the molecular memory of the potentized Cina and thus influence the

connected plants. Cina 200 CH is an eco-friendly, in expensive and effective drug against root-knot nematodes.

Conclusion: Cina 200 CH reduces root-knot nematode infestation of cucumber. Water serves as a carrier of information of the drug effect from one plant to another.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/651/667>

Int J High Dilution Res. 2013;12(44):131-132.

Changes in the dynamics of germination and growth of flax, garden cress and radish seeds under the increasing dilutions of chosen auxins.

Malarczyk E, Wojtkowiak D.

Abstract

Introduction: As it has been proved earlier the activity of the enzymes from a phenoloxidase group of bacteria and fungi [1-5] change in accordance's with a sine curve as a result of the incubation with the increasing dilutions of their phenol effectors. This phenomenon seems to be common, however it requires a greater amount of comparative studies with the use of other kind of biological material and its biological effectors.

Aim: To test the action of subsequent dilutions of three auxins, IAA, NAA and 2,4-D within the range of dilution ranging from C1 (100-1) to C30 (100-30) on the chosen plants.

Methods: Selected flax, garden cress and radish seeds were subject to germination in the presence of solutions of the mentioned auxins in the subsequent dilutions ranging from C1 to C30. The series of dilutions were prepared laboratory. The cultures were carried out in the Petri dishes in water environment or in deeper plastic vessels on the sieved soil. The assessed parameters were the length of sprouts, a percentage of germinated seeds and a speed of plants growth.

Results: Among the three kinds of tested plants, a greater differentiation of growth depending on the used dilution and a kind of auxin, had the flax seeds. A certain correlation between a kind of plant and the effectiveness of a particular auxin has been noticed. The smallest differentiation of the speed of growth was observed in case of a garden cress seeds. The third kind of plant, a radish had an irregular rising not only with regard to a fast increase in a plant mass but also to a kind of auxin.

Conclusion: The obtained studies proved sinusoidal relativities of growth with regard to a plants reaction to different dilutions of a growth effector's similarly as it was proved on a fungal and bacterial material. Apart from that they proved a rule that the changes in the amplitude of these transformations are dependent on the affinity between the effectors and the examined biological object.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/680/666>

Int J High Dilution Res. 2013;12(44):129-130.

Cuprum Sulphuricum - a homeopathic drug can combating toxic effect of Cu, promote seed germination and peroxidase activity in Vigna unguiculata.

Banerjee P, Sukul S.

Abstract

Introduction: Copper (Cu) is an essential trace element for all living organisms including plants. But high concentration of Cu can cause toxic effects due to its redox properties and can catalyze free radicals, such as reactive oxygen species and peroxide compounds. Though, some plants can tolerate heavy metal may be range from exclusion, inclusion and accumulation of heavy metals depending on the plant species. The present study was performed to see the effect of CuSO₄ 200c on seed germination of *Vigna unguiculata* in different Cu concentration.

Materials and Methods: The 0, 50, 100, 150, 200, 250 and 300 ppm copper sulphate solutions were prepared. *Vigna unguiculata* seeds were grouped in three (hundred seeds in each group) and allowed to germinate in Petri dish having whatman no.1 blotting paper soaked with different concentration of copper sulphate solutions.

Before that the seeds were sterilized and tetrazolium test was also performed. In group I and II the seeds were soaked in CuSO₄ 200c and Ethanol 200c respectively for 3 hours before allowed to germinate in different concentration of Cu solutions.

The third group treated as control and allowed to soak in sterile water for 3hrs. The Petri dishes were incubated in room temperature

CuSO₄ .5H₂O was dissolved in 1ml sterile water mg/ml. This solution then mixed with 90% ethanol in equal volume and treated as mother potency. From this, by succussion 200 potency was made and in same way by succession of 90% ethanol, Ethanol 200c was made. Each potency thus prepared was mixed with sterile water 1:100 before use.

The growth parameters like weighed, length of germinating axis were observed after 24 h, 48 h and 72 h. Water uptake percentage were recorded. Total protein, chlorophyll, soluble and insoluble sugar were measured by following standard laboratory protocol.

The activity of peroxidase was determined using guaiacol as a substrate following to Kochhar et al. 1979.

Results and Discussions: In all the parameters observed CuSO₄200c treated seeds showed significant changes as compared to control and Ethanol 200c as the Cu conc. increases. Thus we can assume from the result that higher conc. of Cu causes toxic effect to the tissue which can be checked by pre-treating the seeds in CuSO₄ 200c drug solution. This is perhaps the first time report towards combating against soil pollution due to heavy metal toxicity.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/650/665>

Int J High Dilution Res. 2013;12(44):127-128.

Effectiveness of ultra high diluted arsenic as a function of succussion number as evidenced by wheat germination test and droplet evaporation method.

Betti L, Trebbi G, Kokornaczyk MO, Nani D, Peruzzi M, Brizzi M.

Abstract

Background: In the preparation of ultra high dilutions (UHD) each dilution step is followed by a succussion. Whereas the physical basis of succussion have been well studied [1], there are only few papers regarding the effects of succussion number

(NS) [2]. In previous studies [3, 4] we showed that arsenic at UHD applied on arsenic stressed wheat seeds stimulates the germination rate.

Aims: Investigate whether NS applied between the dilution-steps influences the UHD effectiveness.

Methodology:

Plant material and stress treatment: Wheat seeds (*Triticum aestivum* L.) of cv. Pandas were stressed by 30min of poisoning with 5mM As₂O₃ aqueous solution [3, 4].

Classes of treatment: Undiluted and unsuccussed H₂O (C), H₂O and As₂O₃ both at the 45th decimal dilution/succussion (W_{45x} and As_{45x}, respectively). The succussion was handmade and NS differed for each treatment (NS= 4, 8, 16, 32, 40, 70, 100).

Biological model: In each Petri dish 36 seeds were placed and watered with 20ml of treatment. After 96 hours non-germinated seeds were counted. The experiment was repeated twice and each one consisted in 6 Petri dishes per treatment and 6 trials. The results were analyzed by Poisson test [3].

Droplet evaporation method: The droplet patterns [5] were prepared out of the stressed wheat samples treated either with As_{45x}, W_{45x} (NS=8, 32, 70) or C. The experiment was performed in a 3 day repetition, 3 replicates per day, 5 droplets per replicate. The patterns were evaluated by means of the ImageJ software for their local connected fractal dimension (LCFD) values. The data was analyzed by means of the analysis of variance. Multiple mean comparison was carried out by Turkey's HSD test.

Results: NS strongly influenced both the biological effectiveness of the treatment (i) and the LCFD of the DEM patterns (ii). In particular: (i) the rate of germinated seeds significantly increased vs. C following treatments with NS \geq 32 for both As_{45x} and W_{45x}; (ii) all As_{45x} (NS=8, 32, 70) and W_{45x} with NS=70 significantly increased the LCFD of DEM patterns vs. C. Both approaches showed that UHD effects increase with the growing NS, even if there was a non complete correspondence of the significance levels.

Conclusions: Our results show that NS is an important parameter influencing the UHD effectiveness.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/669/664>

Int J High Dilution Res. 2013;12(44):115.

A new homeopathic potency promotes growth and yield of rice: a field trial.

Mondal S, Sukul nee Chunari S, Sukul NC.

Abstract

In a series of experiments conducted in an experimental garden and a small field during the last seven years we have observed that certain plant growth retardants promote growth of crops at ultra high dilutions. Potentized (2-chloroethyl) trimethyl ammonium chloride (CCC) proved most effective in increasing photosynthesis and plant growth. In homeopathy a substance, which produces morbid symptoms at high doses on healthy individuals, ameliorates the disease in a patient showing similar symptoms at ultra low doses. CCC 200cH was used in a field trial at the Rice Research Station, Govt. of West Bengal, Chinsurah, Hooghly, W. B during the wet

season on two varieties of rice plants. Following Hahnemann's principle CCC 200cH was prepared and CCC 200cH was diluted with water 1:100 and applied by foliar spray on rice plants 22 days after transplantation. A second treatment was given after 15 days. The control solution applied on an equal number of plots consisted of ethanol 200cH. No fertilizers and pesticides were applied in the plots under experiment. CCC 200cH significantly increased chlorophyll, protein and sugar in the leaves of both varieties of rice tested. The drug also increased the panicle length, and the percentage of fertile grains more than double as compared to the control. CCC 200cH treated groups significantly produced more tillers/plant than the control groups. However, plant height did not show any significant change between the control and the treatment groups. The yield in rice grains were significantly higher with CCC 200cH than with the control in both the varieties of rice. Treatment with CCC 200cH resulted in earlier inflorescence in both the varieties of rice than in the control. It is concluded that CCC 200cH promoted growth and yield in rice varieties tested under natural field condition.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/668/657>

Int J High Dilution Res. 2013;12(44):98-99.

New homeopathic potencies promote plant growth and development.

Sukul S, Sukul NC, Mondal S, Sukul A.

Abstract

Introduction: The extensive use of synthetic nitrogen fertilizer in agriculture is causing environmental damage, organic crops contain significantly more vitamin C, iron, magnesium and phosphorus and significantly less nitrates than conventional crops. In this situation it is desirable to find out suitable agents, which would increase plant growth without compromising with the quality of food and of soil. We have studied that potentized growth retardants, chlorocholine chloride CCC (2-chloroethyle trimethyl ammonium chloride) and maleic hydrazide, MH (1, 2-dihydro 3,6 pyridazinedin) can promote growth in pigeon pea *Cajanus cajan* (L.) Millsp; Lady's finger, *Abelmoschus aeculentus* (L) Moench; cow pea, *Vigna unguiculata* L. and in rice, *Oryza sativa* L. The aim of this work is to see if plant growth inhibitors serve as growth promoters at their ultra low doses .

Methods: We have selected two plant growth retardants viz., chlorocholine chloride CCC (2-chloroethyle trimethyl ammonium chloride) and maleic hydrazide, MH (1, 2-dihydro 3, 6 pyridazinedin). Then we prepared 30th potency of them and also 200th potency for CCC. Samples of CCC and MH were mixed separately with 90% ethanol at 1mg/ml and designated as mother tincture (MT). Each MT was diluted with 90% ethanol and succussed 10 times to prepare the 1st centesimal potency. In this way the 30th potency of two drugs and 200th potency of CCC was prepared. The controls ethanol 30th and 200th potency were prepared by succussion 90% ethanol 10 times and treated as 1st potency. Then mix 90% succussed ethanol with 90% ethanol in 1:100 and succussed, thus prepared 2nd centesimal potency. Likewise 30th and 200th potency of 90% ethanol were prepared. The 30th potency of CCC and MH and 200th potency of CCC were treated on 15 days old pigeon pea, *Cajanus cajan* (L.) Millsp grouped in four rows each with twenty pots. Just before drug application, each potency was diluted with sterile water 1:500 and applied by foliar spray. The

treatment was repeated on days 16, 17, 18, 21, 27, 33 and 42. Data were collected on day 75. Morphometric data such as plant height, number of branches, number of leaves/plant, root length and number of flower/plant were recorded. Biochemical parameters like total chlorophyll, sugar, carbohydrate and protein were assessed. The same experiments with CCC30c, CCC200c and MH 30c repeated on Lady's finger, *Abelmoschus aeculentus* (L) Moench. Here foliar spray of drugs in dilution of 1:500 were done on day 12 and 13. Data were collected on day 75. Morphometric data like shoot length, shoot girth, shoot weight, root length, root girth, root weight, number of leaves/plant, average leaf area, leaf weight and leaf water content were taken. Total leaf chlorophyll, protein and soluble and insoluble sugar were also estimated. The 30th potency of MH and CCC were treated on cow pea, *Vigna unguiculata* L. in 1:500 dilution by gently touch on both sides of leaf. The treatments were repeated twice after 15 days interval and final data were collected. Number of leaves/plant was recorded. Total leaf chlorophyll and protein estimated. Fast protein liquid chromatography (FPLC) was also done with the leaf material. 200th potency of CCC was sprayed on two rice (*Oryza sativa* L.) varieties viz., IET 4786-SHATABDI and IET 4094-KHITISH at Rice Research Station, Chinsurah. The drug was diluted 1:100 with distilled water and sprayed twice at fifteen days interval. Total leaf chlorophyll, protein, soluble sugar and carbohydrate were estimated. Panicle length, fertile grain percentage, number of tillers/plant, plant length and productivity /hectare were recorded. All statistical analyses were done by analysis of variance (ANOVA) followed by student –test.

Results: In all the cases significant increase in morphometric as well as biochemical parameters were observed. In pigeon pea MH30c showed comparatively poor performance in the growth promoting effect than the potentized CCC. In Lady's finger all the potentized drugs produced significant improvement in plant growth and increased significantly water, chlorophyll and protein content in leaves. The FPLC study of cow pea leaf protein revealed that CCC 30c induced expression of some new proteins which might have played a role in growth and development of the plant. CCC200c significantly increased yields in rice under field conditions.

Discussion: CCC in material doses inhibits the activity of the enzyme kaurene synthetase in the gibberellin (GA) biosynthesis pathway, resulting reduction in gibberellin formation. Potentized CCC has produced just the opposite effect and promotes the activity of the enzyme, resulting in increased biosynthesis of GA. As gibberellic acid biosynthesis pathway influenced chlorophyll and protein biosynthesis pathways, that is why total leaf chlorophyll and sugar and protein also increased in treated plants. GA also promotes floral initiation, sex determination and setting of fruit in plants, thus rice productivity was increased with CCC200c. MH in material doses acts as an inhibitor of the synthesis of nucleic acids and proteins as expected MH30c produced the opposite effect and enhanced nucleic acid synthesis and protein synthesis. Thus results to promote plant growth and development. These growth retardants in potentized forms increased photosynthesis and may help in carbon sequestration. Thereby indirectly they also help to lowering global warming and keep environment pollution free, in addition to reduce the application of fertilizers and maintaining soil ecosystem.

Link to abstract/paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/643>

Stimulative influence of germination and growth of maize seedlings originating from aged seeds by 2,4-D potencies.

[Dragicevic V](#), [Spasic M](#), [Simic M](#), [Dumanovic Z](#), [Nikolic B](#).

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Abstract

BACKGROUND: The 2,4-D (2,4-dichlorophenoxyacetic acid) is using as a growth regulator in tissue culture media. Maize seeds have poor ability to maintain germination rate in the long term.

OBJECTIVE: To examine the possible restorative effect of homeopathic 2,4-D potencies on maize seedlings originating from seeds damaged by accelerated aging.

METHODS: Seeds of four maize lines were subjected to accelerated aging stress treatment. Seed samples were treated with distilled water (control) and a range of potencies of 2,4-D: 3C, 3.75C, 4.5C, 5.25C and 6C. The germination capacity, fresh substance (FS) and length of root and shoot were determined. Hydrolysis and biosynthesis, GSH/GSSG ratio and redox capacity were calculated.

RESULTS: Induced seed aging decreased germination rate and growth of seedlings. 2,4-D potencies did not have a statistically significant effect on germination.

However, there were statistically significant effects on FS production, root and shoot length and redox capacity. The 3C potency had the largest effect on the FS accumulation, 4.5C increased root and shoot length, compared to control (statistically significant). The GSH/GSSG ratio and the redox capacity were decreased by aging. The 3C and 4.5C potencies tended to reverse the GSH/GSSG ratio (statistically significant) in the root and shoot, (i.e., shifted the redox balance to the reduced state).

CONCLUSION: Homeopathic potencies of 2,4-D appear to have a beneficial effect on artificially aged maize seeds: they stimulate growth through better substance conversion from seed rest, and shift the redox capacity towards a reduced environment. Further work is required to determine if this is an useful means of improving maize seed germination and growth.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/23870377>

Int J High Dilution Res. 2013;12(42):26-39.

Prestimulation of wheat seedlings with gibberellic acid followed by application of an agitated high dilution of the same hormone.

Hribar-Marko S, Graunke H, Scherer-Pongratz W, Lothaller H, Endler PC.

Abstract

In previous multicentre studies, the influence of a homeopathic ultra-high dilution of gibberellic acid on wheat growth was scrutinized. Data showed that this test dilution slowed down stalk growth when experiments were performed in the autumn season. The aim of this work was to test the hypothesis that pretreatment of grains with high concentrations of gibberellic acid would enhance the growth-inhibiting effect of the ultra-high dilution of the plant hormone. Grains of winter wheat (*Triticum aestivum*, 500 or 1000 per group) were pretreated with (non-agitated) gibberellic acid 10-5, 10-4 and 10-3 parts by weight (Ge-5, Ge-4, Ge-3) or with water ("W0") for control prior

to further treatment. Grains were then observed under the influence of extremely diluted gibberellic acid (10-30 parts by weight) prepared by stepwise dilution and agitation according to a protocol derived from homeopathy ("G30x"). Analogously prepared water was used for control ("W30x"). Seedlings were allowed to develop under standardized conditions for 7 days; plants were harvested and stalk lengths were measured. Of the four pretreatment variants under study, Ge-3 yielded most growth, followed by Ge-4, Ge-5 and finally W. This outcome was modulated by the application of G30x in that the inhibition obtained with G30x as compared to W30x was the greater the lower the pretreatment concentration of G had been. The hypothesis that pretreatment of grains with high concentrations of gibberellic acid would enhance the growth inhibiting effect of G30x had to be rejected. Rather, G30x slowed down stalk growth most in the W0 group with $p < 0.001$, only moderately in the Ge-5 and Ge-4 group and not at all in the Ge-3 group.

Link to paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/617/629>

Int J High Dilution Res. 2012;11(41):237-246.

Sepia 200cH at 1:1000 dilution ameliorates salt stress in cowpea seedlings but its medium 90% ethanol proves ineffective at the same dilution.

Sukul (nee Chunari) S, Mondal S, Sukul NC.

Abstract

Soil salinity severely affects crop yield all over the world. In a recent study we observed that Natrum mur 200cH, a homeopathic remedy, improved growth in germinating cowpea seeds. In the present study we have tested another remedy Sepia, which is complementary to Natrum mur, on cowpea seedlings under salt stress. Cowpea seedlings grown over moist filter paper in petridishes were divided into 4 groups: (1) control in sterile water, (2) in 50mM NaCl solution, (3) seeds pretreated with 90% ethanol diluted with water 1:100 and then transferred to 50mM NaCl solution, (4) seeds pretreated with Sepia 200cH diluted with water 1:100 and transferred to 50mM NaCl solution. In another experiment the groups were same, but the dilution of 90% ethanol and Sepia 200cH was 1:1000 instead of 1:100. The purpose was to further reduce the ethanol content in both the drug and its vehicle 90% ethanol, so that the alcohol effect is minimized or abolished. The data were analysed by ANOVA followed by t-test. Sepia 200cH at both 1:100 and 1:1000 dilutions significantly increased growth, sugar, chlorophyll, protein and water content in seedlings as compared to the untreated salt-stressed group. The effect with the 1000th dilution of Sepia 200cH was more pronounced than with its 100th dilution. The vehicle 90% ethanol at 1:100 dilution produced some positive effect on the seedlings, but the 1000th dilution of the vehicle produced no such effect. It is, therefore, concluded that Sepia 200cH could ameliorate salt stress in cowpea seedlings and that the 1000th dilution is more effective than its 100th dilution. The alcohol effect is totally eliminated with the 1000th dilution of 90% ethanol. Thus the 1000th dilution could retain the drug effect and eliminate the vehicle effect.

Link to paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/618/625>

Int J High Dilution Res. 2012;11(40):213-214.

Evaluation of the effects of homeopathic medicines on the germination seeds of *Brassica oleracea* L. var. *Italica*.

Barbosa IS, Valério TS, Siqueira CM, Salgueiro AM, Gomes MDN.

Federal Institute of Rio de Janeiro – IFRJ, Brazil

ABSTRACT

Background: Aiming to increase the productivity and achieve production levels that meet the market demands, agriculture makes use of pesticides and fertilizers. Fertilizers are natural or artificial substances that contain chemical elements and physical properties that enhance plant growth and productivity. However, the addition of fertilizers has generated environmental impacts that jeopardize the sustainability of agricultural ecosystems in the medium and long term. Fertilizers are associated with eutrophication of rivers and lakes, soil erosion, among others. The organic agriculture is an alternative for the use of additives, which aims to enhance the efficient use of nonrenewable natural resources, and utilization of renewable natural resources and biological processes aligned to biodiversity, the environment, economic development and quality of human life. The use of homeopathy for the cultivation of plants is into the organic agriculture. Homeopathic medicines can lead to greater plant growth, the elimination of pests and soil enrichment, without presenting environmental impacts, or damage to the consumer or for the handler.

Aim: The objective of this study was to find on the homeopathic medicine an alternative method for the use of fertilizers in order to increase the germination of broccoli (*Brassica oleracea* L. var. *Italica*).

Methodology: Agitated dilutions of phosphorus 6cH, 30cH and 200cH were prepared from homeopathic matrices in dilution 5cH according to the 3rd edition of the Brazilian Homeopathic Pharmacopoeia. The dilution and the agitation water on the same high dilutions above, are used as a growth control, in the same way, gibberellic acid, a hormone, widely used commercially as a fertilizer, is also used as control. The *Brassica oleracea* L. var. *Italica* seeds were disinfested and inoculated in Petri plates containing water (15 ml). All seeds were placed in a germination chamber kept at 20°C, photoperiod 16 hours light and 8 hours dark, for 10 days. The applications were made every 2 days and each experimental unit comprised 20 seeds in triplicate. Variables assessed included: germination percentage and germination speed index.

Results: In preliminary experiments the phosphorus 6cH showed differences between the groups treated, the germination occurred faster and regular, better than gibberellic acid. More tests are required with other seeds lots.

Conclusion: A quickly, regular and more complete germination is expected when used homeopathic drugs. Rather than use substances harmful to human health, such as fertilizers but gaining it's same efficiency with a less aggressive results for the plant and for who will eat it or work with agriculture.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/576/621>

Int J High Dilution Res. 2012;11(40):196-197.

Reproducibility of effects of the homeopathic dilutions 14x – 30x of gibberellic acid on growth of *Lemna gibba* L.

Majewsky V, Scherr C, Arlt SP, Klocke P, Baumgartner S.

Abstract

Background: Reproducibility of investigations in homeopathy is still challenging. Duckweed (*Lemna gibba* L.), a monocotyledonous waterplant which mostly reproduces vegetatively and therefore builds genetically identical clones, may be a suitable test system for standardised trials.

Aims: This study investigated if formerly observed effects of gibberellic acid 14x – 30x on growth of *Lemna gibba* were reproducible.

Methodology: Duckweed was grown in dilutions of gibberellic acid (14x–30x) as well as once succussed (c1) and unsuccussed (c0) water control. Area-related growth rate for day 0–7 was determined by a computerised image analysis system. Three series including five independent blinded and randomised experiments each were carried out in the same way as in the original study. Only time and conductor of experiments were modified. System stability was controlled by three series of systematic negative control (SNC) experiments with the same set-up, but distilled and autoclaved water was used as the only test substance. According to the series with gibberellic acid, each serie of SNC experiments included five experiments. Full two-way ANOVA ($\alpha = 5\%$) was used for statistical analysis. Independent variables were treatment and experiment number, dependent variable was $r(\text{area})$ for day 0–7. Data of each experiment was normalised to its mean value to allow a better comparison between experiments. Only if the global ANOVA F-test was significant ($p < 0.05$) we compared the investigated groups with Fisher`s LSD test (protected Fisher`s LSD).

Results: No specific effects of agitated dilutions of gibberellic acid were found in the first two replication series ($p=0.263$ and $p=0.062$). In the third serie with gibbous *Lemna gibba* L. we observed a significant effect ($p=0.009$) of the homeopathic treatment, however growth was increased in contrast to decreasing in the former study. Variability in experiments with gibberellic acid 14x – 30x was lower than in SNC experiments. The stability of the experimental system was verified by the SNC experiments.

Conclusions: When designing new studies to investigate reproducibility, different physiological states of the test organism must be considered. Variability might be an interesting parameter to investigate effects of homeopathic remedies in basic research.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/598/605>

Int J High Dilution Res. 2012;11(40):185-186.

The activity of enzymes can be modified by homeopathic dilutions of their effectors.

Malarczyk E.

Abstract

Introduction: The fungal and bacterial materials are very useful for testing the influence of low and very low doses of low molecular phenolic effectors on enzymatic system of phenoloxidases when they are incubated together in the reaction space.

Aim: Searching for the model useful biological systems to study the action of diluted

low molecular substances on living organisms, which is based on common physical and biochemical analytical procedures. Methods: The fungal and actinomycetal bacterial materials from laboratory cultures as a source of common phenoloxidases, laccase, peroxidase and O-demethylase as well as the pure plant peroxidase were used in experiments described earlier [1-5]. Subsequent dilutions of low molecular phenolic metabolites, appropriate for studied enzymatic systems, prepared in 75% ethanol in the proportion of 1:100 (centesimal) and dynamized by shaking in accordance with homeopathic procedures were prepared in our laboratory. During experiments with bacterial and fungal materials and a pure plant peroxidase, which were incubated together with subsequent dilutions of proper phenolic effector, different analytic methods were used including a gel (PAGE) [4] and capillary (MEKCE) electrophoresis [5], spectral and colorimetric methods [1,2,3] as well as the electron microscopy [5]. Results: In the light of presented data [1-5], the incubation of biological material with diluted phenolic effectors induces various effects on tested enzyme activity. It changed in sinusoidal manner with an gradual growth of dilution rate of tested effectors, which was distinctly visible on the diagram when the number of dilutions was localized on abscissa and biological activity on the ordinate. Exemplary results of the chosen experiments will be presented. For tested enzymes: laccase, peroxidase and O-demethylase, the distance between maximal points of enzymatic activity, shown on a sine curve, repeats more often every 10 subsequent centesimal dilutions. Along with the extension of incubation period the displacement of maximal and minimal points on curve were noticed, which revealed a dynamic aspect of studied phenomenon. Conclusions: Fungal and bacterial cells seem to be a very convenient material for studying the action of diluted metabolites on enzymatic systems because their popular presence in environment. Results of all experiments confirmed the same nature of the mentioned observations. Because other authors had similar conclusion concerning human [6,7] and plant materials [8,9], the described relations seem to be common in natural world. It could also be stressed that the therapeutic effect of homeopathic remedies could be based on the mechanism described above and it is highly probable that it leads to a normalisation of disturbed enzyme systems in the living organisms.

Link to abstract/paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/565>

Int J High Dilution Res. 2012;11(40):182-183.

Plant substrate as a vehicle for trituration: a pilot study.

dos santos Junior AF, de Oliveira ER, Verginelli RM, Zacharias CR.

Abstract

Motivation: Lactose and hydroalcoholic solutions are not the proper substances to study the High Dilution (HD) effects using plant models. Plant substrate can not be considered an inert vehicle, but it is not harmful to plants.

Aim: In this pilot study we verify the possibility to use plant substrate as a trituration vehicle to prepare substances to be used in plants.

Methods: We used a partially dried commercial plant substrate (12% humidity) as the vehicle to prepare a set of trituration, having NaCl as the initial active substance.

Triturations were performed using a ball mill, with a mass dilution rate of 1:18 (set A) and 1:100 (set B), up to the 7th trituration, that is, each set contained 8 groups: A0 to A7 and B0 to B7. For each group, the triturated substrate was mixed with a fresh one

in a mass ratio of 1:1. After homogenization, 18 seeds of radish (*Raphanus sativus*) were sown in plastic trays (31 ml cell), for each group and kept in a green house exposed to natural thermal and light variations. After 4 weeks we determine the germination rate and number of mature cotyledon. Then 5 plants from each group were selected at random to determine the following parameters: averaged leaf area, length, fresh and dry mass and pigments amount (chlorophyll a and b, carotenes). Results: Groups A0 and B0 (higher saline concentration) showed those typical effects of saline stress: lower germination ratio, immature cotyledons, smaller and shorter leaves, higher water content and less pigments. All the others groups showed similar results, for all parameters, except pigments amount. The chlorophyll to carotene ratio (CCr) showed an unexpected but interesting behavior (figure 1). Both sets showed an initial CCr growing (as expected due the saline ratio decrease), but followed by an unexpected decrement. Set B (the higher mass dilution rate, 1:100) showed a slower change, compared to set A. When we sort the results in order of saline amount we observe two peaks (figure 2), indicating that this behavior can not be explained by the saline stress.

Conclusions: Trituration using plant substrate as vehicle can be suitable to assess HD effects in plant models. In this pilot study we observed unusual results regarding to the expected saline stress due the saline concentration.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/558/597>

Int J High Dilution Res. 2012;11(40):161-162.

Phytopathological and nutraceutical evaluation of cauliflower plants treated with high dilutions of arsenic trioxide.

Trebbi G, Dinelli G, Marotti I, Bregola V, Brizzi M, Betti L.

Abstract

Introduction: This research aimed at verifying the effects of highly diluted (HD) treatments on cauliflower (*Brassica oleracea* L.) plants both healthy and inoculated by the fungus *Alternaria brassicicola*, causing the dark leaf spot disease. *In vitro* spore germination assays (A), growth chamber experiments (B) and field trials (C) were performed.

Material and Methods: (A): spore suspensions were prepared in HD treatments and their inhibiting effect on germination was recorded microscopically after incubation at 25°C for 5 h. (B): the same treatments were tested in plants artificially inoculated with the fungus. The infection level on leaves was blindly evaluated by a previously defined infection scale. (C): the field was divided into plots according to a complete randomized block design. In the first trial (i), plants were artificially inoculated and weekly treated; the infection level was evaluated on cauliflower heads. The second trial (ii) was performed on the same field with the aim to induce a natural infection, mediated by infected crop residues. Measurement endpoints concerned the evaluation of some physiological parameters along with the glucosinolate content on cauliflower heads.

Results: (A): arsenic trioxide (As 35x and 35x diluted 1:5000) and *Cuprum* 5x induced highly significant inhibition of germination rate (-60%) vs. control. (B): As 35x and Cu 3 g/l induced a significant decrease of mean infection level (-50%). (C): in (i),

a significant reduction of disease symptoms on heads was recorded for As 35x and Cu 3 g/l (-45%). In (ii) natural fungal infection did not occur due to dry weather conditions; physiological and nutraceutical analyses of healthy heads demonstrated that As 35x induced a significant increase of both head size and glucosinolate content.

Discussion: Some evidences on the efficacy of arsenic, at different decimal and centesimal HD, in fungal and viral disease control were previously reported [1]. In the present study the efficacy of HD arsenic in dark leaf spot control in field has been shown for the first time: since fungal inoculation was performed on the leaves before flowering, we can hypothesize that this treatment induced an increase of plant resistance to fungal infection.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/572/573>

Int J High Dilution Res. 2012;11(40):140-141.

Use of plant bioassays in homeopathic basic research – a systematic review.

Baumgartner S, Betti L, Heusser P, Jäger T, Scherr C, Majewsky V, Wolf U.

Abstract

Background: Experimental research on the effects of treatments with homeopathic preparations on plants was systematically reviewed in three research areas (unstressed plants, abiotically stressed plants, and phytopathological models) in 2009/2011.

Aims: The objective of this study was to compile a synthesis of these three recent systematic literature reviews to obtain a general overview on the use of plant bioassays in homeopathic basic research.

Methods: Literature search was carried out on publications that reported experiments with homeopathic preparations on whole plants, seeds, plant parts or cells from 1920 to 2010, in healthy, abiotically or biotically stressed conditions. Outcomes had to be measured by established state-of-the-art procedures and statistically evaluated.

Using a Manuscript Information Score (MIS) those publications were identified that provided sufficient information for proper interpretation (MIS > 5). Further evaluation focused on the use of adequate controls to investigate specific effects of homeopathic preparations and on the use of systematic negative control experiments to ensure proper system performance.

Results: A total of 157 publications with plants were identified. The 157 publications described a total of 167 experimental studies. 84 studies included statistics and 48 had a MIS > 5 allowing proper interpretation. 29 studies were identified with adequate controls to identify specific effects of homeopathic preparations, reporting significant effects of decimal and centesimal homeopathic potencies, including dilution levels beyond Avogadro's number. Studies that tested series of consecutive potency levels reported a non-linear and discontinuous relation between effect and potency level. There were many individual studies with diverse methods and very few replication trials. 10 studies reported use of systematic negative control experiments, yielding evidence for the stability of the experimental set-up.

Conclusions: Plant models appear to be a useful approach to investigate basic research questions on homeopathic preparations, but more independent replication trials and systematic research are needed. Systematic negative control experiments

should be implemented on a routine basis to exclude false-positive and false-negative results.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/571/610>

Int J High Dilution Res. 2012;11(40):129-130.

Comparative study of two bioassays with weakened duckweed and yeast treated with homeopathic preparations.

Jäger T, Scherr C, Simon M, Heusser P, Wolf U, Baumgartner S.

Abstract

Background: In homeopathic basic research, the question as to the most adequate test systems and apt methodology is still open.

Aims: This investigation examined the hypothesis that more complex organisms show stronger reactions to homeopathic remedies than less complex ones. We compared two Arsenic (As5+) stressed bioassays with duckweed (*Lemna gibba*, a multi-cellular autotrophic organism) and yeast (*Saccharomyces cerevisiae*, a single-cellular heterotrophic organism) regarding their response to homeopathic preparations [1].

Methods: For duckweed, growth rates of leaf area and leaf number were evaluated. For yeast, growth kinetics were determined by measuring slope, yield and Et50 (point in time when yield was half maximum) of the sigmoid growth curve. The experiments with duckweed and yeast were performed in parallel (same day, same location and identical homeopathic preparations).

Results: After screening 17 substances, three homeopathic preparations (*Arsenicum album*, *nosode*, *gibberellic acid*) were chosen for repeated experimental series [2].

Five independent experiments were conducted for each remedy with both organisms in parallel. Potency levels used were in the range of 17x–33x for duckweed and 17x–30x for yeast. To control for test system stability, systematic negative control experiments were conducted over the complete experimentation period. All experiments were blinded and randomized. The systematic negative control experiments did not yield any significant effects. Application of potentized *Arsenicum album* in the duckweed bioassay yielded the largest effects compared to water controls without remedies for the parameters leaf area and leaf number ($p < 0.001$) [1, 3]. Potentized *nosode* preparations also had significant effects on duckweed's leaf area and leaf number ($p < 0.01$). Growth was enhanced across all potency levels. In the yeast system the three homeopathic remedies did not show any significant effects on any growth curve parameter.

Conclusions: The results obtained are in line with the hypothesis, that more complex organisms show stronger reactions to homeopathic remedies than less complex organisms. The test system with *Lemna gibba*, the stressor arsenic (As5+) and the homeopathic preparation *Arsenicum album* is suitable to further investigate factors influencing the quality and effects of potentized substances [4].

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/574/569>

Int J High Dilution Res. 2012;11(40):128.

Natrum mur 200c promotes seed germination and increases total protein, chlorophyll, rubisco and sugar in early seedlings of cowpea under salt stress.

Mondal S, Sukul NC, Sukul S.

Department of Botany, Visva-Bharati University, Santiniketan, West Bengal, India.

Abstract

Background: High level of salinity deteriorates seed germination, growth and yield of crops in cultivated lands all over the world. There is no effective remedy to mitigate this global problem. Homeopathy offers a remedy like *Natrum mur* which at ultra high dilution ameliorates diseases of patients having strong desire for salt consumption.

The purpose of the present study is to see whether potentized *Natrum mur* could alleviate salt stress in germinating seeds of cowpea *Vigna unguiculata* (L) Walp.

Methods: Water-soaked seeds were kept over moist filter paper in covered petridishes which were divided into 5 groups: (1) unstressed and untreated control in sterile distilled water, (2) in 100mM sodium chloride solution, (3) seeds pretreated with *Natrum mur* 200c and then kept in sterile distilled water, (4) seeds pretreated with *Natrum mur* 200c and then transferred to 100mM NaCl solution and (5) seeds pretreated with 90% ethanol. Both *Natrum mur* 200 c and its diluent medium 90% ethanol were diluted with distilled water 1:100 before use for treatment.

Results: *Natrum mur* 200c increased the rate of seed germination, seed water content and growth of seedlings. The drug also enhanced chlorophyll, soluble and insoluble sugar, rubisco and total protein content as compared to the untreated salt stressed group. Treatment with *Natrum mur* 200c increased salt tolerance in the seedlings as compared to the untreated salt stressed group. All the data were analyzed by ANOVA and the significance level was not less than 1%.

Conclusion: *Natrum mur* 200c reversed the effects of salt stress in germinated seeds thereby providing evidence for Hahnemann's similia principle in plants. Potentized *Natrum mur* could be safely used with profit on plants grown on brackish soil.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/570/578>

Int J High Dilution Res. 2012;11(40):124-125.

Pre stimulation by gibberellic acid and the effect of extremely diluted agitated gibberellic acid on wheat stalk growth.

Hribar-Marko S, Scherer-Pongratz W, Lothaller H, Endler PC.

Abstract

Background: In previous multicentre studies[1,2], the influence of a homeopathic ultra high dilution of gibberellic acid on wheat growth was scrutinized. Data showed that this test dilution slowed down stalk growth when experiments were performed in autumn season.

Aim: To test the hypothesis that pre treatment of grains with high concentrations of gibberellic acid will enhance the effect of the ultra high dilution of the plant hormone

Methods: Grains of winter wheat (*Triticum aestivum*) were observed under the influence of extremely diluted gibberellic acid (10-30) prepared by stepwise dilution

and agitation according to a protocol derived from homeopathy ("G30x"). Analogously prepared water was used for control ("W30x"). Grains (500 or 1000 per group) were pre treated with (not agitated) gibberellic acid 10-5, 10-4 and 10-3 ("Ge-5, Ge-4, Ge-3") or with water ("W") for control prior to treatment with G30x or W30x. Seedlings were allowed to develop under standardized conditions for 7 days; plants were harvested and stalk lengths were measured.

Results: With regard to pre treatment, it can be seen that the groups treated with Ge-3 showed most growth, followed by the Ge-4 groups, the Ge-5 groups and the non pre treated W groups. This decline is modulated by the application of G30x and W30x (figure 1). The lower the pre treatment concentration of G, the more marked is a slowing down effect of G30x versus W30x.

Conclusion: The hypothesis that pre treatment of grains with high concentrations of gibberellic acid will enhance the effect of G30x had to be rejected. In contrast, G30x slowed down stalk growth in the W group with $p < 0.001$ but only moderately in the Ge-5 and Ge-4 group and not at all in the Ge-3 group.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/605/577>

Int J High Dilution Res. 2012;11(40):122-123.

From Kolisko to nowadays: progresses and discoveries in agro-homeopathy.

Dinelli G, Marotti I, Trebbi G, Betti L.

Abstract

The use of ultra-diluted preparations method in agriculture was introduced with agro-homeopathy, which allows to influence biological processes of plants by either accelerating or delaying growth. Moreover, it can contribute to the control of plagues and diseases, directly promoting an increase of the yield and an improvement of product qualitative traits. Since the pioneering works of Kolisko on wheat germination [1] and Junker on growth of microorganisms (paramecium, yeast, fungi) [2], in the last 30 years work has flourished from independent researchers from worldwide (Americas, Europe and Australasia). The international research works on agro-homeopathy can be conceptually divided in two main groups: effects of ultra-diluted preparations on crop growth and applicability for crop disease control. The first type of investigations usually are carried out on both healthy organisms for determining the growth stimulation of treatments and on abiotically stressed plants (i.e. heavy metal over-exposition, salt excess, water and nutrients deficiency) for determining the re-growth stimulation of ultra-dilutions [3,4]. The second type of investigations are usually performed on artificially diseased organisms (i.e. fungal and viral pathogens or nematode infection), which may react more markedly to homeopathic treatments than healthy ones [5]. Unfortunately, on the basis of the extensive critical review of published papers, there is little firm evidence to support the reliability of the reported results. Except for a limited number of publications, the most common drawbacks of agro-homeopathy researches are the poor experimental methodology and the inadequate statistical analysis. Moreover, since there is no agricultural homeopathic pharmacopoeia, much work is required to find suitable remedies, potencies and dose levels. Considering the criticism on the practical applicability of ultra-diluted preparations, in order to be accepted as a valid part of agricultural practices a well structured research strategy for agro-homeopathy is needed. This is

often hampered by methodological problems as well as by the general underinvestment on the academic and nonacademic research structures. Fundamental researches based on collaborative approaches (i.e. ring tests on selected crop models) and on common experimental protocols (i.e. statistical robustness) are the keys for determining the worldwide acceptability of agro-homeopathy as a sustainable agro-technique.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/585/613>

Int J High Dilution Res. 2012;11(40):115-116.

Droplet evaporation patterns of wheat seed leakages differ following treatments with arsenic at ultra-high dilution level.

Kokornaczyk MO, Borghini F, Dinelli G, Marotti I, Trebbi G, Betti L.

Abstract

Introduction: “Agro-homeopathy” plays an important role in sustainable agriculture providing cost-saving and residue-free plant treatments for the improvement of yield and the management of diseases and pests [1]. However, one of the main difficulties in “agro-homeopathy” is the exact choice of the right remedy and dilution, which requires the performance of many time-consuming trials. The droplet evaporation method could constitute a screening method for evaluating the efficacy of extremely low doses and high dilutions on plants. Droplet patterns prepared out of wheat seed leakages show differences in their complexity in relation to the seed vigour [2]. Here we show that this structure-forming capacity of seed leakages prepared in water or in ultra-high diluted (UHD) solutions may give a reliable picture of the treatment’s stimulating or inhibiting influence on plant vitality.

Materials and Methods: Part of the seeds was stressed with 0.1% As₂O₃ (As) aqueous solution [3]. The droplet patterns were prepared out of four samples: non-stressed (ns) seeds in water, ns-seeds in As 45x, stressed (s) seeds in water, s-seeds in As 45x. The experiment was performed in a 3 day repetition, 3 replicates per day, and 5 droplets per each replicate. The resulting patterns were evaluated by means of the ImageJ software [4] for their local connected fractal dimension (LCFD) values. The plant vigour of the four samples was evaluated by means of in vitro wheat growth [5, 6].

Results: The mean LCFD of patterns deriving from s-seeds was significantly lower (1.4) vs. ns-seeds (1.7). Moreover, for both ns- and s-seeds, the LCFD was significantly higher with treatment As 45x vs. water (1.8 vs. 1.7 for ns-seeds, and 1.5 vs. 1.2 for s-seeds). The results of the growth test showed a significant vigour decrease caused by As stress (shoot length 19.7mm) vs. ns-seeds (22.4mm); a significant stimulating effect following As 45x treatment was observed for both s-seeds (25.1mm) and ns-seeds (31.4).

Discussion: The droplet patterns seem to be a sensitive tool for visualizing the effectiveness of UHD on seeds. The experiment showed that the pattern complexity increased with the application of the treatment for both ns- and s-seeds. The growth test provided a further verification of these results.

Conclusions: Further confirmations are required, but even as it is now the droplet evaporation method may be considered a promising tool for “agro-homeopathic” screening tests.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/564/595>

Int J High Dilution Res. 2012;11(39):60-68.

Water as carrier of information of heat shock and drug effect between two groups of *Adhatoda vasica* plants.

Mondal S, Sukul S, Sukul NC.

Abstract

Adhatoda vasica Nees plants were grown in 50 earthen pots, which were divided into 5 batches A, B, C, D, and E. Of these A, B and C, D were arranged into two separate parallel pairs. One leaf of each plant of an adjacent pair was immersed in sterile tap water in a beaker. Adjacent beakers in each pair A B or C D were connected by polythene tubes containing wet cotton threads. One leaf of each plant of A was given heat shock by immersing a leaf in hot water for 5 min. One leaf of each plant of C was treated with *Cantharis vesicatoria* 200c. Batch E served as the unstressed and untreated control. One hour after heat shock or drug treatment all the leaves were harvested and their proteins were extracted by chilled protein extraction buffer. Proteins were separated by Fast Protein Liquid Chromatography (FPLC). Protein profiles of A, B and C, D showed marked similarity with respect to expression and repression of some proteins. It is concluded that the effect of heat shock and drug treatment is transmitted through water in the capillaries of cotton threads connecting the pairs of plants. It is assumed that heat shock or drug treatment altered locally the water structure in the leaves which was propagated through global network of water structure over the protein network in the whole plants, and from there to the interfacial water in the beakers and cotton threads. A homeopathic potency is thought to be specifically structured water which influences the water structure in the treated organism.

Link to abstract/paper: <http://connection.ebscohost.com/c/articles/78395038/water-as-carrier-information-heat-shock-drug-effect-between-two-groups-adhatoda-vasica-plants>

Int J High Dilution Res. 2012;11(39):45-59.

Wheat germination and highly diluted agitated gibberellic acid (10⁻³⁰) - a multi researcher study.

Kiefer P, Matzer W, Schiestl S, Hartung H, Schwärzler I, Seunig R, Hofäcker J, Endler PC.

Evid Based Complement Alternat Med. 2012;125945. Epub 2012 Aug 27.

Development of a biocrystallisation assay for examining effects of homeopathic preparations using cress seedlings.

[Baumgartner S](#), [Doesburg P](#), [Scherr C](#), [Andersen JO](#).

Institute of Complementary Medicine KIKOM, University of Bern, Insel-Spital, 3010 Bern, Switzerland.

Abstract

A major challenge in basic research into homeopathic potentiation is to develop bioassays that yield consistent results. We evaluated the potential of a seedling-biocrystallisation method. Cress seeds (*Lepidium sativum* L.) germinated and grew for 4 days in vitro in Stannum metallicum 30x or water 30x in blinded and randomized assignment. 15 experiments were performed at two laboratories. CuCl₂-biocrystallisation of seedlings extracted in the homeopathic preparations was performed on circular glass plates. Resulting biocrystallograms were analysed by computerized textural image analysis. All texture analysis variables analysed yielded significant results for the homeopathic treatment; thus the texture of the biocrystallograms of homeopathically treated cress exhibited specific characteristics. Two texture analysis variables yielded differences between the internal replicates, most probably due to a processing order effect. There were only minor differences between the results of the two laboratories. The biocrystallisation method seems to be a promising complementary outcome measure for plant bioassays investigating effects of homeopathic preparations.

Link to paper:

<https://www.google.co.uk/search?q=Development+of+a+biocrystallisation+assay+for+examining+effects+of+homeopathic+preparations+using+cress+seedlings.&ie=utf-8&oe=utf-8&aq=t&rls=org.mozilla:en-GB:official&client=firefox-a>>

J Homeopath Ayurv Med. 2012;1(1):1-7.

Homeopathic medicines protect environment, health and development by controlling mulberry disease.

Datta SC, Datta R.

Abstract

Plant diseases, caused by pathogens, significantly reduce food production particularly in the developing world where farmers have little knowledge of these pests. In sericulture, mulberry is an economical plant because silk production depends on the nutritive quality of the leaves which is hampered by various pathogen attacks like nematodes, fungus, virus, bacteria and insects etc. Recently, synthetic- and chemical- pesticides are the most effective means of control, but they are both expensive and environmentally unfriendly. The “evils” of synthetic- and chemical- pesticides has been a major concern to environmentalists. The use of chemical pesticides may achieve a measure of control of those mulberry diseases but there remains the problem of residual toxicity in the treated plants and this toxicity results in reduced palatability of the leaves to the feeding silkworm larvae, reduction in growth of the larvae and also in silk production. These are serious issues which directly cause crises of financial losses, food productions, and climatic changes, but in combination, their impact could be catastrophic for the global economy. To move forward will require new and more efficient solutions, technologies and products. Climate change and resource productive economies are now universally recognized as a significant global environmental challenge. To meet the challenge of the problems, a number of plant bio-nematicides though effective

and easily biodegradable are not easily available in large quantities from natural sources and isolation of only a small quantity of an effective metabolites requires huge quantities of plant materials. This would result in rapid depletion of natural resources, particularly in tropical regions. Indiscriminate use of plant resources have already created problem of biodiversity conservation in the world. Bio-nematicides from animal origin (like nematode extract) reduce nematodes infestation in different plants and root callous by using their defenserresponse against nematode infection. But it remains as a problem. To conquer this situation, the only 'Homeopathy' can solve all the above mentioned problems. Here, Homeopathic medicines; Cina, prepared from the flowering meristems of *Artemisia nilagirica* (Clarke) pamp and Aakashmoni, prepared from the funicles of *Acacia auriculiformis* A. Cunn, mixed with distilled water @ 7.2 mg/ml, were applied by foliar spray once daily for 15 days @ 10ml/plant on mulberry (*Morus alba* L., cv. S1) are highly effective in ameliorating mulberry diseases; root-knot [*Meloidogyne incognita* (Kofoid and White) Chitwood], leaf spot [*Cercosporam moricola* (Cooke)], powdery mildew [Phyllactinia corylea (Pers.) Karst], mosaic disease (mosaic virus) and tukra disease [*Maconellicoccus hirsutus* (Green)]. Both the drugs also improve the plant growth effectively which directly increase photosynthesis rate and significantly reduce CO₂ in the environment. Both the drugs also improve the growth of silkworms, shell weight, sex ratio percentage [SR%] and egg laying capacity of mother moth and also increase silk production and effective rate of silkworms rearing [ERR] commercially which directly enriches sericulture industry as well as agriculture sector. These cost-effective homeopathic medicines are easily available, biodegradable, non-phytotoxic and non-pollutant as well as conserve our biodiversity which will contribute towards "Sustainable Environment, Health and Development".

Link to paper: <http://www.omicsgroup.org/journals/2167-1206/2167-1206-1-104.php?aid=4121>

Acta Sci. Agron. 2012;34(2):201-206.

The effect of high dilutions of *Pulsatilla nigricans* on the vigour of soybean seeds subjected to accelerated aging.

da Silva HA, Parizotto AV, Moreira FC, Marques RM, Reis B, Bonato CM.

Abstract

The aim of this study was to evaluate the effect of high dilutions of *Pulsatilla nigricans* in dinamisations 6, 12, 18, 24 and 30 CH on the vigour of soybean seeds subjected to accelerated aging. The experiment was conducted according to a randomised design with 6 treatments and 10 replicates. The treatments consisted of dinamisations 6, 12, 18, 24 and 30 CH and a distilled-water control. After the treatments, the seeds were subjected to accelerated aging (48h at 42°C) in a growth chamber (25 ± 2°C). The study evaluated the germination, the length of primary roots and shoots, the fresh weight of roots and shoots and the enzymatic activity of peroxidase (POX-EC1.11.1.7). The variables were analysed by ANOVA, and the means were compared using the Scott-Knott test (p = 0.05). The germination and the fresh weight of roots and shoots of the seedlings treated with *Pulsatilla nigricans* were higher than the water control, except that CH 30 did not significantly increase the fresh weight of shoots. The dinamisations 6, 24 and 30 CH produced a lower primary root length compared with the control. The dinamisations 12, 18 and 30 CH

yielded a greater length of shoots. The total length of seedlings was reduced by the high dilutions 6 and 24 CH.

Link to paper: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1807-86212012000200012&lng=en&nrm=iso

J. Curr. Chem. Pharm. Sc. 2012;2(1),37-49.

Homeopathic Medicine Aakashmoni 200C Control Mulberry Diseases Enriching Sericulture.

Datta SC, Datta R.

Abstract

Homeopathic medicine Aakashmoni 200C, prepared from the funicles of *Acacia auriculiformis* A. Cunn, mixed with water @ 7.2 mg/mL, were applied by foliar spray once daily for 15 days @ 10 mL/plant on mulberry are highly effective in ameliorating mulberry diseases like root-knot [*Meloidogyne incognita* (Kofold & White) Chitwood], leaf spot [*Cercosporam moricola* Cooke], powdery mildew (*Phyllactinia corylea* (Pers.) Karst], mosaic disease (mosaic virus) and tukra disease [*Maconellicoccus hirsutus* (Green)]. It also improves the growth of silkworms, shell weight, effective rate of silkworms rearing, sex ratio percentage and egg laying capacity of mother moth which commercially increased silk production without disturbing biosphere.

Link to paper:

http://www.sadgurupublications.com/ContentPaper/2012/6_118_JCCPS_2%281%292012_P.pdf

Nat Prod Commun. 2011 Oct;6(10):1499-504.

Characterization of essential oil and effects on growth of *Verbena gratissima* plants treated with homeopathic phosphorus.

[Santos FM](#), [Monfort LE](#), [Castro DM](#), [Pinto JE](#), [Leonardi M](#), [Pistelli L](#).

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Abstract

Plant models offer a method to examine the efficacy of homeopathic solutions. Homeopathic Phosphorus (P) dynamizations were evaluated on the linear growth and dry biomass of *Verbena gratissima*, a plant native to Brazil. The yields and chemical characterization of the essential oil are also given. Plants exhibited phenotypic plasticity after the homeopathic Phosphorus treatments. The dynamization 9CH, in particular, interfered with plant growth, height, diameter of stems and total dry mass. 9CH treatment showed the highest yield of essential oil. The essential oil composition of *V. gratissima* varied according to the different dynamization used. Homeopathic Phosphorus provided the greatest amount of beta-pinene, trans-pinocarveol, trans-pinocamphone and trans-pinocarvyl acetate in comparison with controls.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/22164793>

Homeopathy. 2011 Oct;100(4):275-87. doi: 10.1016/j.homp.2011.05.008.

Use of homeopathic preparations in experimental studies with abiotically stressed plants.

[Jäger T](#), [Scherr C](#), [Shah D](#), [Majewsky V](#), [Betti L](#), [Trebbe G](#), [Bonamin L](#), [Simões-Wüst AP](#), [Wolf U](#), [Simon M](#), [Heusser P](#), [Baumgartner S](#).

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Abstract

BACKGROUND: Experimental research on the effects of homeopathic treatments on impaired plants was last reviewed in 1990.

OBJECTIVES: To compile a systematic review of the existing literature on basic research in homeopathy with abiotically stressed plants using predefined criteria.

METHODS: The literature search was carried out on publications that reported experiments on homeopathy using abiotically stressed whole plants, seeds, plant parts and cells from 1920 to 2010. Outcomes had to be measured by established procedures and statistically evaluated. Using of a Manuscript Information Score (MIS) we identified those publications that provided sufficient information for proper interpretation (MIS≥5). A further evaluation was based on the use of adequate controls to investigate specific effects of homeopathic preparations and on the use of systematic negative control experiments.

RESULTS: A total of 34 publications with abiotically stressed plants was identified, published between 1965 and 2010. The 34 publications described a total of 37 experimental studies. Twenty-two studies included statistics, 13 had a MIS≥5, 8 were identified with adequate controls and 4 with negative control experiments. Significant and reproducible effects with decimal and centesimal potencies were found, including dilution levels beyond Avogadro's number. One experimental model was independently assessed by another research team and yielded inverted results compared to the original trial.

CONCLUSIONS: Abiotically stressed plant models seem to be a useful approach to investigate homeopathic basic research questions, but more experimentation and especially more independent replication trials are needed. Systematic negative control experiments should be implemented on a routine basis to exclude false-positive results.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/21962204>

ScientificWorldJournal. 2011;11:1667-78. doi: 10.1100/2011/462736. Epub 2011 Sep 26.

Seasonal variation of the effect of extremely diluted agitated gibberellic acid (10e-30) on wheat stalk growth: a multi researcher study.

[Endler PC](#), [Matzer W](#), [Reich C](#), [Reischl T](#), [Hartmann AM](#), [Thieves B](#), [Pfleger A](#), [Höföcker J](#), [Lothaller H](#), [Scherer-Pongratz W](#).

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Abstract

The influence of a homeopathic high dilution of gibberellic acid on wheat growth was studied at different seasons of the year. Seedlings were allowed to develop under standardized conditions for 7 days; plants were harvested and stalk lengths were measured. The data obtained confirm previous findings, that ultrahigh diluted potentized gibberellic acid affects stalk growth. Furthermore, the outcome of the study suggests that experiments utilizing the bioassay presented should best be performed in autumn season. In winter and spring, respectively, no reliable effects were found.

Link to paper: <http://www.hindawi.com/journals/tswj/2011/462736/>

Complement Ther Med. 2011 Jun;19(3):164-169. doi: 10.1016/j.ctim.2011.03.001. Epub 2011 May 20.

The effect of extremely diluted agitated gibberellic acid (10e-30) on wheat stalk growth--a two researcher pilot study.

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Abstract

OBJECTIVE: Use of a wheat growth bio assay after 7 days in research on homeopathic dilutions of gibberellic acid.

METHODS: Grains of winter wheat (*Triticum aestivum*, Capo variety) were observed under the influence of extremely diluted gibberellic acid (10(-30)) prepared by stepwise dilution and agitation according to a protocol derived from homeopathy (30×). Analogously prepared water was used for control. In a two centre study, 3 experiments with a total of 4880 grains were performed.

RESULTS: Data were found to be rather homogeneous within the control group as well as within the verum group in general. Germination rates were around 95%, with no significant difference between verum and control group ($p > 0.05$). Mean stalk lengths (mm) were 40.63 ± 20.96 for the verum and 44.33 ± 21.11 for the control group (mean \pm S.D.) at grain level (N=2440 per group) and ± 5.33 and ± 5.89 , respectively at dish level (122 cohorts of 20 grains per treatment group). In other words, verum stalk length (91.65%) was 8.35% smaller than control stalk length (100%). This difference is statistically highly significant ($p < 0.001$) and was found by both researchers involved independently.

CONCLUSION: These results suggest that there was an influence of gibberellic acid 30× on wheat seedling development, i.e. the wheat growth bio assay can be a useful tool for further experiments on homeopathic dilutions of gibberellic acid.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/21641523>

J Altern Complement Med. 2011 Apr;17(4):315-23. doi: 10.1089/acm.2010.0246. Epub 2011 Apr 8.

Development of a test system for homeopathic preparations using impaired duckweed (*Lemna gibba* L.).

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Abstract

OBJECTIVES: A bioassay with arsenic-stressed duckweed (*Lemna gibba* L.) was developed to study potentially regulative effects of homeopathic preparations. We compared potentized substances (nine different potency levels between 17 x and 33 x) with two controls (unsuccussed and succussed water) regarding their influence on number- and area-related growth rate and color of fronds (leaves). Screening included 11 potentized substances: Arsenicum album, gibberellic acid, nosode, arsenic(V), phosphorus, Conchae, Acidum picricum, Argentum nitricum, Crotalus horridus, Hepar sulfuris, and Mercurius vivus naturalis.

DESIGN: Duckweed was stressed with arsenic(V) for 48 hours. Afterwards, plants grew in either potentized substances or water controls for 6 days. Growth rate and color of fronds were determined with a computerized image analysis system for different time intervals (days 0-2, 2-6, 0-6). A systematic negative control experiment with unsuccussed water was used to investigate the stability of the bioassay. All experiments were randomized and blinded.

RESULTS: Arsenicum album and nosode potencies increased frond number-related growth rate compared to controls (succussed water controls or pooled water controls [succussed and unsuccussed], $p < 0.05$, t test). Regarding color classification, no effects were observed.

CONCLUSIONS: The experimental setup with *L. gibba* stressed by arsenic(V) provides a valuable tool to investigate regulative effects of potentized substances. In order to verify the effects of Arsenicum album and nosode potencies, further independent replication experiments are necessary.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/21476829>

Int J High Dilution Res. 2011;10(36):265-267.

Plants: a unique model for research on high diluted substances.

Novasadyuk TV.

Abstract

Introduction: High efficiency and low cost of homeopathic drugs, lack of side effects and accumulation of toxins in animal farming products made homeopathy one of the priority developments in veterinary medicine. However, opponents of homeopathy have intensified their activity in the recent years. The attacks of the opponents of homeopathy, with their unfounded claims that it is totally explained by the placebo effect, can largely be explained by complexity of understanding the mechanism of action of these remedies which does not fit into the established concepts the effect of drugs on the body. That is why further study of homeopathic phenomenon is especially important in these days. In order to disprove the opinion that homeopathic phenomenon is explained by placebo effect, we have been studying the effect homeopathic remedies on vegetable growth and ripening. This choice was based on

the hope that the opponents of homeopathy would not be able to accuse plants of self-suggestion under the effect of potentiated remedies. There are many publications about application of homeopathic remedies on plants. For example, in this direction such researchers as Stephan Baumgartner, Carneiro SMTPG, Rossi F, Carvalho LM, Bonato CM, Betti L, Lazzarato L V. Majewsky, and other researchers worked. Methods: Our first experiments that we performed during two years demonstrated a significant improvement of growth and ripening variables when homeopathic remedies were added to fertilizing mixtures, as compared with conventional plant care. Tomatoes of Typhoon F1 and Titan breeds were used to study the effect of homeopathic remedies on plant growth and ripening. The studies were performed in greenhouse conditions in summer 2009 and 2010, on fertile soils of an experimental farm in the Krasnoselskiy district of the Leningrad region. Every study group of a certain tomato breed contained 20 plants. When the young plants were planted in the soil they were watered with adding Coca 1000 $\Delta\Delta\Delta\Delta$ remedy, and then in one month the upper part of the plant was sprayed with Echinacea 30 $\Delta\Delta\Delta\Delta$. The same amounts of similar plants of the same breeds treated according to conventional agricultural technology were used as a control group. Results: As a result earlier ripening was found in the Typhoon F1 tomato breed: it occurred by 19 days earlier: that is by 18.3% than in the control group. The Titan tomatoes group ripened by 14.3% faster than in the control one. Every plant of the Typhoon breed produced an average of 45 tomato fruits, while in the control group the average number amounted to 14 (i.e. there was an increase of 221.4% in the test group). An average of 78 tomato fruits were produced by the Titan breed plants, while in the control group this number was only 20 (increase by 290%). Mean weight of the Typhoon tomato fruit increased by 59.5 g from the control values, i.e. by 180.8%. Mean weight of the Titan tomato fruit increased by 128.5 i.e. by 208.9%. A notable difference was found by all observers in the taste of experimental and control vegetables. The experimental plants had significantly better taste characteristics and they were also more resistant to buck eye rot. Conclusion: In such a way, the studies performed confirm the existence of homeopathic phenomenon in live organisms in the absence of the placebo effect. It has been demonstrated that the use of homeopathic remedies is effective in improvement of agricultural productivity. Plants are unique model for research of ultrahigh dilutions of substances.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/viewArticle/522>

Int J High Dilution Res. 2011;10(36):263-264.

Seasonal variation of the effect of extremely diluted agitated gibberellic acid (10-30) on wheat stalk growth: a multi researcher study.

Endler PC, Reich C, Matzer W, Reischl T, Hartmann AM, Thieves K, Pflieger A, Hofäcker J, Lothaller H, Scherer-Pongratz W.

Interuniversity College for Health and Development Graz / Castle of Seggau, Austria

Abstract

Control experiments were performed at different seasons of the year as a follow-up to pilot experiments [1] where a homeopathic high dilution of gibberellic acid had

influenced growth in a wheat bio assay (7 days). Grains of winter wheat (*Triticum aestivum*, Capo variety) were observed under the influence of extremely diluted gibberellic acid (10-30) prepared by stepwise dilution and agitation according to a protocol derived from homeopathy ("G30x"). Analogously prepared water was used for control ("W30x"). Following up on 5 pilot experiments (4 in autumn 2007, 1 in spring 2008), 10 experiments were performed (5 in autumn 2008 or 2009 and 5 in winter 2009 or 2010) with a total of 9 experiments in autumn season (5 researchers, about 9,000 grains), and 6 in winter/spring (4 researchers, about 6,000 grains). Germination rates after 7 days were slightly higher for the autumn experiments (96.1%) than for the winter/spring experiments (94.8%) ($p > 0,05$), with a non significant trend of more seedlings having germinated in the verum group in the autumn experiments ($p > 0,05$). All of the 9 autumn experiments (i.e. pilot as well as repetition experiments) showed less stalk growth in the verum group (statistically significant with $p < 0.01$ in 4, with $p < 0.05$ in 3 cases, trend in 2 cases). Mean stalk lengths (mm) were $46.97 + 20.50$ for the verum group and $50.66 + 19.77$ for control (mean + S.D.) at grain level ($N = 4,440$ per group) and $+ 3.87$ and $+ 3.38$ (+ S.D.) respectively at dish level (217 cohorts of 20 or 25 grains per treatment group). In other words, verum stalk length (92.72%) was 7.28% smaller than control stalk length (100%). The effect size (D means : S.D.), calculated on the basis of dishes, was high ($d = 1.02$). In contrast, no reliable effect was found in experiments performed in winter/spring (less stalk growth in the verum group in one case, no difference in 2 cases, and more growth in 3 cases). Overall verum stalk length (103.64%) was slightly greater than control stalk length (100%). The effect size, however, was small ($d = 0.45$). The new data are in line with the 2007 findings, i.e. confirm that gibberellic acid 30x does influence stalk growth.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/520/533>

Int J High Dilution Res. 2011;10(36):253-258.

High dilutions of *Magonia pubescens* hidrogel affect germination variables in *Sorghum bicolor* L. Moench.

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ABSTRACT

Introduction: In science homeopathic diseases or physiological disorders are not considered just a result of abiotic and biotic factors, but rather a consequence of loss of organic system homeostasis. Homeopathic science is currently being used efficiently in the control of plagues[1], plant diseases[2], in the increase of medicinal plants' active principles[3] and in plant metabolism[4,5]. Although actual results, both in the academic and field-level, very little is known about physiological mechanisms action of homeopathic medicine on germination process[6]. This work aims to study the effect of *M. pubescens* hydrogel, on some physiological variables of sorghum germination (*Sorghum bicolor* L. Moench).

Material and methods: The experiment was conducted at Homeopathy and Plant Physiology of Biology Department at UEM in the period from 04/05/06 to 30/12/06. *M. pubescens* (tingui) seeds were obtained from the region of Montes Claros - Minas

Germais. The *M. pubescens* hidrogel was obtained from the external centrals wrappers of 4 dry seeds, after they have been disposed in petri dishes with distilled water for a period of 36 hours of soaking (25°C). The hidrogel mother tincture was prepared according to Manual of Technical Standards for Homeopathic Drugstore [7] 3rd ed (2003), in the proportion of a hidrogel part (5g) to ten parts (50g) of absolute alcohol 70 and stored in a glass amber (capped and protected from light). After 15 days of maceration, the solution was filtered and after 48h at rest, the mother tincture was considered ready for use. The dilution 1cH (Centesimal Hahnemannian) was obtained by adding 0.2 ml of the mother tincture in 19.8 ml of distilled water (1/100) and suctioned 100 times (33 suction s-1) by mechanical arm dynamizer with automatic stop (Model Denise 50 - AUTIC). The subsequent dilutions (2cH to 30cH) were obtained from the same procedure, starting from the dilution 1cH. Bioassay: In petri dish containing 15 seeds of sorghum in a circular distributed were added 10 ml with their dilutions (3, 6, 9, 12, 15, 20 and 30cH) and the control containing distilled water. The petri dishes were placed in a growth chamber (type BOD), temperature of (25 ± 2)°C and photoperiod of 16h. The variables were analyzed by germination period of 73.5h as described below:

Germination (%G): $\%G = (\sum ni \cdot N - 1) \times 100$, where $\sum ni$, is the total number of germinated seeds in relation to the number of seeds put to germinate, expressed in percentage.

Germination average time (GAT): $GAT = \sum ni \cdot ti / \sum ni$, where ni is the number of germinated seeds within a certain interval of time $ti-1$ and ti ; expressed in hours.

Germination average speed (GAS), expressed in hours): $GAS = \sum ni / \sum ni \cdot ti$

Germination speed index (GSI): $IVG = G1 / N1 + G2 / N2 + \dots + Gn / Nn$, where $G1, G2, \dots, Gn$ is the number of germinated seeds and $N1, N2, \dots, Nn$ is the number of hours after sowing.

The total number of germinated seeds, at each time (12h) was also analyzed. Seeds were considered germinated when the radical had 1 to 2 mm of lengths.

Experimental design: The experimental design was randomized block with 4 replications, totalling 32 experimental units. It was adopted the double-blind methodology, to avoid possible interference or direction by the researcher.

Statistical Analysis: The data were analyzed by ANOVA and the averages compared by Scott-Knott test ($p \leq 0.05$). The twinning combined data were analyzed for interaction germination x time (G x T) by F test to 5% of probability.

Results and discussion: The homeopathy of *Magonia pubescens* hidrogel affected on the germination kinetic variables of sorghum seeds, when compared with the control (Fig. 1). This effect was most observed in the initial process of germination (from 13h). Research accomplished by Salgado-Labouriau (1973) [8] showed that the hidrogel formed from the external wrapper *Magonia pubescens* seeds, does not contain inhibiting, but contains factors that accelerate the germination process.

Apparently, these results seem contradictory. However, for the homeopathic optics, some used medicines in a considered way might have determined effect. Already in high diluted doses this behavior can be reversed, as it happens with some drugs.

This behavior in pharmacokinetics is denominated Hormesis. When diluted and given dynamism, the product of hidrogel, instead of stimulating, it can delay the germination for the same phenomenon. Hormesis is not yet explained by science.

Homeopathy of the *Magonia pubescens* gel significantly increased the germination average time (GAT) of sorghum seeds and reduced the germination average speed (GAS) and the germination speed index (GSI) (Fig. 2A, B and C). The values of

these variables suggest that homeopathy, somehow slowed the speed of sorghum seeds soaking.

Conclusion: The results here presented suggest that high dilutions of *Magonia pubescens* hidrogel can be used in future experiment such as bioherbicide.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/viewFile/512/526>

Int J High Dilution Res. 2011;10(36):249-252.

High dilutions of acetone affect the *Avena sativa* growth in vitro.

Reis B, Marques RM, da Silva HA, Lolis MA, Moreira FC, Belato KK, Bonato CM.

Abstract

Introduction: Acetone is an organic solvent with molecular structure $\text{CH}_3(\text{CO})\text{CH}_3$, its endogenous production in the animal body is called ketosis. The production of this compound increases with the fat. Acetone influences the lipid membrane, altering its fluidity and lipid composition [1], causing cell damage and leakage and can cause cell death. The use of herbicides in organic farming is not accepted by the Brazilian legislation [2]. So the weed control becomes a problem for organic farmers. The aim of this study is to evaluate the herbicide potential of high dilutions of acetone on *Avena sativa* L.

Materials and Methods: The preliminary tests were conducted at the Laboratory of Plant Physiology and Homeopathy, State University of Maringá (UEM). The seeds of *Avena sativa* are placed in Petri dishes. Fifty seeds were germinated and grown in Petri dishes containing 15ml of high dilution of acetone and maintained at $25^\circ\text{C} \pm 2$ and 12h photoperiod. Acetone dilutions (6, 12, 18, 24 and 30cH) were obtained according to the Brazilian Homeopathic Pharmacopoeia [3]. Were evaluated the shoot length (cm), total length (cm), fresh root (mg) and total dry mass (mg). The plants growth was measured after 7 days. The control consisted of distilled water. The experiment evaluated 4 replicates of each treatment and the data were analyzed by ANOVA and means were compared by Scott-Knott test ($P \leq 0.05$).

Results and Discussion: Dilutions 6, 24 and 30 cH inhibited the growth of the shoot and total seedling of *A. sativa*. The root fresh weight was significantly reduced by 4 dilutions (6,12,24 and 30x), with no difference of 24x compared to the control. The total dry mass of plants of *A. sativa* was reduced in all the dilutions studied, showing an inhibitory effect on growth of seedlings subjected to treatment. Somehow, acetone diluted inhibited the growth and accumulation of biomass of these seedlings, suggesting an imbalance in metabolism that resulted in a reduction in the variables values.

Conclusion: The results suggest that high dilutions acetone interfere on the growth and accumulation of biomass of *A. sativa*.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/511/525>

Int J High Dilution Res. 2011;10(36):245-248.

High dilution of *Belladonna* affect the mycelial growth of *Corynespora cassiicola* in vitro.

Fagan RV, Reis B, Schawan-Estrada KRF, Bonato CM.

Abstract

Introduction: The target spot is a disease caused by fungus *Corynespora cassiicola* (Berk. & Curt.) Wei. This disease has occurred in several states of Brazil. It is a late season disease and causes economic losses in various crops such as soybeans [1]. Currently there is no adequate treatment for the control of *C. cassiicola* in organic cultivation of soybeans, since the application of fungicides for the control and management of diseases is not allowed by Brazilian legislation [2]. Thus, the purpose of this experiment was to test the effectiveness of high dilutions of *Belladonna* in vitro on mycelial growth of *Corynespora cassiicola*.

Materials and Methods: The preliminary tests were conducted at the Laboratory of Plant Pathology, State University of Maringá (UEM). The fungal isolate of *C. cassiicola* was obtained from Embrapa Soja. The fungus was peaked and grown on PDA (potato dextrose agar) maintained at 25°C ± 2 and 12h photoperiod. *Belladonna* dilutions (6, 12, 18, 24 and 30dH) were obtained according to the Brazilian Homeopathic Pharmacopoeia [3]. PDA culture medium plus *Belladonna* dilutions (6, 12, 24 and 30dH) beyond the control containing distilled water were placed in petri dishes after filtration through a Millipore membrane (pore diameter of 0.45µm). After medium solidification, a disc of mycelium (4 mm diameter) of *C. cassiicola* was peaked towards the center of each plate and sealed with plastic wrap and then incubated at 25°C with 12h photoperiod. The mycelial growth was measured daily for 8 days. The control consisted of distilled water. The data were analyzed by ANOVA and means were compared by Scott-Knott test (P ≤ 0.05).

Results and Discussion: All dilutions of *Belladonna* (6, 12, 24, 30dH) were effective (p <0.05) in reducing the mycelial growth of *C. cassiicola* compared to control (Figure 1). *Belladonna* 30dH was higher in all periods and the difference increased with time. Dilutions 6, 12 and 24dH showed intermediate values but always higher than the control (Figure 1). It is known that the target spot cause pods rotting (seeds) and intense stems spots. When it causes root rot, the symptoms are characterized by yellow leaves and roots of dark-brown color. Thus, productivity is compromised by the lower pod filling and seed. The alternatives currently used are based on the use of fungicides, which increase the cost of production and affect the environment.

Thus, the use of ultra-high diluted *Belladonna* for target spot control may be able to mitigate the damage of this fungus in soybean. Based on these results, we suggest that ultra-high dilutions of belladonna may be able to reduce production costs and at the same time benefit the environment through reduced environmental impact.

Conclusion: The results obtained so far are encouraging. *Belladonna* presents as great potential in controlling the fungal disease caused by *C. cassiicola*, in vitro.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/510/524>

Int J High Dilution Res. 2011;10(36):239-244.

Germination and vigour of seed of sorghum (*Sorghum bicolor* L. Moench) treated with *Arsenicum album*.

Marques RM, Reis B, Cavazin ACT, Moreira FC, Buchoski M, Silva HA, Lolis M, Bonato CM.

ABSTRACT

Introduction: The accelerated aging test evaluates the behavior of seeds exposed to stress conditions based on the fact that the rate of deterioration is considerably increased by exposure to high temperature and relative humidity [1]. The knowledge acquired in homeopathic science is experimental research on healthy living organisms that are undergoing experimentation using homeopathic medicines [2]. The experimental research on homeopathic plants has been performed in Europe, Mexico, India and Brazil, proving that the principle of homeopathy, as set out in the animal kingdom has been found in plants [3]. This experiment aimed to evaluate the effect of the homeopathic Arsenicum album in decimal (x) and centesimal (cH) scale on the physiological variables of the germination and growth of sorghum (*Sorghum bicolor* L.) subjected to accelerated aging.

Materials and methods: The experiment was conducted at the Laboratory of Plant Physiology and Homeopathy, Universidade Estadual de Maringá - UEM. Arsenicum album 6x and 2CH matrices were acquired in homeopathic pharmacy. From matrices were prepared further dynamizations in decimal (x) and centesimal (C) scale, according to the Brazilian Homeopathic Pharmacopoeia [4]. In the accelerated aging test were used samples of 200 seeds per treatment distributed evenly forming a single layer on the surfaces of metal wire suspended inside the plastic box containing inside 40ml of Arsenicum album (9, 12, 18, or 30x 24 and 9, 12, 18, 24 or 30C). The control consisted of distilled water. The boxes were placed in BOD-chamber adjusted to 42°C and relative humidity 100% for 96 hours. After this period, led to the germination test, using four replicates of 50 seeds, totalizing 52 experimental units which were placed on germination paper previously soaked with distilled water in an amount equivalent to 2.5 times the paper weight[5]. The rolls were arranged randomly in the BOD-chamber at 25°C±2. The interpretation of the test was performed after seven days [6]. Germination percentage (% PG) was determined according to the Rules for Seed Analysis [5]. The length of primary roots (PRL) and hypocotyl (LH) were only performed in normal seedlings. The total length of the radicle (TLR) was calculated as the sum of the lengths of hypocotyl and primary root. The experimental design was completely randomized. We adopted the double-blind procedure, avoiding possible interference from the researcher. Data were subjected to analysis of variance and means compared by Scott-Knott test ($P \leq 0.05$).

Results: Arsenicum album 9x, 9CH and 12CH reduced the percentage of germination (%PG) (Figure 1A). The highest values in the length of hypocotyl (LH) were observed in 12 and 24x dilutions, followed by a reduction in intermediate and higher inhibition at 30x and 9x. The 18x does not differ from control. All centesimal dilution presented effect on the variable analyzed. There was an increase in hypocotyl length in the 12, 18 and 24 dilutions, and reduction in 9 and 30 cH dilutions (Figure 1B). The primary root length (PRL) of sorghum was increased in dilutions 18 and 30x. However, the centesimal dilutions were not different from control (Figure 1C). There was an increase in the total length of the seedlings (TLS) in the dilutions 18, 24 and 30x and reduction in 9x when compared to control. As for centesimal dilutions, there was an effect only in 18cH. The other centesimal dilutions were not different from control (Figure 1D).

Discussion: The accelerated aging consists of evaluating seed response, after they have been subjected to high temperature and relative humidity near 100% for some period of exposure. The seeds exposed to accelerated aging suffer serious degenerative changes in metabolism resulting in increase respiratory activity and

reserves consumption causing a decrease in germination [1]. Similar effects in reducing germination percentage were found by Lahnstein et al. [7] in wheat seeds stressed with arsenic trioxide A. album 45dH. However, we can not say that the germination reduction in dilutions 9x, 9cH and 12cH resulted from direct action of A. album, or it is a consequence of the increase in abnormal seedlings in these dilutions. Vigorous seeds present more capacity to convert in storage tissues and the greater incorporation of these substances in embryonic axis resulting in a higher growth [1]. The increase in hypocotyl elongation in the dilutions 12 e 24x and 12, 18 and 24cH suggest more efficient use of reserves by seeds stressed. The increase in primary root length is a very important feature in the competition for nutrients and water in the soil. Manifestations of increase in length of the root system mediated by the same dilutions of homeopathic remedies were observed in decimal scale. The increase in the total seedlings of sorghum caused by dilution 18, 24 and 30x and 18cH showed the effectiveness of the dilutions in the stimulation of early growth of seedlings which is important in the early stages of development, it includes the establishment period of culture [6].

Conclusions: In general, homeopathic preparations did not affect the germination percentage except for 9x, and 9cH 12cH dilution. Furthermore, the dilutions reduced the effects on premature aging verified by high values of growth variables. These results suggest that high dilution Arsenicum album can be an alternative to minimize the deleterious effect to high temperature.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/507/518>

Int J High Dilution Res. 2011;10(36):233-238.

Physiological response of sorghum seeds treated with Arsenicum album submitted to low temperature.

Marques RM, Reis B, Cavazin ACT, Moreira FC, Silva HA, Buchoski MG, Lolis MA, Bonato CM.

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ABSTRACT

Introduction: Temperature is one of the main environmental factors that act on plants, affecting physiological processes such as germination and vigor, growth, photosynthesis, water and nutrients uptake, among others [1]. When seeds are exposed to temperature stress during imbibition process occur dramatic changes in the reorganization and function of the plasma membrane impairing the stability and functional structure of the membrane resulting in the decrease on germination and embryo death [2][3]. In plant, stress triggers wide response that extends from the change of gene expression and cell metabolism to changes in growth rate and productivity. The organism's reaction is a function of plant capacity to produce effects opposite to the action of stressors [4].

Aim: the purpose of this study was to evaluate high dilution effect of Arsenicum album on physiological variables of germination and growth of sorghum.

Material and Methods: The experiment was conducted at the Laboratory of Physiology and Homeopathy at Universidade Estadual de Maringá - UEM.

Arsenicum album 6x matrix was acquired in homeopathic laboratory. From matrix,

other dilutions were prepared according to Brazilian Homeopathic Pharmacopoeia [5] with the homeopathic remedies prepared in distilled water (1/10) and succussed by 100 times in mechanical arm (50-Denise Model Autic). For cold test, 50 seeds were distributed on germitest paper moistened to 2.5 times the weight of paper under different dilutions of *A. album* (9, 12, 18, 24 and 30x) with four replications. The control consisted of distilled water. After sowing, the rolls were placed in plastic bags and sealed, and lead in BOD-chamber at 10°C for 7 days. After this period, the rolls were removed from plastic bags and transferred to BOD-chamber at (25 ± 2)°C, arranged at random where they remained for seven days. Germination percentage (GP%) were evaluated according to Rules for Seed Analysis [6]. The length of primary roots (LPR) and length of hypocotyl (LH) were determined only for seedlings. The total length seedlings (TLS) was calculated as the sum of the lengths of hypocotyl (LH) and primary root (LPR). The fresh biomass (FB) of the seedlings were obtained by removing from their cotyledons, and then weighed on an analytical balance. The dry biomass (DB) was obtained after drying at (80 ± 1)°C for 72h. The experimental design was completely randomized. We adopted the double-blind procedure, thereby avoiding possible researcher interference. Data were subjected to analysis of variance and means compared by Scott-Knott ($P \leq 0.05$).

Results: Seed exposure for seven days to cold stress at 10° C inhibited the germination percentage (GP%). Dilutions 9 and 18x showed the lowest germination percentage (Figure 1A). The cold inhibited the total length of hypocotyls (LH) the length of the seedlings (TLS), with the lowest values observed in seeds treated with dilution 24x (Figures 1B and 1C). Fresh biomass production of seedlings (FB) also was reduced the dilutions 9, 12 and 24x (Figure 1D). Seedlings treated with the dilution 24x reduced the dry biomass production (DB) (Figure 1E).

Discussion: Cold stress causes dramatic changes in seed physiology. The stress caused by temperatures between 0 and 10°C, which are above the freezing point can cause effect reversible or irreversible, depending on time of exposure and the physiological potential of seed [7]. Under these conditions the level of seed vigour has a decisive influence on the germination process or delaying it, causing the appearance of abnormal seedlings or preventing germination [1]. Nine and 18x dilutions adversely affected seed germination. It is suggested that these dilutions may be affecting some way a key mechanism for germination, such as the mechanisms of degradation and/or reserve mobilization (Fig. 1A). Moreover, these dilutions could be affecting important metabolic steps such as the respiration rate in which the germination process is highly dependent. The dilution 24x reduced the hypocotyl length (HL), the total length (TL) and fresh (FB) and dry biomass (DB) (Figures 1B to 1E). In this case, it is suggested that Arsenicum album 24x may be interfering with the cell elongation and/or cell division of the hypocotyl. This fact can be partly explained to low water content observed in the hypocotyl (1F). Low-temperature stress limits the nutrient and water uptake interfering in biosynthesis process that occurring to a lesser degree, being one of the more direct temperature effects on the growth reduction of tissues [8].

Conclusions: We can conclude that homeopathy Arsenicum album 24x reduced the germination percentage, the length, fresh and dry biomass of sorghum. Probably the cause of this reduction is the lower absorption/water content in the system. The reduction in water content can be the cause lower values for the variables mentioned. However, the inhibitory action of the 24x dilution in water content is not yet known and will be one of the goals of future work.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/506/519>

Int J High Dilution Res. 2011;10(36):231-232.

Germination of radish seeds (*Raphanus sativus*) treated with homeopathic drugs.

Donadon MFB, Romano EDB, de Pinho WR, de Souza MLV, do Nascimento PHA, Rodrigues MRL, de Toledo Piza Gomes Carneiro SM.

Abstract

The radish is a short cycle crop, since it is harvested at 25-30 days after direct sowing. Under the economic point of view it is an important species, but there are few studies on germination of radish seeds. The objective of this study was to evaluate the effect of high diluted substances on the germination of radish seeds. The trial was conducted at the Agricultural Research Institute of Paraná (IAPAR) in Londrina / Paraná. It was used a pesticide free cultivar named Cometa. The treatments were: Bryonia, hydroalcoholic solution, Arnica montana, Cina and Lupine + Oat, all of them diluted and agitated at 9x; distilled water and agitated distilled water were used as controls. The mother tincture of Lupine + Oat was prepared from plants collected at the experimental station of IAPAR in Londrina. The mother tincture and all treatments were prepared according to the guidelines in the Brazilian Homeopathic Pharmacopeia, Part I [1]. The agitations of the treatments were made by a mechanical equipment, model Denise 10-50 manufactured by Autic. The water was distilled the day before preparing the treatments. The experiment was performed with 300 seeds per treatment. The seeds were placed in gerbox with germitest paper, and 50 gerbox were used per treatment, with six seeds in each gerbox. The germitest papers were moistened with the treatments and the seeds were soaked for 2 hours previously set up the experiment. The substances in high dilutions were agitated 100 times on the machine before soaking the seeds and moistening the germitest paper. The experimental design was entirely randomized and the gerbox were kept at the bench at the Laboratory of Plant Protection of IAPAR. A person not involved in conduct of the experiment coded (blinded) the treatments solutions with a random letter code. The code was kept secret until all measurements and data processing were finished. Seeds were observed daily for germination and counted only those considered germinated. Seeds were considered germinated when the radicle was at least two millimeters length. Arnica montana 9x increased 5.9% the seed germination when compared with distilled water.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/471/480>

Int J High Dil Res. 2011;10(35):79.

Seasonal variation of the effect of extremely diluted agitated gibberellic acid (10^{-30}) on wheat seedling development.

Scherer-Pongratz W, Endler PC.

Abstract

Objective: Performing a study on a wheat growth bio assay with a homeopathic dilution of gibberellic acid at different seasons of the year. Methods: Grains of winter wheat (*Triticum aestivum*, Capo variety) were observed under the influence of extremely diluted gibberellic acid (10-30, 30x). Analogously prepared water was used for control. 15 experiments were performed, 9 in autumn season (5 researchers, 4,440 grains per group), and 6 in winter / spring (4 researchers, with 3,140 grains per group). Results: All 9 autumn experiments showed less stalk growth in the verum group ($p > 0.01$ in 4 cases, $p > 0.05$ in 3, trend in 2 cases). Mean stalk lengths (mm) were $46.97 + 20.50$ for verum and $50.66 + 19.77$ for control at grain level ($N = 4,440$ per group) and $+ 3.87$ and $+ 3.38$ respectively at dish level (217 cohorts of 20 or 25 grains per treatment group). Verum stalk length (92.72%) was 7.28% smaller than control stalk length (100%). In contrast, no reliable effect was found in experiments performed in winter / spring (less stalk growth in 1 case, no difference in 1, more growth in 3 cases). Overall verum stalk length (103.64%) was 3.64% slightly greater than control stalk length (100%). Data were found to be homogeneous within the control groups as well as within the verum groups. Conclusion: Results suggest that especially in the experiments performed in autumn, there was an influence of gibberellic acid 30x on wheat seedling development. The effect size is small when calculation is done on the basis of grains ($d = 0.18$) but high when done on the basis of dishes ($d = 1.02$). In contrast, no reliable effect was found in experiments performed in winter / spring. Further experiments should thus be performed in the autumn season.

Link to abstract/paper: <http://bases.bireme.br/cgi-bin/wxislind.exe/iah/online/?IsisScript=iah/iah.xis&src=google&base=HomeoIndex&lang=p&nextAction=lnk&exprSearch=10684&indexSearch=ID>

Int J High Dilution Res 2011;10(34):37-45.

Pathogenetic trial of boric acid in bean and tomato plants.

de Toledo Piza Gomes Carneiro SM, Romano EDB, dos Santos Garbim TH, de Oliveira BG, Teixeira MZ.

Abstract

Background: homeopathy is held in organic agriculture as a means to control disease and plagues. However, different from doctors, who have works on materia medica and repertories available to choose the most suitable homeopathic medicine for each patient, agronomists do not yet have an equivalent Homeopathic Materia Medica of Plants (HMMP) describing symptoms observed in plants. Aim: the aim of this study was to carry out a homeopathic pathogenetic trial (HPT) in plants comparing the effects elicited by boric acid in ponderable dose and dilution 6cH in two different plant species, namely bean and tomato cultivars.

Methods: 4 tests were carried out, 2 on tomato and 2 on bean plants, which received 1 to 6 applications of treatments.

Results: there were differences between both species regarding their sensitiveness to boric acid. None of the tomato plants that received Boron 6cH showed symptoms, differently from bean plants. On the other hand, in tests of ponderable doses of boric acid, tomato plants exhibited 3 symptoms more than bean plants. A higher number of bean plants exhibited symptoms with boric acid in ponderable dose than in dilution

6cH). Nos ensaios com feijoeiro, um maior número de plantas apresentou sintomas após o tratamento com ácido bórico na dose ponderal do que com ácido bórico 6cH. Conclusions: these results suggest that the elaboration of a HMMP must take into account the species in which symptoms were obtained. Moreover, HPTs in plants must be carried out with both ponderable doses and high dilutions in order for differences in sensitiveness among species be better identified.

Link to paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/422/458>

Evid Based Complement Alternat Med. 2011;2011:696298. doi: 10.1093/ecam/nep217. Epub 2011 Feb 14.

The efficacy of ultramolecular aqueous dilutions on a wheat germination model as a function of heat and aging-time.

[Brizzi M](#), [Elia V](#), [Trebbe G](#), [Nani D](#), [Peruzzi M](#), [Betti L](#).

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Abstract

This study evaluates the effects of temperature and aging on the efficacy of As(2)O(3) at the 45th decimal potency in a wheat germination model, compared against a control and potentized H(2)O 45 \times . Each treatment-temperature combination was tested on seeds (*Triticum aestivum* L.) of Pandas variety, using six Petri dishes (33 seeds/dish) per trial, performing eight trials. Seeds were pre-treated by poisoning with 0.1% As(2)O(3) solution to reduce germination, to allow a better evaluation of homeopathic treatment effects. The outcome variable was the number of non-germinated seeds after 96 h. Temperature effect was investigated by heating each treatment in a water bath for 30 min (at 20, 40 or 70°C), or for 5 min (at 100°C), and that of aging by dividing experimental data, collected over a period of nearly five months, into two groups: early and late experiments. Results seem to show that the efficacy of As(2)O(3) 45 \times is unaltered at 20 and 40°C, increases at 70°C and decreases at 100°C. As regards aging, a notable difference was found between early trials, with no significant efficacy, and late trials, where As(2)O(3) 45 \times exhibits a repeated significant effect versus control, except at 100°C. A reduction in variability was observed for As(2)O(3) 45 \times at 20°C versus control, confirming the findings of previous work. The main conclusion suggested by this experiment is that the efficacy of As(2)O(3) 45 \times on wheat germination may be influenced by heating degree and seems to have an increasing trend as a function of aging.

Link to paper: <http://www.hindawi.com/journals/ecam/2011/696298/>

ScientificWorldJournal. 2010 Dec 14;10:2330-47. doi: 10.1100/tsw.2010.224.

A review of three simple plant models and corresponding statistical tools for basic research in homeopathy.

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Abstract

In this paper, we review three simple plant models (wheat seed germination, wheat seedling growth, and infected tobacco plants) that we set up during a series of experiments carried out from 1991 to 2009 in order to study the effects of homeopathic treatments. We will also describe the set of statistical tools applied in the different models. The homeopathic treatment used in our experiments was arsenic trioxide (As_2O_3) diluted in a decimal scale and dynamized. Since the most significant results were achieved with the 45th decimal potency, both for As_2O_3 (As 45x) and water (W 45x), we here report a brief summary of these results. The statistical analysis was performed by using parametric and nonparametric tests, and Poisson distribution had an essential role when dealing with germination experiments. Finally, we will describe some results related to the changes in variability, which seems to be one of the targets of homeopathic treatment effect. Link to paper: <http://www.hindawi.com/journals/tswj/2010/378193/abs/>

Eur J Integr Med. 2010;2(4):264.

Influence of mental state on the homeopathic manufacturing process?

Reischl T, Reicher B.

Abstract

Objective: To investigate whether the potentization process can be influenced by the mental state of the researcher.

Background: The reproducibility of experiments on homeopathic remedies raises a number of complex issues, one of which is discussed under heading of “investigator effect” (van Wijk, Smith, Walach). One possible factor of influence could be the emotional or mental state of the person preparing the potency: Is it conceivable for this to influence the transfer of information from a molecular mother tincture to a high dilution? This was investigated using the development of wheat seedlings as a bioassay. Generally a significant and consistent difference in growth between seedlings treated with 30x potencies of gibberellic acid and water-treated controls is observed with this bioassay (ECIM abstract 2009 by Endler et al.).

Methods: Two batches of 30x potencies (diluted to 10^{-30}) of gibberellic acid (G) were prepared in different mental states: G 30x [+] was prepared in an elevated state of “unconditional love” brought about by prior meditation, while the control substances G 30x [-] and W 30x [-] were prepared while the investigator strove to be in a mental state which he experienced subjectively as diffuse. Bio-organically grown wheat (500 grains in each of 25 germination plates per group) was brought into contact with one of the three test liquids in a blind experiment. Stalk lengths were measured after 7 days. Data were interpreted on the assumption of G 30x [-] and W 30x [-] being reference groups which could potentially reveal a deviant effect of G 30x [+].

Results: Stalk length were (mm): G 30x [-]: 60.8 ± 18.4 ; W 30x [-]: 56.2 ± 16.8 ; G 30x [+]: 57.5 ± 14.3 . A significant difference was found between G 30x [-] and W 30x [-] (Scheffée: $p < 0.01$); no difference was found between W 30x [-] and G 30x [+] ($p > 0.05$), but a significant difference ($p < 0.05$) between G 30x [-] and G 30x [+].

Conclusion: As expected, the groups treated with G 30x [-] and W 30x [-] showed significant differences between them (G 4.6 mm = 8.2%). A significant difference was found between those treated with G 30x [-] and G 30x [+]. It is thus possible that the

investigator's emotional or mental state influenced the transfer of information from the mother tincture to the high dilution, though evidently not in an amplifying manner, as had originally been speculated. Further investigations would be needed to exclude the possibility of these findings being coincidental.

Link to abstract/paper:

http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDUQFjAA&url=http%3A%2F%2Fwww.inter-uni.net%2Fstatic%2Fdownload%2Fpublication%2Fkomplementaer%2Fp_Reischl-Reicher-ECIMPoster2010abstract.pdf&ei=wsSGUazAGvT60gXwr4CoDw&usg=AFQjCNESz3nqzbAUw4f7oS3tToqZhovDHg&bvm=bv.45960087,d.d2k

Eur J Integr Med. 2010;2(4):251.

Development of a biocrystallisation method for examining effects of homeopathic preparations on germinating cress seeds.

Baumgartner S, Doesburg P, Huber M, Nierop D, Scherr C, Andersen JO.

Abstract

A major challenge in basic research into homeopathic potentiation is to develop bioassays that yield consistent results. We evaluated the potential of a seedling-biocrystallisation method. Cress seeds (*Lepidium sativum* L.) germinated and grew for 4 days in vitro in Stannum metallicum 30x or water 30x in blinded and randomized assignment. 15 experiments were performed at two laboratories. CuCl₂-biocrystallisation of seedlings extracted in the homeopathic preparations was performed on circular glass plates. Resulting biocrystallograms were analysed by computerized textural image analysis. All texture analysis variables analysed yielded significant results for the homeopathic treatment; thus the texture of the biocrystallograms of homeopathically treated cress exhibited specific characteristics. Two texture analysis variables yielded differences between the internal replicates, most probably due to a processing order effect. There were only minor differences between the results of the two laboratories. The biocrystallisation method seems to be a promising complementary outcome measure for plant bioassays investigating effects of homeopathic preparations.

Link to paper: <http://www.hindawi.com/journals/ecam/2012/125945/>

Eur J Integr Med. 2010;2(4):246.

Information transfer from an ultra high dilution through glass walls - A study on wheat seedlings, with regard to storage safety of homeopathic remedies.

Reich C, Lothaller H, Endler PC.

Abstract

Objective: To investigate whether information transfer between homeopathic potencies is possible through glass walls during storage or transport handling.

Introduction: Previous studies using zoological (Endler et al. 1995, 1998; Hermann 2005) as well as botanical (Pongratz et al. 1998) bio-assays have examined interactions between ultra high dilutions, sealed in glass vials, and organisms. The

possibility of information transfer from a potency through glass walls may also be interesting with regard to storage insensitivity of homeopathic remedies.

Methodology: We compared the effects of potentized gibberellic acid (GA3; a plant growth hormone) and potentized solvent on wheat seedlings. In previous experiments (Bauhofer et al. 2007, Pflieger et al. 2010, Endler et al. 2010) potentized gibberellic acid had shown an inhibiting effect on winter wheat growth when experiments were performed in autumn season. In order to avoid molecular effects we chose to exceed Avogadro's limit by potentizing GA3 (as well as the solvent water for control) up to 30x (i.e. $10e-30$). For the growth experiment wheat seedlings were germinated in three groups using (a) GA3 30x ("G30x"), (b) water 30x ("W30x"), and (c) water 30x that had been submitted to an additional process of gently being banged against G30x-bottles ("W/G30x"). Stalk lengths were measured after 7 days according to a standardized protocol. Differences in stalk length of germinated seedlings were calculated with ANOVA.

Results: G30x-plants (57.38 ± 13.13 mm) as well as W/G30x-plants (58.60 ± 13.43 mm) showed less stalk growth than control plants (W30x; 61.97 ± 11.90 mm).

Significant differences were found between G30x-plants and W30x-plants as well as between W/G30x plants and W30x plants, ($p < 0.01$) but not between G30x-plants and W/G30x-plants ($p > 0.05$).

Conclusions: The findings of this pilot study suggest that banging glass bottles of liquid homeopathic remedies together can lead to information transfer, and that relevant precautions may be desirable during transport and storage. Further studies are needed to substantiate our laboratory results on aqueous potencies and to determine whether these may also be relevant for alcoholic homeopathic dilutions or globuli.

Link to abstract/paper:

http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDAQFjAA&url=http%3A%2F%2Fwww.inter-uni.net%2Fstatic%2Fdownload%2Fpublication%2Fkomplementaer%2Fp_Reich-Lothaller-Endler-ECIMPoster2010abstract.pdf&ei=zcCGUejOEoqM0AXqtoH4Dw&usq=AFQjCNFMcVtwRam8BbnmGTX50qti9Alurw&bvm=bv.45960087,d.d2k

Eur J Integr Med. 2010;2(4):244-245.

Wheat germination (20 h) and extremely diluted gibberellic acid (10e-30) - Explorative experiments on a fundamental homeopathy research model.

Hartung H, Schiestl S, Matzer W, Endler PC.

Objective: To further explore a model on the effect of extremely diluted gibberellic acid ($10e-30$) on wheat growth by modifying observation time (20hrs) and the observation parameters (germination and rooting).

Background: In previous project phases 1 and 2, experiments were performed by staff and students at the Interuniversity College (www.inter-uni.net) within the Master's programme on Complementary Health Sciences. Observation of longitudinal growth of wheat stalks after 7 days showed reduced coleoptile length in groups treated with gibberellic acid 30x (stepwise diluted and succussed, $10e-30$: "G30x") as compared to groups treated with water 30x (W 30x) or inert water (W0),

especially when experiments were performed in autumn (ECIM abstracts 2009 by Endler et al. And 2010 by Matzer et al.).

Methods: In this study on project phase 3, germination and development of roots of wheat seedlings was observed after 20 hours. Seedlings were treated with G 30x (potentized verum, see above, Background) or W 30x (potentized control).

Appearance of stalks and appearance of roots was monitored after 20 hrs. Two independent researchers from the Interuniversity College were involved, each of whom performed an experiment comprising 500 seedlings per group of G 30x, W 30x and W0. Experiments were performed in September and February, respectively. Results were analysed by means of chi square tests.

Results: In both experiments, germination rates and root development after 20 hrs were reduced in groups treated with G 30x when compared to W 30x.

Conclusion: Experiments showed an inhibiting effect of G 30x on wheat germination and development of roots after 20 hours, with higher significance in autumn than in winter. This finding is comparable to previous results on longitudinal growth of wheat stalks after 7 days (ECIM abstract 2009 by Endler et al.; 2010 by Matzer et al.). The bio-assay on wheat germination and development of roots after 20 hours is distinguished by its ease of handling (site and materials preparation, total duration of experiment and measuring time). This assay should therefore be applied to further research problems, and its use by independent researchers should be encouraged.

Link to abstract/paper:

http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CD8QFjAC&url=http%3A%2F%2Fwww.inter-uni.net%2Fstatic%2Fdownload%2Fpublication%2Fkomplementaer%2Fp_Hartung-Schiestl-Matzer-Endler-ECIMPoster2010abstract.pdf&ei=k8KGUeH3J-bO0QWkIHwAg&usq=AFQjCNHVMXaZSFICs76_ITUJoOJLitoa_A&bvm=bv.45960087,d.d2k

Eur J Integr Med. 2010;2(4).

Wheat growth (7 days) and extremely diluted gibberellic acid (10e-30) - Repetitive experiments on a fundamental homoeopathy research model.

Matzer W, Hartmann M, Endler PC.

Abstract

Objective: To test, in multiresearcher experiments, a hypothesis on the seasonal influence on the effect of extremely diluted gibberellic acid (10e-30) on wheat growth (7 days).

Background: In a first project phase (2007-2009, see ECIM abstract 2009 by Endler et al.), several independent researchers working at the Interuniversity College found significantly reduced longitudinal growth of wheat stalks in groups treated with gibberellic acid 30x (stepwise diluted and succussed, 10e-30: "G 30x") as compared with groups treated with water 30x (W 30x) when experiments were performed in autumn season. However, in replications in winter growth rates in the G 30x groups were approximately equal to or higher than in the W 30x groups. As a rule, each single experiment comprised 500 seedlings per group of G 30x or W 30x.

researcher Pfleger Hofäcker Reich Reischl Thieves 1 Thieves 2 Pfleger
autumn 07 autumn 07 autumn 08 winter 09/10 winter 09/10 winter 09/10 winter
09/10 rel. diff. (%) - 6.7 - 11.2 - 6.2 + 7.5 + 9.7 + 0.4 + 10.0

Methods: In a second project phase (2009-2010), the experiment was repeated a) in autumn and b) in winter. Wheat stalk growth after 7 days was observed under the influence of G 30x (potentized verum, see above, background) and W 30x (potentized control), as well as W0 (inert control). Each experiment comprised 500 seedlings per group G 30x and W 30x. Results (stalk lengths based on numbers of germinated seedlings) were analysed by means of analysis of variance.

Results: Interestingly, in all experiments, stalk growth after 7 days was reduced in groups treated with G 30x compared to W 30x

Conclusion: The idea (derived from ECIM abstract 2009) that the direction of the effect depends on the experimental season (autumn or winter) has to be modified. It rather appears that experiments in autumn (i.e. the natural growth season) reliably show less growth under treatment with G 30x (7 out of 7 experiments), whereas experiments in winter (i.e. natural resting season) yield inconsistent results (out of 5 experiments, 1 showed less, 3 showed more and one showed equal growth under G 30x). We therefore suggest performing further repetitive studies on the model in the autumn season. Furthermore, it may be interesting to examine germination rates within the first day(s) of development (see ECIM abstract 2010 by Hartung et al.).

Link to abstract/paper:

http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CDwQFjAC&url=http%3A%2F%2Fwww.inter-uni.net%2Fstatic%2Fdownload%2Fpublication%2Fkomplementaer%2Fp_Matzer-Hartmann-Endler-ECIMPoster2010abstract.pdf&ei=lsGGUfW1OKPa0QXuyYCoBw&usg=AFQjCNH91cNrlLFI5GtCb6N32K4xmBqwlQ&bvm=bv.45960087,d.d2k

ScientificWorldJournal. 2010 Nov 4;10:2112-29. doi: 10.1100/tsw.2010.202.

Effects of homeopathic arsenicum album, nosode, and gibberellic acid preparations on the growth rate of arsenic-impaired duckweed (*Lemna gibba* L.).

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Abstract

This study evaluated the effects of homeopathically potentized *Arsenicum album*, nosode, and gibberellic acid in a bioassay with arsenic-stressed duckweed (*Lemna gibba* L.). The test substances were applied in nine potency levels (17x, 18x, 21x-24x, 28x, 30x, 33x) and compared with controls (unsuccussed and succussed water) regarding their influence on the plant's growth rate. Duckweed was stressed with arsenic(V) for 48 h. Afterwards, plants grew in either potentized substances or water controls for 6 days. Growth rates of frond (leaf) area and frond number were determined with a computerized image analysis system for different time intervals (days 0-2, 2-6, 0-6). Five independent experiments were evaluated for each test substance. Additionally, five water control experiments were analyzed to investigate the stability of the experimental setup (systematic negative control experiments). All experiments were randomized and blinded. The test system exhibited a low

coefficient of variation (approximately equal to 1%). Unsucceded and succeded water did not result in any significant differences in duckweed growth rate. Data from the control and treatment groups were pooled to increase statistical power. Growth rates for days 0-2 were not influenced by any homeopathic preparation. Growth rates for days 2-6 increased after application of potentized Arsenicum album regarding both frond area ($p < 0.001$) and frond number ($p < 0.001$), and by application of potentized nosode (frond area growth rate only, $p < 0.01$). Potencies of gibberellic acid did not influence duckweed growth rate. The systematic negative control experiments did not yield any significant effects. Thus, false-positive results can be excluded with high certainty. To conclude, the test system with *L. gibba* impaired by arsenic(V) was stable and reliable. It yielded evidence for specific effects of homeopathic Arsenicum album preparations and it will provide a valuable tool for future experiments that aim at revealing the mode of action of homeopathic preparations. It may also be useful to investigate the influence of external factors (e.g., heat, electromagnetic radiation) on the effects of homeopathic preparations. Link to paper: <http://www.hindawi.com/journals/tswj/2010/107597/abs/>

BMC Microbiol. 2010 Sep 20;10:243. doi: 10.1186/1471-2180-10-243.

Colonization of *Morus alba* L. by the plant-growth-promoting and antagonistic bacterium *Burkholderia cepacia* strain Lu10-1.

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Abstract

BACKGROUND: Anthracnose, caused by *Colletotrichum dematium*, is a serious threat to the production and quality of mulberry leaves in susceptible varieties. Control of the disease has been a major problem in mulberry cultivation. Some strains of *Burkholderia cepacia* were reported to be useful antagonists of plant pests and could increase the yields of several crop plants. Although *B. cepacia* Lu10-1 is an endophytic bacterium obtained from mulberry leaves, it has not been deployed to control *C. dematium* infection in mulberry nor its colonization patterns in mulberry have been studied using GFP reporter or other reporters. The present study sought to evaluate the antifungal and plant-growth-promoting properties of strain Lu10-1, to clarify its specific localization within a mulberry plant, and to better understand its potential as a biocontrol and growth-promoting agent.

RESULTS: Lu10-1 inhibited conidial germination and mycelial growth of *C. dematium* in vitro; when applied on leaves or to the soil, Lu10-1 also inhibited the development of anthracnose in a greenhouse, but the effectiveness varied with the length of the interval between the strain treatment and inoculation with the pathogen. Strain Lu10-1 could survive in both sterile and non-sterile soils for more than 60 days. The strain produced auxins, contributed to P solubilization and nitrogenase activity, and significantly promoted the growth of mulberry seedlings. The bacteria infected mulberry seedlings through cracks formed at junctions of lateral roots with the main root and in the zone of differentiation and elongation, and the cells were able to multiply and spread, mainly to the intercellular spaces of different tissues.

The growth in all the tissues was around $1-5 \times 10^5$ CFU per gram of fresh plant tissue.

CONCLUSIONS: Burkholderia cepacia strain Lu10-1 is an endophyte that can multiply and spread in mulberry seedlings rapidly and efficiently. The strain is antagonistic to C. dematium and acts as an efficient plant-growth-promoting agent on mulberry seedlings and is therefore a promising candidate as a biocontrol and growth-promoting agent.

Link to paper: <http://www.biomedcentral.com/1471-2180/10/243>

Int J High Dilution Res. 2010;9(33):147-155.

Effect of biotherapeutic of Alternaria solani on the early blight of tomato-plant and the in vitro development of the fungus.

de Toledo Piza Gomes Carneiro SM, Romano EDB, Pignoni E, Teixeira MZ, da Costa Vasconcelos ME, Gomes JC.

Abstract

Background: Homeopathy is a means permitted in organic agriculture to control disease and plagues; biotherapeutics are a practical means for farmers to intervene on the health of plants in agro-ecological systems of production. Tomato-plants can be affected by several diseases, one of the most significant ones in Brazil is early blight, caused by fungus *Alternaria solani*, due to the damage it causes and its wide distribution in the country. **Aims:** to establish whether a biotherapeutic of *A. solani* may interfere on the in vitro development of the fungus and whether it affects the severity of early blight on tomato-plants in greenhouse.

Methods: the effect of the biotherapeutic on the fungus was evaluated through the percentage of germinated spores under microscope and the growth of colonies in a culture medium. Treatments used were: biotherapeutic 26cH, 27cH, 28cH, 29cH and 30cH; sterilized distilled water; and diluted and agitated hydroalcoholic solution. The effect of the biotherapeutic on the development of disease was evaluated in 4 experiments in greenhouse. Plants were kept in vases and subjected to artificial inoculation of the fungus after the application of treatments. Evaluation of disease was carried out through diagrammatic scale.

Results: no treatment affected the germination of spores or the development of fungus colonies in the culture medium. In the first test, treatment 26cH differed from water in Tukey's test at 5% but did not differ from diluted and agitated hydroalcoholic solution. In the second test, treatments 27cH and 28cH showed significant difference from both water and hydroalcoholic solution with an average control of disease of 57% and 62% respectively. The other 2 tests did not exhibit any significant effect. **Conclusions:** there was no direct effect of the biotherapeutic on the fungus, but there was an effect on the severity of the disease. Factors affecting the efficiency of the biotherapeutic must be better understood before it can be recommended to farmers for the management of early blight in tomato-plants.

Link to paper:

http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDEQFjAA&url=http%3A%2F%2Fwww.feg.unesp.br%2F~ojs%2Findex.php%2Fijhdr%2Farticle%2FviewFile%2F410%2F451&ei=j-tUYGFN8HYPJfGgJgM&usg=AFQjCNE9aDaXpnegWhzMreave5Oe2_zP9g&bvm=bv.45645796,d.ZWU

Int J High Dilution Res. 2010; 9(33):138-146

Germination and vigor of lettuce seeds (*Lactuca sativa* L.) pelleted with homeopathic preparations Alumina and Calcarea carbonica subjected to toxic levels of aluminium.

Bonfim FPG, das Dores RGR, Martins ER, Casali VWD.

Abstract

Background: Aluminium toxicity is the most important factor limiting the growth of plants in acid soils, whereas current treatments are unfeasible. For this reason, alternatives are sought for, among which homeopathic treatment.

Aims: This study aimed at evaluating the influence of homeopathic preparations Alumina 6cH, Alumina 12cH, Calcarea carbonica 6cH and Calcarea carbonica 12cH on the germination and vigor of lettuce seeds subjected to toxic levels of aluminum in paper-solution. At the same time, it was sought to develop a new procedure to apply homeopathic preparations in plants (pelleting).

Methods: The statistical design was entirely randomized (CRD) with 6 treatments and 4 repetitions. Treatments included: 1) pelleted seeds/talc + Alum 6 cH; 2) pelleted seeds/talc + Alum 12cH; 3) pelleted seed/talc + Calc 6cH; 4) pelleted seeds/talc + Calc 12cH; 5) pelleted seeds/talc + distilled water; 6) non pelleted seeds (control).

Variables evaluated were: germination percentage (GP), germination speed index (GSI) and radicle length (RL).

Results : There was significant difference in GSI and RL variables that reflect the vigor of seeds - between the samples treated with homeopathic preparations and the controls.

Conclusions: Homeopathic preparations Alumina 6cH and 12cH and Calcarea carbonica 6cH and 12cH had significant effect on the vigor of lettuce seeds subjected to stress conditions.

Link to paper: <http://www.scribd.com/doc/51383418/Germination-and-Vigor-of-Lettuce-Seeds-Lactuca-Sativa-L-Pelleted-With-Homeopathic-Preparations-Alumina-and-Calcarea-Carbonica-Subjected-to-Toxic-Le>

Int J High Dilution Res. 2010;9(30):43-50.

A pilot study of the influence of Natrum muriaticum 6cH and 30cH in a standardized culture of *Phaseolus vulgaris* L.

Lensi MM, Siqueira TJ, Silva GH.

Faculdade de Ciências Farmacêuticas, PUC, Campinas, SP, Brazil.

ABSTRACT

The use of highly diluted and agitated solutions is widespread. Its use extends to all living beings including plants, acting effectively in the latter's primary and secondary metabolism. Aims: this is a pilot study designed to assess the action of Natrum muriaticum in dilutions 6 CH and 30 CH in comparison to the action of 5.0% NaCl solution administered separately to a population of *Phaseolus vulgaris* L. (common bean). Materials and methods: it was determined the relative growth rate (RGR) of the bean population treated for 6 weeks and subdivided into 4 groups (5 vases

each): P1 (control) treated with 30% alcohol solution only; P2, treated with aqueous 5.0% NaCl solution; P3, treated with Nat-m 6 CH; P4, treated with Nat-m 30 CH. Results: it was seen an increase in the salinity of the soil that caused the inhibition of the development of the bean population P2. In addition, the use of Nat-m promoted a significant increase in vegetable growth, chiefly in dilution 6 CH (P3), causing a significant increase in the RGR of the bean population. Conclusion: high dilutions of Nat-m showed to be efficient to stimulate the growth of common bean.
Link to paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/viewFile/380/417>

Bioresour Technol. 2010 Jul;101(14):5658-66. doi: 10.1016/j.biortech.2010.01.144. Epub 2010 Mar 3.

Influence of biodynamic preparations on compost development and resultant compost extracts on wheat seedling growth.

[Reeve JR](#), [Carpenter-Boggs L](#), [Reganold JP](#), [York AL](#), [Brinton WF](#).

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Abstract

Biodynamic (BD) agriculture, a form of organic agriculture, includes the use of specially fermented preparations, but peer-reviewed studies on their efficacy are rare. Composting of a grape pomace and manure mixture was studied in two years (2002 and 2005) with and without the BD compost preparations. Water extracts of finished composts were then used to fertigate wheat seedlings, with and without added inorganic fertilizer. BD-treated mixtures had significantly greater dehydrogenase activity than did untreated (control) mixtures during composting, suggesting greater microbial activity in BD-treated compost. In both years there was a distinct compost effect on wheat shoot and root biomass irrespective of supplemental fertilizer. Shoot biomass was highest in all treatments receiving 1% compost extract. Wheat seedlings that received 1% compost extract in 2005 grew similar root and shoot biomass as fertilized seedlings, despite only containing 30% as much nitrogen as the fertilizer treatment. In both years seedlings that received fertilizer plus 1% compost extract produced 22-61% more shoot biomass and 40-66% more root biomass than seedlings that received fertilizer alone, even at higher rates. In 2002 a 1% extract of BD compost grew 7% taller wheat seedlings than did 1% extract of untreated compost. At 0.1% only BD extract grew taller plants than water, but in 2002 only. No effect on shoot or root biomass was seen at 0.1%. Our results support the use of compost extracts as fertilizer substitutes or supplements, testimonial reports on the growth promoting effects of compost extracts, and the occasional superiority of BD compost to untreated compost.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/20202833>

Braz. Arch. Biol. Technol. 2010;53(4):835-843.

Homeopathic and larvicide effect of *Eucalyptus cinerea* essential oil against *Aedes aegypti*.

Cavalca PAM, Lolis MIGA, Reis B, Bonato CM.

Abstract

The aim of this work to study the homeopathic and larvicide effect of *Eucalyptus cinerea* essential oil on *Aedes aegypti*. Essential oil had high larvicide effect with LC₅₀ and LC₉₀ of 0.38 and 0.27 mg mL⁻¹, respectively. Generally, the homeopathy of essential oil affected the *A. aegypti* development stages. Dynamizations 6CH, 9CH and 12CH reduced the mean number of larvae when compared to that of control. Mean number of mosquitoes decreased through homeopathic dynamization 30CH. Results showed that *E. cinerea* essential oil was highly promising and could be used in public health system for the control of *A. aegypti*.

Link to paper: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1516-89132010000400012&lng=en&nrm=iso

Physiol Mol Biol Plants. 2010 Apr;16(2):201-6. doi: 10.1007/s12298-010-0022-x. Epub 2010 Sep 5.

TDZ-induced high frequency shoot regeneration in *Cassia sophera* Linn. via cotyledonary node explants.

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Plant Biotechnology Laboratory, Department of Botany, Aligarh Muslim University, Aligarh, 202 002 India.

Abstract

Cassia sophera Linn. is an important medicinal plant belonging to family Fabaceae. It is extensively used in Homeopathy and is well known for its medicinal properties. The present study describes a simple, efficient and reproducible regeneration system for in vitro propagation of *C. sophera* through cotyledonary node (CN) explant excised from 21 d old axenic seedlings. Explants were cultured on Murashige and Skoog (MS) medium supplemented with different concentrations of thidiazuron (TDZ). Multiple shoots were produced on all the concentrations of TDZ; however 2.5 µM concentration proved to be optimal for the production of maximum number of shoots. To avoid adverse effects of prolonged exposure to TDZ in long term establishment, the cultures were transferred to TDZ free MS medium fortified with various concentrations of 6- benzyl aminopurine (BA) for multiplication, proliferation and elongation of induced shoots. Emergence of new shoot buds and multiplication continued up to second subculture passage and maximum number (14.9 ± 1.4) of shoots obtained on MS + BA (1.0 µM). Best rooting response was observed on half strength MS containing Indole-3-butyric acid (IBA) (1.0 µM). Regenerated plantlets were successfully acclimatized and hardened off inside the culture room and then transferred to green house with 100 % survival rate.

Link to paper: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3550599/>

Int J Pharma Bio Sci. 2010;1(2):1-13.

Management of genetic activity through homoeopathy.

Gangar HU.

Abstract

Preliminary study on effects of homeopathic drugs on plants was undertaken at Central Institute for Research on Cotton Technology, Mumbai. It was found that homeopathic drugs influence genetic activity in the agricultural plant bodies in a big way. Since, there is neither brain nor any central nervous system in plants; known principles/theories of homeopathy cannot be applied here. Under this background, research study on the current subject is undertaken. It is found that medicated water (carrying homeopathic drug) contains intermolecular electrical charges. Present paper explains how these electrical charges perform the act of transferring the energy, (received from original drug), into the concerned gene within the DNA of that cell to trigger the respective gene into the act of activation, acceleration, retardation or turning off its relevant activities. This phenomenon is explained with the help of experiments on cotton, wheat, gram, mungbean etc.

Link to paper:

<http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDAQFjAA&url=http%3A%2F%2Fwww.ijpbs.net%2Fissue-2%2F177.pdf&ei=P8yGUY6VHO2o0AX0k4HQBw&usg=AFQjCNGLPVCadkcmsWx6h7apLkKIN0rr4A&bvm=bv.45960087,d.d2k>

ScientificWorldJournal. 2010 Jan 8;10:38-48. doi: 10.1100/tsw.2010.12.

Homeopathic preparations to control the rosy apple aphid (*Dysaphis plantaginea* Pass.).

[Wyss E](#), [Tamm L](#), [Siebenwirth J](#), [Baumgartner S](#).

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Abstract

A laboratory model system with the rosy apple aphid (*Dysaphis plantaginea* Pass.) on apple seedlings was developed to study the effects of homeopathic preparations on this apple pest. The assessment included the substance *Lycopodium clavatum* and a nosode of the rosy apple aphid. Each preparation was applied on the substrate surface as aqueous solution of granules (6c, 15c, or 30c). Controls were aqueous solutions of placebo granules or pure water. In eight independent, randomized, and blinded experiments under standardized conditions in growth chambers, the development of aphids on treated and untreated apple seedlings was observed over 17 days, each. Six experiments were determined to assess the effects of a strict therapeutic treatment; two experiments were designed to determine the effects of a combined preventative and therapeutic treatment. After application of the preparations, the number of juvenile offspring and the damage on apple seedlings were assessed after 7 and 17 days, respectively. In addition, after 17 days, the seedling weight was measured. In the final evaluation of the six strictly therapeutic trials after 17 days, the number of juvenile offspring was reduced after application of *L. clavatum* 15c (-17%, $p = 0.002$) and nosode 6c (-14%, $p = 0.02$) compared to the pure water control. No significant effects were observed for leaf damage or fresh weight for any application. In the two experiments with combined preventative and therapeutic treatment, no significant effects were observed in any measured parameter. Homeopathic remedies may be effective in plant-pest systems. The magnitude of observed effects seems to be larger than in models with

healthy plants, which renders plant-pest systems promising candidates for homeopathic basic research. For successful application in agriculture, however, the effect is not yet sufficient. This calls for further optimization concerning homeopathic remedy selection, potency level, dosage, and application routes.

Link to paper: <http://www.hindawi.com/journals/tswj/2010/358407/abs/>

Acta Scientarum Agronomy. 2009;31(1):101-105.

Homeopathic drugs *Arsenicum album* and *Sulphur* affect the growth and essential oil content in mint (*Mentha arvensis* L.).

Bonato CM, Proenca GT, Reis B.

Abstract

Effects of homeopathic drugs *Sulphur* and *Arsenicum album* in growth variables and essential oil content of mint are analyzed. Four homeopathic dinamizations (6, 12, 24 and 30CH) were used for both drugs in the centesimal scale (CH=centesimal hahnemannian), besides control (water). Treatments were conducted in greenhouse and homeopathic drugs applied weekly (250 mL vase⁻¹) for 98 days. Plant height, root system's dry mass, shoot's dry mass and essential oil content were determined. Among the tested homeopathy drugs, *Sulphur* increased values of fresh and dry biomass more than *Arsenicum album*. Plant height increased by the two drugs and their respective dinamizations. Whereas *Sulphur* inhibited dry biomass production, except 6CH dinamization, it increased substantially mint plant's essential oil content. *Arsenicum album* presented the same behavior as *Sulphur* drug, with the difference that it increased the fresh biomass in 24 and 30CH dinamizations. Results suggest that *Sulphur* and *Arsenicum album* modify plant metabolism, especially by increasing secondary metabolism as occurs with essential oil contents.

Link to abstract/paper:

<http://periodicos.uem.br/ojs/index.php/ActaSciAgron/article/view/6642/6642>

Homeopathy. 2009 Oct;98(4):244-66.

Use of homeopathic preparations in phytopathological models and in field trials: a critical review.

[Betti L](#), [Trebbi G](#), [Majewsky V](#), [Scherr C](#), [Shah-Rossi D](#), [Jäger T](#), [Baumgartner S](#).

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Abstract

BACKGROUND: The literature on the applications of homeopathy for controlling plant diseases in both plant pathological models and field trials was first reviewed by Scofield in 1984. No other review on homeopathy in plant pathology has been published since, though much new research has subsequently been carried out using more advanced methods.

OBJECTIVES: To conduct an up-to-date review of the existing literature on basic research in homeopathy using phytopathological models and experiments in the field.

METHODS: A literature search was carried out on publications from 1969 to 2009, for papers that reported experiments on homeopathy using phytopathological models (in vitro and in planta) and field trials. The selected papers were summarized and analysed on the basis of a Manuscript Information Score (MIS) to identify those that provided sufficient information for proper interpretation (MIS \geq 5). These were then evaluated using a Study Methods Evaluation Procedure (SMEP).

RESULTS: A total of 44 publications on phytopathological models were identified: 19 papers with statistics, 6 studies with MIS \geq 5. Publications on field were 9, 6 with MIS \geq 5. In general, significant and reproducible effects with decimal and centesimal potencies were found, including dilution levels beyond the Avogadro's number.

CONCLUSIONS: The prospects for homeopathic treatments in agriculture are promising, but much more experimentation is needed, especially at a field level, and on potentiation techniques, effective potency levels and conditions for reproducibility. Phytopathological models may also develop into useful tools to answer pharmaceutical questions.

Link to paper: <http://www.ncbi.nlm.nih.gov/pubmed/19945678>

Homeopathy. 2009 Oct;98(4):228-43.

Use of homeopathic preparations in experimental studies with healthy plants.

[Majewsky V](#), [Arlt S](#), [Shah D](#), [Scherr C](#), [Jäger T](#), [Betti L](#), [Trebbe G](#), [Bonamin L](#), [Klocke P](#), [Baumgartner S](#).

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Abstract

BACKGROUND: The last comprehensive review of experimental research on effects of homeopathic treatments on plants was published in 1984, and lacked formal predefined criteria to assess study quality. Since then several new studies with more advanced methods have been published.

OBJECTIVES: To compile a review of the literature on basic research in homeopathy with healthy plants with particular reference to studies investigating specific effects of homeopathic remedies.

METHODS: The literature search included English, French, German, Italian, Portuguese and Spanish publications from 1920 to April 2009, using predefined selection criteria. We included experiments with healthy whole plants, seeds, plant parts and cells. The outcomes had to be measured by established procedures and statistically evaluated. We developed a Manuscript Information Score (MIS) and included only publications which provided enough information for proper interpretation (MIS \geq 5). A formalised Study Methods Evaluation Procedure (SMEP) was used to evaluate these studies, and the subgroup of studies with adequate controls to identify specific effects.

RESULTS: A total of 86 studies in 79 publications was identified, 43 studies included statistics, 29 had MIS \geq 5, and 15 studies investigated the specificity of homeopathic preparations. Specific effects of decimal, centesimal and fifty millesimal potencies were found including dilution levels far beyond the Avogadro number. In consecutive series of potencies only some of the tested potencies showed effects.

There were many individual studies with diverse methods and very few reproduction trials.

CONCLUSIONS: Healthy plant models seem an useful approach to investigate basic research questions about the specificity of homeopathic preparations. More investigations with more advanced methods are recommended, especially in the sectors of potentisation techniques, effective potency levels and conditions for reproducibility. Systematic negative control experiments should become a routine procedure to control the stability of the experimental systems.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/19945677>

Homeopathy. 2009 Oct;98(4):198-207.

Isopathic treatment effects of Arsenicum album 45x on wheat seedling growth-further reproduction trials.

[Lahnstein L](#), [Binder M](#), [Thurneysen A](#), [Frei-Erb M](#), [Betti L](#), [Peruzzi M](#), [Heusser P](#), [Baumgartner S](#).

Institute of Complementary Medicine KIKOM, University of Bern, Switzerland.

Abstract

BACKGROUND: Two experimental studies on wheat preintoxicated with Arsenic trioxide yielded a significant shoot growth increase after an isopathic application of Ars-alb 45x. One independent reproduction trial however, yielded an effect inversion: wheat shoot growth was significantly decreased after application of Ars-alb 45x.

AIMS: In this study we investigated the role of three potential confounding factors on the experimental outcome: geographical location of the experiments, influence of the main experimenter, and seed sensitivity to Arsenic poisoning. Laboratory-internal reproducibility was assessed by meta-analysis.

MATERIAL AND METHODS: Wheat poisoned with Arsenic trioxide was cultivated in vitro in either Ars-alb 45x, water 45x, or unpotentised water. Treatments were blinded and randomised. Shoot length was measured after 7 days. The stability of the experimental set-up was assessed by systematic negative control (SNC) experiments.

RESULTS: The SNC experiments did not yield significant differences between the three groups treated with unpotentised water. Thus the experimental set-up seemed to be stable. We did not observe any shoot growth increase after a treatment with Ars-alb 45x in any of the newly performed experiments. In contrast, the meta-analysis of all 17 experiments performed (including earlier experiments already published) yielded a statistically significant shoot growth decrease (-3.2%, $p=0.017$) with isopathic Ars-alb 45x treatment. This effect was quantitatively similar across all five series of experiments.

CONCLUSIONS: Ultramolecular Ars-alb 45x led to statistically significant specific effects in arsenic poisoned wheat when investigated by two independent working groups. Effect size and effect direction differ, however. The investigated factors (geographical location, experimenter, seed sensitivity to Arsenic poisoning) did not seem to be responsible for the effect inversion. Laboratory external reproducibility of basic research into homeopathic potentisation remains a difficult issue.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/19945675>

Nonlinear Biomed Phys. 2009 Sep 4;3(1):10. doi: 10.1186/1753-4631-3-10.

Influence of very low doses of mediators on fungal laccase activity - nonlinearity beyond imagination.

[Malarczyk E](#), [Kochmanska-Rdest J](#), [Jarosz-Wilkolazka A](#).

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Abstract

Laccase, an enzyme responsible for aerobic transformations of natural phenolics, in industrial applications requires the presence of low-molecular substances known as mediators, which accelerate oxidation processes. However, the use of mediators is limited by their toxicity and the high costs of exploitation. The activation of extracellular laccase in growing fungal culture with highly diluted mediators, ABTS and HBT is described. Two high laccase-producing fungal strains, *Trametes versicolor* and *Cerrena unicolor*, were used in this study as a source of enzyme. Selected dilutions of the mediators significantly increased the activity of extracellular laccase during 14 days of cultivation what was distinctly visible in PAGE technique and in colorimetric tests. The same mediator dilutions increased demethylation properties of laccase, which was demonstrated during incubation of enzyme with veratric acid. It was established that the activation effect was assigned to specific dilutions of mediators. Our dose-response dilution process smoothly passes into the range of action of homeopathic dilutions and is of interest for homeopaths.

Link to paper: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2749849/>

Scientific World Journal. 2009 May 20;9:320-330. doi: 10.1100/tsw.2009.38.

Homeopathic treatment of *Arabidopsis thaliana* plants infected with *Pseudomonas syringae*.

[Shah-Rossi D](#), [Heusser P](#), [Baumgartner S](#).

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Abstract

Homeopathic basic research is still in the screening phase to identify promising model systems that are adapted to the needs and peculiarities of homeopathic medicine and pharmacy. We investigated the potential of a common plant-pathogen system, *Arabidopsis thaliana* infected with the virulent bacteria *Pseudomonas syringae*, regarding its response towards a homeopathic treatment. *A. thaliana* plants were treated with homeopathic preparations before and after infection. Outcome measure was the number of *P. syringae* bacteria in the leaves of *A. thaliana*, assessed in randomized and blinded experiments. After a screening of 30 homeopathic preparations, we investigated the effect of *Carbo vegetabilis* 30x, *Magnesium phosphoricum* 30x, *Nosode* 30x, *Biplantol* (a homeopathic complex remedy), and *Biplantol* 30x on the infection rate in five or six independent experiments in total. The screening yielded significant effects for four out of 30 tested

preparations. In the repeated experimental series, only the homeopathic complex remedy Biplantol induced a significant reduction of the infection rate ($p = 0.01$; effect size, $d = 0.38$). None of the other four repeatedly tested preparations (Carbo vegetabilis 30x, Magnesium phosphoricum 30x, Nosode 30x, Biplantol 30x) yielded significant effects in the overall evaluation. This phytopathological model yielded a small to medium effect size and thus might be of interest for homeopathic basic research after further improvement. Compared to Bion (a common SAR inducer used as positive control), the magnitude of the treatment effect of Biplantol was about 50%. Thus, homeopathic formulations might have a potential for the treatment of plant diseases after further optimization. However, the ecological impact should be investigated more closely before widespread application.

Link to paper:

<http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CEIQFjAB&url=http%3A%2F%2Fdownloads.hindawi.com%2Fjournals%2Ftswj%2F2009%2F484396.pdf&ei=tyvTUI3TKM6T0QXBp4HwAw&usg=AFQjCNHd9MNOBQrqntjtAzAln7VDrCNJog&bvm=bv.1355534169,d.d2k>

Clin Exp Homeopat. 2009;1:1–10.

Potentised drugs promote growth of Lady's finger.

Sukul N, Singh R, Sukul Chounari S, et al.

Eur J Integr Med. 2009;1(4):246-247.

Biophoton emission in high-potency research on wheat seed models.

Peters G, van Wijk R, Endler PC.

Abstract

Background: Researchers at the interuniversity college for health and development Graz/Castle of Seggau, showed in a model with seeds (*Triticum aestivum*), that homeopathic gibberellic acid (GA3) D30 is able to influence the growth length of the seeds, which had been measured after 7 days. The inhibition or the stimulation of the growth length correlated to the time period in which the researches had been done (winter, spring or autumn).

Objective: Is it possible to recognize the long-term effects from homeopathic gibberellic acid on the growth length, in very early stages, by studying coherence effects with biophoton emission measurements?

Materials and methods: The biophoton emission from *Triticum aestivum* was measured in dry and wet conditions for different time periods. For wet conditions 4 different trigger solutions were chosen: gibberellic acid (GA3) D30, water D30, gibberellic acid (GA3) molecular and water molecular. The homeopathic agents were ultra-high dilutions above the Avogadro number to prevent molecular interactions.

Results: In total 64,000 measuring points on the different samples were corrected by the background signal and evaluated. The trigger solutions showed significantly different photon emission patterns during early development.

Conclusion: The results back the hypothesis, that the effects of homeopathic agents on biological systems may be recognized in very early stages by biophoton coherence measurements. The observations of the present data showed similarities

with the growth length experiments, which had been done in the same time period. The wheat seed model which showed some fluctuations, has to be refined, and might thus be an interesting model for studying coherence interactions in relation to homeopathic agents. Further research is required to make the model more stable, to define his boundaries and to increase the amount of data.

Link to abstract/paper:

<http://www.europeanintegrativemedicinejrn.com/article/S1876-3820%2809%2900171-1/abstract>

Complement Ther Med. 2009 Apr;17(2):63-70. Epub 2009 Jan 7.

Effects of potentised substances on growth rate of the water plant *Lemna gibba* L.

[Scherr C](#), [Simon M](#), [Spranger J](#), [Baumgartner S](#).

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Abstract

OBJECTIVES: This study investigated, whether the growth rate of *Lemna gibba* L. (duckweed) can be influenced by the application of homeopathic potencies of gibberellic acid, kinetin, argentum nitricum, and *lemna minor*.

METHODS: Duckweed was grown in either potencies (14x-30x, decimal steps) or water controls (unsuccused and succused) over seven days. Frond (leaf-like structure) growth was measured using a non-destructive image analysis system. Growth rates were calculated for three time intervals (0-7, 0-3, 3-7 days). Five to six independent, randomized and blinded experiments were analysed for each of the four tested substances. Water control experiments were performed repeatedly to test the reliability of the experimental set-up (systematic negative controls).

RESULTS: The systematic negative control experiments did not yield any significant effects. Hence, false positive results could be excluded. The test system had a low coefficient of variation (1.5%). Out of the four tested substances gibberellic acid had the most pronounced effect ($p=0.0002$, F-test) on the main outcome parameter frond growth rate ($r(\text{area})$ day 0-7). Potency levels 15x, 17x, 18x, 23x and 24x reduced growth rate of *Lemna gibba* ($p<0.05$ against the pooled water control, LSD test).

CONCLUSIONS: *Lemna gibba* may be considered as a suitable test organism for further studies on the efficacy of homeopathic potencies. Evidence accumulates, that adjacent potency levels may strongly differ in their biological activity. Potential consequences for therapeutical application might be worth investigating.

Link to paper: <http://omeopatia->

veterinaria.com/PDF/Effects%20of%20potentised%20substances%20on%20growth%20rate%20of%20the%20water%20plant%20Lemna%20gibba%20L..pdf

PLoS One. 2008 Sep 4;3(9):e3133. doi: 10.1371/journal.pone.0003133.

Test system stability and natural variability of a *Lemna gibba* L. bioassay.

[Scherr C](#), [Simon M](#), [Spranger J](#), [Baumgartner S](#).

Research Institute of Organic Agriculture, Frick, Switzerland. scherr@vfk.ch

Abstract

BACKGROUND: In ecotoxicological and environmental studies *Lemna* spp. are used as test organisms due to their small size, rapid predominantly vegetative reproduction, easy handling and high sensitivity to various chemicals. However, there is not much information available concerning spatial and temporal stability of experimental set-ups used for *Lemna* bioassays, though this is essential for interpretation and reliability of results. We therefore investigated stability and natural variability of a *Lemna gibba* bioassay assessing area-related and frond number-related growth rates under controlled laboratory conditions over about one year. **METHODOLOGY/PRINCIPAL FINDINGS:** *Lemna gibba* L. was grown in beakers with Steinberg medium for one week. Area-related and frond number-related growth rates ($r(\text{area})$ and $r(\text{num})$) were determined with a non-destructive image processing system. To assess inter-experimental stability, 35 independent experiments were performed with 10 beakers each in the course of one year. We observed changes in growth rates by a factor of two over time. These did not correlate well with temperature or relative humidity in the growth chamber. In order to assess intra-experimental stability, we analysed six systematic negative control experiments (nontoxicant tests) with 96 replicate beakers each. Evaluation showed that the chosen experimental set-up was stable and did not produce false positive results. The coefficient of variation was lower for $r(\text{area})$ (2.99%) than for $r(\text{num})$ (4.27%). **CONCLUSIONS/SIGNIFICANCE:** It is hypothesised that the variations in growth rates over time under controlled conditions are partly due to endogenic periodicities in *Lemna gibba*. The relevance of these variations for toxicity investigations should be investigated more closely. Area-related growth rate seems to be more precise as non-destructive calculation parameter than number-related growth rate. Furthermore, we propose two new validity criteria for *Lemna gibba* bioassays: variability of average specific and section-by-section segmented growth rate, complementary to average specific growth rate as the only validity criterion existing in guidelines for duckweed bioassays.

Link to paper: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2518950/>

Complement Ther Med. 2008 Aug;16(4):183-91. Epub 2008 Apr 24.

Reproducibility of dwarf pea shoot growth stimulation by homeopathic potencies of gibberellic acid.

[Baumgartner S](#), [Shah D](#), [Schaller J](#), [Kämpfer U](#), [Thurneysen A](#), [Heusser P](#).

Institute of Complementary Medicine KIKOM, University of Bern, Bern, Switzerland.
stephan.baumgartner@kikom.unibe.ch

Abstract

OBJECTIVES: Investigation of the conditions for reproducibility of dwarf pea shoot growth stimulation through homeopathic potencies of gibberellic acid. **METHODS:** 4 batches of pea seed (*Pisum sativum* L. cv. Früher Zwerg; harvests from 1997, 1998, 1999, and 2000) were tested regarding their reaction to gibberellic acid 17x and 18x (compared to unsuccussed and succussed water (1x) as controls) in 8 independent randomized and blinded experiments. Pea seed was immersed for

24h in watery solutions of homeopathic potencies or controls, and cultivated under controlled laboratory conditions. Pea shoot length was measured after 14 days. Two systematic negative control experiments assessed the stability of the experimental set-up.

RESULTS: The systematic negative control experiments yielded no significant effects and confirmed the stability of the experimental set-up. 2 out of 4 seed batches reacted to the homeopathic treatment ($p < 0.05$). Seed batch 1997 showed a reproducible reaction to gibberellic acid 17x (shoot length stimulation of +11.2%, $p = 0.007$), and seed batch 1998 showed a significant varying response (increase/decrease). Seed batch 1997 differed from the other 3 batches by an increased glucose and fructose content, and reduced 1000kernel weight. Meta-analysis with data of earlier experiments is in accordance with the results of the present experimental series.

CONCLUSIONS: We identified 'seed quality' as a possible trigger factor for successful reproducibility in homeopathic basic research. Premature harvesting as a possible key factor for responsiveness of dwarf peas to homeopathic potencies of gibberellic acid is our current working hypothesis to be tested in future experiments. Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/18638708>

Environ Ecol. 2008;26(3):1115–1118.

Potentized drugs enhance growth of pidgeon pea.

Sukul N, Singh R, Sukul Chounari S, Sen P, Bhattacharyya A, Sukul A, Chakrabarty R.

Memoria Foro inter-institucional avances de la investigacion en homeopathia humana, veterinaria e agrohomeopathia. 2008;5:118–121

Cambio de potencial de hidrogeno en dinamizaciones homeopaticas de cloro en trigo (*Triticum aestivum*).

[Change in potential hydrogen chloride homeopathic potencies in wheat (*Triticum aestivum*)].

[Article in Spanish]

Ruiz Espinoza F, Ventura J, Anaya S.

Memoria Foro inter-institucional avances de la investigacion en homeopathia humana, veterinaria e agrohomeopathia. 2008;5:107–111.

Efecto de siete medicamentos homeopaticos en la produccion de lechuga orejona (*Lactuca sativus* L.).

[Effect of seven homeopathic medicines in the production of romaine lettuce (*Lactuca sativus* L.)].

[Article in Spanish]

Sanchez J.

Memoria Foro inter-institucional avances de la investigacion en homeopathia humana, veterinaria e agrohomeopathia. 2008;5:80-85.

Dinamizaciones homeopáticas (Dioscorea villosa, Calcarea carbonicum, Arsenicum album, Sulphur) como promotores de la germinación en Ferocactus histrix.

[Homeopathic potencies (Dioscorea villosa, Calcarea carb, Arsenicum album, Sulphur) as promoters of germination of Ferocactus histrix].

[Article in Spanish]

Casas Ruiz N.

Memoria Foro inter-institucional avances de la investigacion en homeopathia humana, veterinaria e agrohomeopathia. 2008;5:73–79.

Cinco medicamentos homeopaticas y su influencia en calidad de semilla de chile serranum (Capsicum annum L.), medida esta por: Prueba de germinacion e indicé de velocidad de germinacion.

[Five homeopathic medicines and their influence on seed quality serranum chile (Capsicum annum L.), measured by: Test speed germination and germination rate].

[Article in Spanish]

Sanchez J.

Memoria Foro inter-institucional avances de la investigacion en homeopathia humana, veterinaria e agrohomeopathia. 2008;5:64–72.

Influencia de cinco medicamentos homeopaticos en el crecimiento, floracion e fructificacion de chile serrano (Capsicum annum L. var. Tampiqueno).

[Influence of five homeopathic drugs on growth, flowering and fruiting of serrano chile (Capsicum annum L. var. Tampiqueño)].

[Article in Spanish]

Sanchez J.

Int J High Dilution Res. 2008;7(24):122-131.

Electromagnetic transference of molecular information in garden cress germination.

Ruzic R, Jerman I, Skarja M, Leskovar RT, Mogilnicki L.

Abstract

We followed the hypothesis that biologically relevant information from various substances can be non-chemically transferred to organisms through the combination of a high voltage electric field that can stably imprint information into water or a water solution. A special device was constructed and a thoroughly tested biological sensor system (cress seedlings exposed to heat stress) was used. Results showed biological effects of electrically imprinted information of biologically active substances into water solutions, however not necessarily with an obvious connection to the

effects of the original (donor) substance. The growth reaction of cress seedlings was either stimulatory or inhibitory depending on the time of application.

Link to paper:

<http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDAQFjAA&url=http%3A%2F%2Fwww.feg.unesp.br%2F~ojs%2Findex.php%2Fijhdr%2Farticle%2FviewFile%2F300%2F366&ei=yzmEUd3xJcHPOf-r-gNgE&usg=AFQjCNEzldjJ-LucZJyX07FE38KvMudb7g&bvm=bv.45960087,d.ZWU>

Int J High Dilution Res. 2008;7(23);113-117.

Use of homeopathic Arnica montana for the issuance of roots of Rosmarinus officinalis L. and Lippia alba (Mill) N.E.Br.

Bonfim FPG, Martins ER, das Dores RGR, Barbosa CKR, Casali VWG, Honório ICG.

ABSTRACT

This study sought to evaluate the influence of dilutions of the homeopathic preparation Arnica montana on the rooting of rosemary (*Rosmarinus officinalis*) and white Lippia (*Lippia alba*). Cuttings of *R. officinalis* and *Lippia alba* were placed for rooting in trays of commercial substrate "plantmax"-like and soon after, subjected to daily applications of Arnica montana 3cH, 6cH, 9cH and 12cH and two controls – distilled water and ethanol 70%. Statistical design was entirely casualized delineation, with 6 treatments and 4 repetitions, each experimental unit was composed by 10 stakes. Applications were made via pulverization, 10 drops of the treatment in 400 ml of water. 45 days later the number of roots, the number of shoots, the length of the largest root, the percentage of sets and the quality of stakes were assessed. Data were analyzed through variance analysis, means were compared by Tukey's test at 5% level of statistical significance. Arnica montana 3cH, 6cH and 12cH had a stimulatory effect on all variables regarding the issuance of roots in both species studied, showing the similarity of this homeopathic preparation to the physiological picture arising from the process of cutting, promoting an increase in the percentage and quality of roots.

Link to paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/viewFile/276/348>

Int J High Dilution Res. 2008;7(23):3-11.

Kinetic changes in activity of HR-peroxidase, induced by very low doses of phenol.

Malarczyk E.

Abstract

The allosteric protein of horseradish peroxidase (HRP) shows two main types of activity, peroxidase and oxidase, depending on the kind of low molecular effectors. The effects of very low doses of phenol, prepared by successive dilutions in water or in 75% ethanol, on initial HRP activity in oxidation of o-dianisidine or luminol were tested in a systematic manner by colorimetric and luminometric methods. Results showed that phenol dilutions, including those below Avogadro's number, could activate or inhibit HRP in peroxidase and oxidase-type reactions with a sinusoidal

pattern. Km values for the studied substrates changed parallel to HRP peroxidase/oxidase activity and the maximum activity in the peroxidase reaction corresponded to the minimum activity in the oxidase reaction and vice versa. The effect also depended on the type of dilutor. The observations of the peroxidase/oxidase oscillations in the sinusoidal pattern of HRP activity, dependent on the rate of phenol dissolution and the time of pre-incubation, point out to the conclusion that HRP might be a good model for high dilutions research. The experiments provide strong evidence that horseradish peroxidase (HRP) is a very sensitive detector of subtle changes in the concentration of phenol used as a cofactor in the peroxidase-oxidase reaction.

Link to paper:

<http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CEEQFjAB&url=http%3A%2F%2Fwww.feg.unesp.br%2F~ojs%2Findex.php%2Fijhdr%2Farticle%2FviewFile%2F37%2F349&ei=54uFUcObG8jgOvLlgO&usg=AFQjCNF3-Of1HSRTiJ71xKJQmKgarbvXkA&bvm=bv.45960087,d.ZWU>

Int J High Dilution Res. 2008;7(22):31–35.

Effects of high dilutions of *Cymbopogon winterianus* Jowitt (Citronella) on the germination and growth of seedlings of *Sida rhombifolia*.

Marques R, Marques-Silva G, Bonato C.

Abstract

The effects of high dilutions of *Cymbopogon winterianus* (citronella) on the growth and germination of *Sida rhombifolia* are analyzed; 5 homeopathic dilutions (3cH, 6cH, 12cH, 24cH, 30cH) and a control (water) were used, with 5 repetitions. Variables analyzed were the primary growth of the root system, length of the shoot, fresh mass total, germination percentage and germination speed index. All dilutions stimulated the primary growth of the root. Dilutions 3cH, 6cH, 12cH and cH stimulated the growth of the aerial parts and 24cH inhibited it. Dilutions 6cH, 12cH, 24cH and 30cH stimulated a larger production of fresh mass than 3cH. Dilution 12cH resulted in the largest germination percentage while 24cH in the lowest. Dilution 12cH resulted in the highest score in the germination speed index, while 3cH and 24cH in the lowest.

Link to paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/viewFile/208/342>

FACT. 2007 Dec;12(1):30-31.

The effects of some nanodilutions on plant development.

Kosturkova GP, Delinick AN, Sikalidis CA.

Link to abstract/paper: <http://onlinelibrary.wiley.com/doi/10.1111/j.2042-7166.2007.tb05891.x/full>

J Altern Complement Med. 2007 Nov;13(9):931-937.

Duckweed (*Lemna gibba* L.) as a test organism for homeopathic potencies.

[Scherr C](#), [Simon M](#), [Spranger J](#), [Baumgartner S](#).

Research Institute of Organic Agriculture, Frick, Switzerland. scherr@vfk.ch

Abstract

OBJECTIVES: A bioassay with duckweed (*Lemna gibba* L.) was used to study the effects of homeopathic potencies on the plant's growth rate. Screening included 12 substances: argentum nitricum, copper sulfate, gibberellic acid, 3-indole acetic acid, kinetin, lactose, lemna minor, methyl jasmonate, metoxuron, phosphorus, potassium nitrate, and sulfur. Each substance was tested in the potency range 14x-30x. Controls were unsuccussed and succussed water.

DESIGN: In randomized and blinded experiments, duckweed was grown in either potentized substances or water controls over 7 days. Frond (leaf) growth was measured regularly with a computerized image analysis system and growth rates were calculated for different time intervals (day 0-7, 0-3, 3-7). Additionally, a water control run with unsuccussed water as the only test substance was performed to determine the variability of the bioassay.

RESULTS: For the water control run, the between-group coefficient of variance for groups of five replicates was 0.87% for the frond area-related average specific growth rate $r(\text{area})$ compared to 1.60% for the frond number-related average specific growth rate $r(\text{num})$. Thus, the former is the preferred parameter to be used. Of twelve tested substances, potentized argentum nitricum, phosphorus, and kinetin significantly ($p < 0.05$, analysis of variance F-test) affected the main parameter: frond area-related average specific growth rate (day 0-7). Segmented area growth rates (day 0-3 or 3-7) were affected by potentized argentum nitricum, gibberellic acid, lactose, and phosphorus.

CONCLUSIONS: The described experimental set-up with *L. gibba* as test organism appears to be a promising new model system to investigate effects of potentized substances. Yet larger sets of replication experiments with selected test substances and systematic negative controls are necessary to verify the effects found.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/18047439>

Int J High Dilution Res. 2007 Oct-Dec;21:24-28.

Homeopatia em Modelos Vegetais.

[Homeopathy in plant models].

[Article in Portuguese]

Bonato CM.

English Abstract

The use of dynamized substances in agriculture, especially on plants, has been growing fast. Diseases or physiological disorders are not considered merely the results of the action of physiopathological agents and abiotic factors, but a consequence of the loss of homeostasis in the organism. Notions proper to homeopathy are used in several areas of agriculture. Although effective results have been observed both in the academic and the field milieus, not too much is known regarding the physiological mechanisms of action of the dynamized substances on plants. Usually, the applications to agriculture are grounded on the principle of isopathy, as they do not involve the observation of symptoms, a necessary step in

homeopathy in strict sense. Nevertheless, the continually growing knowledge on vegetal physiology allows describing symptoms and physiological reactions in plants quite similar to the human ones. Thus, there is a possibility to ground the selection of remedies on symptoms and to apply homeopathy to plants. This paper discusses some physiological properties observed in plants which may help choosing the most suitable remedy according to the principle of similarity.

Link to paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/35/28>

Forsch Komplementmed. 2007 Oct;14(5):301-5. Epub 2007 Oct 25.

The role of variability in evaluating ultra high dilution effects: considerations based on plant model experiments.

[Nani D](#), [Brizzi M](#), [Lazzarato L](#), [Betti L](#).

Italian Society of Anthroposophical Medicine, Milan, Italy.

Abstract

A series of experiments, performed on plant models with ultra high dilutions (UHD) of arsenic trioxide at 45th decimal potency has been reviewed with a particular focus on variability. The working variables considered are: the number of germinated seeds out of a fixed set of 33, the stem length of wheat seedlings and the number of necrotic lesions in tobacco leaf disks inoculated with tobacco mosaic virus (TMV). A thorough comparison between treatment and control group has been proposed, considering the two main sources of variability in each series of experiments: variability within and between experiments. In treated groups, a systematic decrease in variability between-experiments, as well as a general decrease, with very few exceptions, in variability within experiments has been observed with respect to control. Variability is traditionally considered as control parameter of model systems. Our hypothesis, based on experimental evidences, proposes a new role of variability as a target of UHD action. This hypothesis may help interpret unanswered questions that keep rising in basic and clinical research in homeopathy.

Link to paper: <http://www.medicinaantroposofica.it/page-societ%C3%A0/the-role-of-variability.pdf>

Environ Ecol. 2007;25S:520-524.

Enhancement of photosynthesis and plant growth by potentized drugs.

Sukul NC, Chattopadhyay S, Das C, Ghosh S, Sinhababu SP.

Indian Journal for Research in Homeopathy. 2007;1(1):1–5.

Management and control of genetic processes in cotton plants through homeopathy.

Gangar HU.

Abstract

Detailed study on effects of homoeopathic drugs on plant bodies was undertaken at

Central Institute for Research on Cotton Technology (ICAR) in Mumbai. This paper presents promising results of some of these preliminary experiments. This study reveals that electrically neutral and pure distilled water develops internal electrical charges as soon as homeopathic drugs are added into it. Different drugs as well as different potencies of same drug develop different electrical charges. Further experiments, conducted on plants, proved that medicated water containing drugs of highest potency strongly influences the genetic processes of plants. It can accelerate germination process, can shorten cultivation period, can enhance yield as well as quality of cotton crop and also makes it possible to grow it during off-season.

Link to paper:

<http://www.homeopathyworldcommunity.com/group/agricultureplants/forum/topics/management-control-of-genetic>

Forsch Komplementmed. 2006 Oct;13(5):298-306. Epub 2006 Oct 20.

Effects of potentised substances on growth kinetics of *Saccharomyces cerevisiae* and *Schizosaccharomyces pombe*.

[Scherr C](#), [Baumgartner S](#), [Spranger J](#), [Simon M](#).

Verein für Krebsforschung, Institut Hiscia, Arlesheim, Schweiz. scherr@vfk.ch

Abstract

BACKGROUND: Homeopathic potencies are used as specific remedies in complementary medicine. Since the mode of action is unknown, the presumed specificity is discussed controversially.

OBJECTIVE: This study investigated the effects of potentised substances on two yeast species, *Saccharomyces cerevisiae* and *Schizosaccharomyces pombe*, in a stable and reliable test system with systematic negative controls.

MATERIALS AND METHODS: Yeast cells were cultivated in either potentised substances or water controls in microplates and their growth kinetics were measured photometrically. Water control runs were performed repeatedly to investigate the stability of the experimental set-up (systematic negative controls).

RESULTS: 4 out of 14 screened substances seem to have affected the growth curve parameters slope or yield. Out of these substances, azoxystrobin and phosphorus were chosen for 8 further replication experiments, which partly confirmed the results of the screening. On the average of all experiments, azoxystrobin affected the slope of the growth curve of *Saccharomyces cerevisiae* ($p < 0.05$), and phosphorus affected the slope of the growth curve of *Schizosaccharomyces pombe* ($p < 0.05$). No effects were seen in the water control runs. In addition, significant interactions between treatment with potentised substances and experiment number were observed in all experiments with potentised substances ($p < 0.01$), but not in the water control runs.

CONCLUSIONS: Both yeast species reacted to certain potentised substances by changing their growth kinetics. However, the interactions found point to additional factors of still unknown nature, that modulate the effects of potentised substances. This stable test system with yeasts may be suitable for further studies regarding the efficacy of homeopathic potencies.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/17057391>

Int J High Dilution Res. 2006;5(17):14-17.

Application of homeopathic remedy Carbo vegetabilis and development of plants of lettuce.

[Aplicação do Medicamento Homeopático Carbo vegetabilis e Desenvolvimento das Mudanças de Alface].

[Original Article in Portuguese]

Rossi F, Melo PCT, Ambrosano EJ, Guirrao N, Schaminass EA.

Abstract

The aim of this work was to verify the influence of the application of the homeopathic preparation Carbo vegetabilis, in different dynamizations, on the development of lettuce seedlings in two environments of production, a stress one, under the shade in greenhouse, and a normal one, completely under the sun in a greenhouse. The treatments consisted in Hahnemanian centesimal dynamizations 6CH, 12CH, 30CH, 100CH and 200CH, and two control treatments, alcohol 70%, and an absolute control, in which nothing was applied. There was significance in polynomial regression of the third degree for the changes produced in normal environment, inflection point on the curve corresponding to the maximum value of the analyzed variable of young plants produced in stress conditions. The increment of the dry mass of aerial part of seedlings and amount of young plants developed in the field 15 days after the transplant demonstrated that the 100CH dynamization was responsible for balance of seedlings produced in stress conditions.

Link to original paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/173/177>

Int J High Dilution Res. 2006 Jul-Sep;5(16).

Aplicação dos Medicamentos Homeopáticos Lachesis e Isoterápico do Vírus do Mosaico da Cana-de-açúcar (SCMV) sobre o Crescimento e Infecção Viral em Sorgo (Sorghum bicolor (L.) Moench).

[The Application of the Homoeopathic Drugs Lachesis and Isotherapeutic Virus in the Growth and Infection Control for SCMV in Sorghum (Sorghum bicolor (L.) Moench) Plants].

[Article in Portuguese]

Bonato CM, Viotto EG, Hara JH, Reis B, Myzote AT, Cisneiros JA.

English Abstract

The aim of this research was to analyze the effect of homoeopathic drugs Lachesis and Virus on some variables of growth and infection control for SCMV in sorghum plants. 4 dynamizations of Lachesis (6CH, 12CH, 24CH and 30CH) and 4 dynamizations of Virus (3CH, 6CH, 12CH and 30CH) were used, including control (water) for both drugs. The application of Lachesis and Virus improved the general conditions of the plants in practically all the studied variables when it is compared with the control. Dynamizations 30CH of Lachesis and Virus induced the best results. Control was the treatment that presented the most negative results. Results suggest that Lachesis can be an alternative for agricultural use, reducing the use of chemical inputs and protecting the environment.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/235/268>

Int J High Dilution Res. 2006 Jul-Sep;5(16).

Análise de Regressão do Teor de Tanino das Plantas de *Porophyllum ruderale* após a Aplicação de Sulphur 4CH.

[Regression Analysis of Tannin Content in *Porophyllum ruderale* Plants after application of Sulphur 4CH].

[Article in Portuguese]

Fonseca Marques MC, Dias Casali VW, Cecon PR.

English Abstract

Medicinal plants like *Porophyllum ruderale* are more suitable to pathogenetic tests as tannin changes, because they were not disturbed by genetic selections for yield or for dependence to agrochemicals. A double blind trial under randomized blocks design of 3 replicates, 8 tannin determinations (each 48 hours) and a control (distilled water) was conducted. A single application of Sulphur 4CH was performed over the soil of pots containing one plant. Tannin content of control plants remained about the same from zero to 13 days period ($y = 1,4768$). Tannin of Sulphur treated plants decreased from the day of application up to 48th hour but reached minimum value by 96th hour and by 192nd hour it was equal to control plants reaching maximum value by 288th hour decreasing then on until the end of the trial. Adjustment through regression analysis allowed the interpretation of the data along the study period.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/230/258>

Int J High Dilution Res. 2006 Jul-Sep;5(16).

Avaliação dos Efeitos da Aplicação de Soluções Homeopáticas de *Rosmarinus officinalis* L. e *Artemisia absinthium* L. na Germinação e no Desenvolvimento de Corda-de-viola (*Ipomea* sp).

[Effects of Homeopathic Solutions of *Rosmarinus officinalis* L. and *Artemisia absinthium* L. on the Germination and Growing of Cordade-viola (*Ipomea* sp)].

[Article in Portuguese]

Marques-Silva GG, Bonato CM.

English Abstract

Several studies demonstrated the many applications of homeopathy in agriculture. One of these applications refers to the increase and inhibition of the seeds germination. This aim of this research was to study the effects of homeopathic solutions of Rosemary (*Rosmarinus officinalis* L.) and Wormwood (*Artemisia absinthium* L.) in germination and development of corda-de-viola seedlings (*Ipomea* sp). Homeopathic solutions of these plants were used in the 3CH, 6CH, 9CH, 12CH, 24CH and 30CH dinamizations. 5 repetitions were made with 20 seeds each. The fresh mass production of corda-de-viola seedlings suffered inhibition in 6CH dinamization of Wormwood and increase in 9CH, 12CH, 24CH and 30CH

dinamizations of Rosemary. The values of dry mass were increased in 3CH dinamization of Wormwood. The dinamizations 12, 24 and 30CH of Rosemary increased the number of seeds germinated.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/232/262>

Int J High Dilution Res. 2006 Jul-Sep;5(16).

Repetibilidade e Estabilidade da Fotossíntese em Plantas de Spagneticola Trilobata tratadas com Cantharis.

[Repeatability and Stability of Photosynthesis in Spagneticola Trilobata Plants Treated with Cantharis].

[Article in Portuguese]

da Silva RTB, Casali VWD, Lisboa SP, da Silva MRB, Cruz CD.

Abstract

A aplicação de preparados homeopáticos em plantas pode alterar o metabolismo primário representado pela fotossíntese. Foi determinada a assimilação de CO₂ em plantas clonadas, via Analisador de Gás no Infravermelho. As determinações foram feitas a cada 30 segundos, durante 10 minutos após o tratamento com Cantharis 3CH, 5CH, 7CH, 9CH e com água destilada (controle). Os dados foram submetidos as análises: variância, estabilidade (Plaisted e Peterson), repetibilidade (Componente Principal, de Covariância e Correlação) via programa GENES. Os tratamentos causaram efeitos estatisticamente significativos na fotossíntese líquida. Houve maior oscilação dos dados exceto com 7CH e controle. O coeficiente de repetibilidade dos resultados foi 95%, demonstrando que o padrão de resposta persistiu no decorrer do tempo de 10 minutos. A repetibilidade e estabilidade dos dados comprovaram a precisão experimental e a constância dos efeitos após a aplicação do preparado homeopático.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/233/265>

Int J High Dilution Res. 2006 Jul-Sep;5(16).

Repetibilidade dos Resultados da Assimilação de CO₂ em Plantas de Sphagneticola trilobata Tratadas com Apis Mellifica 6CH.

[Repeatability of CO₂ Assimilation Data in Plants of Sphagneticola trilobata Treated with Apis Mellifica 6CH].

[Article in Portuguese]

da Silva MRB, da Silva RTB, Casali VWD.

English Abstract

Homeopathic solutions may influence the rate of photosynthesis Sphagneticola trilobata plants. CO₂ assimilation of 3 replicates of cloned plants along 20 consecutive minutes was quantified through the Infra Red Gas Analyzer after application of Apis mellifica 6CH and distilled water (control). Repetibility analysis were performed through GENES program after variance analysis. Repetibility coefficient of CO₂ results was 99% meaning that the differences between control

and treated plants results were kept along 20 determinations. Stability results of CO₂ assimilation were greater in plants treated with *Apis mellifica* as compared to control.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/234/266>

Int J High Dilution Res. 2006 Jul-Sep;5(16).

Microbial efficiency in soil treated with homeopathy.

Andrade FMC, Casali VWD, Kasuaya MCM, Cecon PR.

Abstract

The efficiency of soil microorganisms was evaluated through the indicator metabolic quotient (qCO₂). The experiment followed the agronomic protocol of randomized blocks, with 3 replicates, in split plots (days after treatment), 18 homeopathies plus a control. Homeopathies were: Sulphur D12 and D201; Magnesium carbonicum D12, D30 and D201; Phosphorus D6, D12, D30 and D201; Calcarea carbonica D30 and D201; Kali carbonicum D6 and D30; Solum unum D9, D30 and D201; Silicea terra D201 and Carbo vegetabilis D30. The means of qCO₂ (respiration rate of the soil per microbial carbon) were grouped by Scott-Knott test at 5 % probability. The homeopathic remedies did influence the stability of the soil system. Microbial efficiency was mainly decreased by Magnesium carbonicum and increased by Solum unum, indicating the potential use of homeopathic remedies in managing soil dynamics.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/viewArticle/226>

Int J High Dilution Res. 2006 Jul-Sep;5(16).

Aplicação dos Medicamentos Homeopáticos Lachesis e Isoterápico do Vírus do Mosaico da Cana-de-açúcar (SCMV) sobre o Crescimento e Infecção Viral em Sorgo (*Sorghum bicolor* (L.) Moench).

[The Application of the Homoeopathic Drugs Lachesis and Isotherapeutic Virus in the Growth and Infection Control for SCMV in Sorghum (*Sorghum bicolor* (L.) Moench) Plants].

[Article in Portuguese]

Bonato CM, Viotto EG, Hara JH, Reis B, Myzote AT, Cisneiros JA.

English Abstract

The aim of this research was to analyze the effect of homoeopathic drugs Lachesis and Virus on some variables of growth and infection control for SCMV in sorghum plants. 4 dinamizations of Lachesis (6CH, 12CH, 24CH and 30CH) and 4 dinamizations of Virus (3CH,6CH, 12CH and 30CH) were used, including control (water) for both drugs. The application of Lachesis and Virus improved the general conditions of the plants in practically all the studied variables when it is compared with the control. Dinamizations 30CH of Lachesis and Virus induced the best results. Control was the treatment that presented the most negative results. Results suggest that Lachesis can be an alternative for agricultural use, reducing the use of chemical inputs and protecting the environment.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/235/268>

Int J High Dilution Res. 2006 Jul-Sep;5(16).

Controle da Ferrugem (*Phakopsora euvtis* Ono) em Videira pela Aplicação de Soluções Homeopáticas.

[Rust (*Phakopsora euvtis* Ono) Control in the Grape Culture with the Application of Homeopathic Solutions].

[Article in Portuguese]

C.M. Bonato ; A. Ferreira de Souza; M.A. Collet.

English Abstract

The objective of this experiment was to verify the applicability of some homeopathic solutions in the rust control in the grape culture. Homeopathic solutions used were *Silicea terra* 30CH and isoterapic 6CH, 12CH and 30CH. Homeopathic treatments reduced the rust attack substantially when compared to the control (water).

Homeopathic solutions *Silicea terra* 30CH and isoterapic 6CH, 12CH and 30CH only presented 7, 17, 9 and 18% of the severity degree presented by the treatment controls (100%), respectively. The results suggest that the homeopathic solutions can be an alternative viable and ecologically correct for the control of biotic factors that commit the productivity in the grape culture.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/236/270>

Int J High Dilution Res. 2006 Jul-Sep;5(16).

Interação entre Assimilação de CO₂ e Minutos Pós-tratamento de Plantas de *Sphagneticola trilobata* com *Apis mellifica* 6CH.

[Interaction among CO₂ Assimilation and Minutes Post-treatment of *Sphagneticola trilobata* with *Apis mellifica* 6CH].

[Article in]

da Silva MRB, Casali VWD, Bonato CM, Santos NT.

Universidade Federal de Viçosa/DFT, Viçosa-MG; Universidade Estadual de Maringá-PR, Brasil
vwcasali@ufv.br

English Abstract

Apis mellifica affects gas exchange according to *Matéria Médica*. *Sphagneticola trilobata* (L.) Pruski, a medicinal plant, gives fast physiological responses of CO₂/O₂ exchanges after homeopathic treatment. An infrared gas analyzer was used to quantify the CO₂ assimilation of cloned plants (3 replicates) that received *Apis mellifica* 6CH and distilled water. The interaction of *Apis mellifica* was statistically significant except at the 17th minute. Assimilation of CO₂ was increased by *Apis mellifica* as compared to control. The F test of regression analysis was statistically significant. There was greater data oscillation and less adjustment of CO₂ assimilation results from plants treated with *Apis mellifica*. Results support previous

data and ratify that plants are fast responsive to homeopathic treatment as long as metabolic variables are measured.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/227/256>

Int J High Dilution Res. 2006 Jul-Sep;5(16).

Patogenesia em Plantas de *Ocimum basilicum* L.: Experimentação Homeopática em Blocos Casualizados.

[Pathogenesis in *Ocimum basilicum* L. Plants: Homeopathic Experimentation under Randomized Blocks].

[Article in Portuguese]

Almeida AZ, Casali VWD, Cecon PR.

English Abstract

Agronomic experimentation applies statistical designs like randomized blocks that allow to control many influences over plants improving scientific precision of pathogenesis tests. An experiment on pathogenesis over the essential oil of inflorescences and fresh matter of inflorescences was conducted. For 30 consecutive days, twice a day, over the pot soil, under double blind procedure, it was applied: two controls (A – distilled water; B – ethanol 70%) and the homeopathic preparations (30CH) *Calcarea carbonica*, Sulphur, *Arsenicum album*, *Carbo vegetabilis*, Phosphorus, *Silicea terra*. Compared to control A by Duncan test of means (0,05%) the following pathogenesis effects were statistically significant: 1st – Phosphorus increased 40% the MFI and 140% the OE (this was interpreted as a physiological dilution of OE related to MFI); 2nd there was decrease of OE being Sulphur 52,8%, *Calcarea carbonica* 47,5%, *Carbo vegetabilis* 27,3%, *Silicea terra* 20,9% and Ethanol 49,9%.

Link to abstract/paper:

<http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/231/260>

Homeopathy. 2006 Jul;95(3):144-147.

Amelioration of root-knot disease of lady's finger plants by potentized Cina and Santonin.

[Sukul NC](#), [Ghosh S](#), [Sukul A](#), [Sinhbabu SP](#).

Department of Zoology, Visva-Bharati University, Santiniketan 731235, West Bengal, India. ncsukul@rediffmail.com

Abstract

Lady's finger plants (*Hibiscus esculentus*), grown in pots, were inoculated with the second-stage larvae (76+/-6) of root-knot nematodes *Meloidogyne incognita*, starting 7 days later they were treated with Cina 30c, Santonin 30c or Ethanol 30c by foliar spray for 10 consecutive days. The drugs in 90% ethanol were diluted with distilled water 1:1000 before application on plants. Thirty days after the last treatment the plants were uprooted. Cina 30c and Santonin 30c reduced nematode infestation of plants significantly in terms of root-gall number, root-protein content and nematode

population in roots. Santonin 30c reduced root water content. Santonin 30c may have influenced the water channel proteins of root tissues thereby altering the water contents of roots. The reduced water content in roots might have adversely affected the root-knot nematodes and thus reduced nematode infestation. Ethanol 30c also has some effect on treated plants.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/16815517>

J Altern Complement Med. 2006 May;12(4):359-65.

Does potentized HgCl₂ (Mercurius corrosivus) affect the activity of diastase and alpha-amylase?

[Witt CM](#), [Bluth M](#), [Hinderlich S](#), [Albrecht H](#), [Lüdtke R](#), [Weisshuhn TE](#), [Willich SN](#).

Institute for Social Medicine, Epidemiology and Health Economics, Charité University Medical Center, Berlin, Germany. claudia.witt@charite.de

Abstract

BACKGROUND: Homeopathic drugs even with dilutions beyond 10(23) (high potencies) are frequently used, although their working mechanism is still unknown. Curative information preserved in solvent structure is postulated to exert biologic effects.

OBJECTIVE:

The objective was to test for a stimulating or inhibiting effect of high potencies of the homeopathic remedy HgCl₂ (Mercurius corrosivus) on two sugar hydrolases.

METHODS: High potencies were produced using stepwise dilution plus shaking. Controls included potentized solvent (aqua bidestillata), equimolar dilutions without shaking, and enzyme-free references. Tested were potencies with dilution factors 1:200 (CC) on diastase extract from winter barley, and 1:100 (C) on alpha-amylase from hog pancreas. Enzyme activity was colorimetrically determined by Lugol's iodine-starch reaction.

RESULTS: An inhibiting effect of HgCl₂ on enzyme activities was observed only in low potencies and dilutions. Statistically significant differences between potencies and controls were not found in randomized and blinded experiments.

CONCLUSIONS: This experimental design provided independent reproducible results of cell-free in vitro assays. However, it did not indicate an effect of potentized HgCl₂ on hydrolases. Demonstrating potency effects may require additional experimental features.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/16722785>

Homeopathy. 2006 Apr;95(2):98-102.

Effects of Cina on root-knot disease of mulberry.

[Datta SC](#).

Department of Zoology, Visva-Bharati University, Santiniketan 731235, West Bengal, India. dattasubhas@rediffmail.com

Abstract

Root-knot disease of mulberry is caused by the nematode *Meloidogyne incognita*. It has important economic implications for sericulture. The homeopathic medicines, Cina mother tincture (MT) and potentised Cina 200C, prepared from the flowering meristems of *Artemisia nilagirica* (Clarke) Pamp, were applied by foliar spray on mulberry (*Morus alba* L.) infected with *M. incognita* juveniles (J2). Pretreatment (ending 6 days before inoculation) and post-treatment (starting 6 days after inoculation) schedules were tested. The two uninoculated control batches were treated with the same procedure with Cina MT and Cina 200C. Both pre- and post-treatment significantly reduced nematode infection in terms of root gall number and nematode population in root. All the treated plants showed improved growth in terms of fresh biomass of shoot and root, length of shoot and root, number of leaves, leaf surface area, root and leaf-protein content. Cina 200C is more effective than Cina MT in all respects of nematode control as well as growth of the test plants. Pretreatments show slightly better effects than the post-treatments. It is interesting that inoculated and treated plants not only are less affected by nematodes but also have a better growth than uninoculated, untreated control.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/16569626>

Fit. Bras. 2006 Mar-Apr;31(2):171-179.

Avaliação de produtos alternativos para controle da requeima do tomateiro. [Quantification of the efficacy of alternative products for tomato late blight control].

[Article in Portuguese]

Diniz LP, Maffia LA, Dhingra OD, Casali VWD, Santos RHS, Mizubuti ESG.

English Abstract

The efficacy of alternative products to manage tomato (*Lycopersicon esculentum*) late blight, caused by *Phytophthora infestans*, was evaluated in three field trials (E) that compared: E1- [chili pepper (*Capsicum chinense*)+ black pepper (*Piper nigrum*) + clove (*Syzygium aromaticum*) + turmeric (*Curcuma longa*) + garlic (*Allium sativum*) extracts]; (black pepper + clove + garlic extracts); and (clove + turmeric + garlic extracts); E2 - neem (*Azadirachta indica*) oil (0.5%), crude cow milk diluted in water (20% v/v), and Bordeaux mixture; E3 - homeopathic preparation (from tomato tissue infected with *P. infestans* – C30), the water-ethanol mixture, and Bordeaux mixture. All experiments had two controls: no sprays and metalaxyl. Severity at halfway through the epidemic (Y_{50}); at the end of the epidemic (Y_{max}); area under disease progress curve (AUDPC); and disease progress rate (r) were estimated. None of the extracts reduced Y_{50} , Y_{max} , AUDPC, or r values. Neem oil and Bordeaux mixture resulted in similar Y_{50} values (3% and 1%, respectively). Y_{max} (44%) in plots treated with neem was higher than in those treated with Bordeaux mixture (14%). Milk at 20% did not reduce Y_{max} . Values of r (0.161) and AUDPC (533) were lower with neem oil than in control ($r = 0.211$ and AUDPC = 1186) and similar to the Bordeaux mixture plots ($r = 0.156$ and AUDPC = 130). Values of r and AUDPC on plots treated with milk were similar to those in the control plots. There was no significant reduction of Y_{50} , Y_{max} , AUDPC, or r values when plants were treated with homeopathic product. Bordeaux mixture was the most efficient treatment in controlling late blight. Neem oil is potentially useful. Integrated management must be

implemented to keep late blight at acceptable levels on alternative tomato production systems.

Link to paper: <http://www.scielo.br/pdf/fb/v31n2/30011.pdf>

Int J High Dilution Res. 2006 Jan-Mar;5(14):6–8.

Efeito de aplicação única dos preparados homeopáticos calcarea carbonica, kalium phosphoricum, magnesium carbonicum, natrium muriaticum e silicea terra no teor de tanino em *Porophyllum ruderale* (Jacqu.) Cassini.

[Effect of a single application of homeopathic preparations calcarea carbonica, kalium Phosphoricum, carbonicum magnesium, and natrium muriaticum silicea land in tannin content in *Porophyllum ruderale* (Jacqu.) Cassini].

[Article in Portuguese]

Fonseca M, Casali V, Cecon P.

English Abstract

Experiments on the effect of homeopathy in plants are being conducted by growers. Benefic effects are several, especially the production of residue-free plants, very important to medicinal plants. The objective of the present trial was to establish the reaction of *Porophyllum ruderale* to five different homeopathic preparations, concerning the tannin yield of leaves and roots. Homeopathic preparations elicited significant effects, either increasing, or decreasing tannin yield. Single applications of Sulphur, Natrium muriaticum, Kalium phosphoricum and Calcarea carbonica at the 4CH dynamization increased tannin yield 240-288 hours after application; Silicea terra and Magnesium carbonicum 4CH between 288-336 hours after application. Kalium phosphoricum and Calcarea carbonica were the homeopathic preparations that elicited maximal increase in tannin yield of leaves. The use of homeopathic preparations in *P. ruderale* employed in human nutrition may reduce tannin yield, reduce astringency and improve palatability. On the other hand, homeopathic preparations that increase pharmacologically active compounds is of interest to phytotherapy.

Link to paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/viewFile/150/153>

Am J Enol Vitic. 2005 Dec;56(4):367-376.

Soil and Winegrape Quality in Biodynamically and Organically Managed Vineyards.

Reeve JR, Carpenter-Boggs L, Reganold JP, York AL, McGourty G, McCloskey LP.

Abstract

Wines produced from biodynamically grown grapes have received increasing attention. Similar to organic agriculture, biodynamics eliminates synthetic chemical fertilizers and pesticides. The primary difference between the two farming systems is that biodynamics uses a series of soil and plant amendments, called preparations, said to stimulate the soil and enhance plant health and quality of produce. Whether these preparations actually augment soil or winegrape quality is unclear and controversial. A long-term, replicated, 4.9-ha study was initiated in 1996 on a commercial Merlot vineyard near Ukiah, California, to investigate the effects of these

biodynamic preparations on soil and winegrape quality. The study consisted of two treatments, biodynamic and organic (the control), each replicated four times in a randomized, complete block design. All management practices were the same in all plots, except for the addition of the preparations to the biodynamic treatment. No differences were found in soil quality in the first six years. Nutrient analyses of leaf tissue, clusters per vine, yield per vine, cluster weight, and berry weight showed no differences. Although average pruning weights for both treatments in 2001 to 2003 fell within the optimal range of 0.3 to 0.6 kg/m for producing high-quality winegrapes, ratios of yield to pruning weight were significantly different ($p < 0.05$) and indicated that the biodynamic treatment had ideal vine balance for producing high-quality winegrapes but that the control vines were slightly overcropped. Biodynamically treated winegrapes had significantly higher ($p < 0.05$) Brix and notably higher ($p < 0.1$) total phenols and total anthocyanins in 2003. Biodynamic preparations may affect winegrape canopy and chemistry but were not shown to affect the soil parameters or tissue nutrients measured in this study.

Link to abstract/paper: <http://ajevonline.org/content/56/4/367.abstract>

Homeopatia Mex. 2005 Sep-Oct;74(638):170-179.

Agrohomeopatía una opción para la agricultura en Cuba.

[Agrohomeopathy an option for agriculture in Cuba].

[Article in Spanish]

Moreno NM,

Abstract

En este trabajo hemos realizado una recopilación de los principales trabajos realizados en Cuba por nuestro grupo de investigación, sobre la aplicación de la Homeopatía en la agricultura (Agrohomeopatía), tema este que va despertando el interés de los científicos de todo el mundo que se dedican a la investigación en agricultura en aras de obtener alimentos sanos e baratos, así como las perspectivas que nos ofrece la aplicación de esta terapéutica a las plantas. [...] La aplicación de la terapéutica homeopática en la agricultura es limitada y en Cuba ya se comienzan a dar los primeros pasos en la aplicación de esta terapéutica. [...] Para dar continuidad a todos estos trabajos se oferta en nuestra institución un diplomado en Agrohomeopatía, donde se forman los especialistas en este tema.

Link to abstract/paper: <http://bases.bireme.br/cgi-bin/wxislind.exe/iah/online/?IscScript=iah/iah.xis&src=google&base=LILACS&lang=p&nextAction=lnk&exprSearch=526459&indexSearch=ID>

Rev Bras Pl Med. 2005;7(3):33-36.

Efeito da homeopatia de Arnica montana, nas potências centesimais, sobre plantas de artemísia.

[Effect of homeopathic Arnica montana, the proximate powers, on sagebrush plants].

[Article in German]

Carvalho LM, Casali VWD, Lisboa SP, Souza MA, Cecon PR.

Abstract

Quarenta e cinco dias após o transplante em vasos, plantas de *Tanacetum parthenium* (L.) Schultz-Bip., obtidas de sementes, receberam preparados homeopáticos de *Arnica montana*, escala centesimal (CH1, CH2, CH3, CH4 e CH5). As aplicações, semanais, foram feitas sempre no mesmo horário, vertendo-se o preparado no solo ao redor da planta, após ser diluído em água desmineralizada. A altura das plantas foi determinada a cada 15 dias, enquanto que a massa fresca da parte aérea e o teor de partenólídeo foram determinados apenas no final do experimento. Apesar da altura e massa fresca nas plantas não terem sido alteradas em função da aplicação dos preparados homeopáticos, o teor de partenólídeo diminuiu, especialmente com a aplicação das potências CH3 e CH5.

Link to paper:

http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDAQFjAA&url=http%3A%2F%2Fwww.sbpmed.org.br%2Fdownload%2Fissn_05_3%2Fartigo5_v7_n3.pdf&ei=FI2FUZexOsTMPdmFgbAL&usg=AFQjCNG90ULCFmjn4K4Mg2Fe25i9UBpv0g&bvm=bv.45960087,d.ZWU

Rev Bras Pl Med. 2005;7(3):18-24.

Essential oil and antimalarial compounds in plants of *Bidens pilosa* L. treated with the China homeopathy.

[Teor de óleo essencial e compostos antimaláricos em plantas de *Bidens pilosa* L. tratadas com a homeopatia China].

[Article in Portuguese]

Armond C, Casali VWD, Cecon PR, Reis EL, Filho LNC, Lisboa SP, Arruda VM, Duarte ESM, Moreira AM, Silva CV, Brandão MGL.

Forsch Komplementarmed Klass Naturheilkd. 2005 Oct;12(5):284-91. Epub 2005 Oct 13.

The effects of a 45x potency of arsenicum album on wheat seedling growth -- a reproduction trial.

[Binder M](#), [Baumgartner S](#), [Thurneysen A](#).

Institute for Complementary Medicine (KIKOM), University of Bern, Switzerland.

Abstract

BACKGROUND: Independent replications of preclinical investigations of homeopathic potencies are rare. However, they are a necessary tool to determine the relevant factors modulating the effects of homeopathic potencies in preclinical systems.

OBJECTIVE: The goal of the present study was to reproduce a trial published in 1997. An Italian group of researchers investigated the effect of *Arsenicum album* 45x on the growth of wheat which had been previously poisoned with a material dose of *Arsenicum album*. The homeopathic treatment was associated with increased wheat shoot growth significantly different from the control group (+24%, $p < 0.001$).

MATERIALS AND METHODS: Wheat poisoned with a sublethal dose of *Arsenicum album* was cultivated in either *Arsenicum album* 45x, water 45x, or unpotentized

water. After 7 days, shoot length was measured. Reproducibility was assessed in eight independent experiments.

RESULTS: Arsenicum album 45x significantly inhibited wheat shoot growth (-3%) compared to treatment with unpotentized water and water 45x ($p = 0.011$ and $p = 0.037$). Within the experimental series performed in this reproduction trial, the effects of Arsenicum album 45x proved to be reproducible. The wheat seed species used did not seem to have a significant impact on the experimental outcome.

CONCLUSION: The result of this replication trial is a reversal of the original study, since Arsenicum album 45x inhibited wheat shoot growth instead of enhancing it. Nevertheless, high homeopathic potencies may induce statistically significant effects in biological systems. However, the magnitude and direction of these effects seem to depend on yet unknown parameters.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/16230858>

Forsch Komplementarmed Klass Naturheilkd. 2005 Oct;12(5):277-83. Epub 2005 Oct 13.

A biostatistical insight into the As(2)O(3) high dilution effects on the rate and variability of wheat seedling growth.

[Brizzi M](#), [Lazzarato L](#), [Nani D](#), [Borghini F](#), [Peruzzi M](#), [Betti L](#).

Department of Statistical Sciences, Bologna University, Italy.

Abstract

BACKGROUND: Most criticism of homeopathy concerns the lack of scientific bases and theoretical models. Fundamental research could make important contributions to our understanding of the mechanisms of action of homeopathic treatments. Plant-based bioassays are suitable for basic research -- lacking the placebo effect and ensuring large data samples for structured statistical analyses.

OBJECTIVE: The aim of this study was to reproduce a previous experiment on the effects of arsenic trioxide (As(2)O(3)) high dilutions on wheat seedling growth in order to verify whether the same significant results could be obtained working in a different place and with a different experimental team. A further goal was to investigate high dilution effects on variability.

MATERIAL AND METHODS: A structured experiment was performed blind over 9 weeks, using wheat seeds previously stressed with a sublethal dose of As(2)O(3). The seeds were then treated with either potentized As(2)O(3) (5x, 15x, 25x, 35x, 45x), potentized water (equivalent potencies) or diluted As(2)O(3) (10(-5), 10(-15), 10(-25), 10(-35), 10(-45)). The working variable was the stem length, measured after 4, 5, 6 and 7 days.

RESULTS: Some potencies (As(2)O(3) 45x and H(2)O 45x) induced a relevant increase in seedling growth and/or a variability decrease. Diluted As(2)O(3) did not induce any significant results.

CONCLUSIONS: Confirmation of a significant stimulating effect on seedling growth and a significant decrease of variability was obtained with ultra-high dilutions at the 45x potency. The model of wheat germination and growth has been confirmed to be a good tool for basic research in homeopathy.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/16230857>

Forsch Komplementarmed Klass Naturheilkd. 2005 Feb;12(1):6-13.

High homeopathic potencies are different from potentized solvent when investigated with the REDEM technology.

[Witt C](#), [Lüdtke R](#), [Weisshuhn TE](#), [Willich SN](#).

Institut für Sozialmedizin, Epidemiologie und Gesundheitsökonomie, Charité-Universitätsmedizin, Berlin. Claudia.witt@charite.de

Abstract

OBJECTIVE: To determine in a series of randomized blinded experiments using the REDEM technology whether differences between high homeopathic potencies and similarly potentized solvent can be detected.

DESIGN AND ANALYSIS: A REDEM device was employed as a black box. Samples were measured in a capacitor that was connected to 60 individual oscillator circuits at frequencies between 250 and 930 KHz; their oscillation damping was recorded. In two experiments (3 and 4 replications) stable differences between a potentized 'mother tincture' and potentized solvent were assessed. Statistical analysis was done using ANCOVA.

RESULTS: Significant differences ($p < 0.01$) between remedy and control were found, mostly at the same oscillator frequencies. Those differences found for only one remedy always were at frequencies adjacent to frequencies with differences for other remedies. **VISUAL ANALYSIS:** Where output curves were not near 0, remedy values were higher than controls. Curves within a replication ran parallel, their distances varied. Between replications, curve shapes and remedy- control differences were similar, however, control curves varied in height. Control and remedy curves between experiments varied in shape. Effects increased with time and sample conductivity. Ethanol 43% as solvent eliminated the observed effects, use of polyethylene containers considerably attenuated them.

CONCLUSIONS: A probably physical difference was seen between potentized homeopathic remedies and potentized solvent. The differences are associated with sample age, solvent, and container material. The REDEM technology requires further investigation to determine the nature of the underlying mechanisms of the observed differences.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/15772457>

Annals of Plant Protection Sciences. 2005;13(2):497-498.

Biodynamic preparations: a novel way to manage plant diseases.

[Bijender Kumar Vishwakarma SN](#).

Forsch Komplementarmed Klass Naturheilkd. 2004 Oct;11(5):281-92.

Growth stimulation of dwarf peas (*Pisum sativum* L.) through homeopathic potencies of plant growth substances.

[Baumgartner S](#), [Thurneysen A](#), [Heusser P](#).

Kollegiale Instanz für Komplementärmedizin, Universität Bern, Insel-Spital, Imhoof-Pavillon, Bern, Switzerland. s.baumgartner@hisca.ch

Abstract

BACKGROUND: Efficacy of higher homeopathic potencies is controversial. Universally accepted specific detection assays for homeopathic dilutions do not exist. Basic research has to develop a spectrum of standardized tools to investigate the mode of action and nature of homeopathic potencies.

OBJECTIVE: Can the shoot growth reaction of dwarf peas (gibberellin- deficient mutants) be regarded as evidence of treatment with homeopathic potencies of plant growth substances?

MATERIALS AND METHODS: Pea seed (*Pisum sativum* L. cv. Fruher Zwerg) is immersed for 24 hours in homeopathic potency or control solutions for soaking. Plants germinate and grow in a standard cultivation substrate under controlled environmental conditions. Shoot length is measured 14 days after planting.

RESULTS: A screening of homeopathic potencies (12x-30x) of four different plant growth substances revealed biological activity of certain potency levels of gibberellin and kinetin ($p < 0.05$). Growth stimulation through gibberellin 17x (5×10^{-18} M) was assessed in six independent replications; results confirmed those of the screening ($p < 0.05$). The effect of gibberellin 17x seemed to weaken during the course of the experiments.

CONCLUSION: The results back the hypothesis that homeopathic potencies of plant growth substances affect pea shoot growth. Dwarf peas might thus be an interesting system model for studying the action of homeopathic potencies. Further work is required to identify all boundary conditions modulating the reactivity of this system.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/15572869>

Biology and Fertility of Soils. 2004 Sep; 40(4):222-229.

Effects of traditional and biodynamic farmyard manure amendment on yields, soil chemical, biochemical and biological properties in a long-term field experiment.

[Johann G. Zaller](#), [Ulrich Köpke](#)

Abstract

We studied the effects of applications of traditionally composted farmyard manure (FYM) and two types of biodynamically composted FYM over 9 years on soil chemical properties, microbial biomass and respiration, dehydrogenase and saccharase activities, decomposition rates and root production under grass-clover, activity and biomass of earthworms under wheat, and yields in a grass-clover, potatoes, winter wheat, field beans, spring wheat, winter rye crop rotation. The experiment was conducted near Bonn, on a Fluvisol using a randomised complete block design ($n=6$). Our results showed that plots which received either prepared or non-prepared FYM ($30 \text{ Mg ha}^{-1} \text{ year}^{-1}$) had significantly increased soil pH, P and K concentrations, microbial biomass, dehydrogenase activity, decomposition (cotton strips), earthworm cast production and altered earthworm community composition than plots without FYM application. Application of FYM did not affect the soil C/N ratio, root length density, saccharase activity, microbial basal respiration, metabolic quotient and crop yields. The biodynamic preparation of FYM with fermented

residues of six plant species (6 g Mg⁻¹ FYM) significantly decreased soil microbial basal respiration and metabolic quotient compared to non-prepared FYM or FYM prepared with only *Achillea*. The biodynamic preparation did not affect soil microbial biomass, dehydrogenase activity and decomposition during 62 days. However, after 100 days, decomposition was significantly faster in plots which received completely prepared FYM than in plots which received no FYM, FYM without preparations or FYM with the *Achillea* preparation. Furthermore, the application of completely prepared FYM led to significantly higher biomass and abundance of endogeic or anecic earthworms than in plots where non-prepared FYM was applied.

Link to abstract/paper: <http://link.springer.com/article/10.1007%2Fs00374-004-0772-0>

Flemish Veterinary Journal. 2004;73(6):360-364.

Can homeopathy resist scientific testing?

Sluijs, F. J. Van

Revista de Protección Vegetal. 2004;19(3):183-184.

Agrohomeopatía: una opción ecológica para el campo.

[Agrohomeopathy: an environmentally friendly option for the countryside].

[Article in Spanish]

Meneses N, Moreno L, González R.

Abstract

En este trabajo hemos realizado una recopilación de las principales publicaciones, donde se recogen las investigaciones de científicos de países como, Italia, India, México, Austria, Alemania, y Cuba sobre la aplicación de la homeopatía en la agricultura (Agrohomeopatía), tema este que va despertando el interés de los científicos de todo el mundo que se dedican a la investigación en agricultura en aras de obtener alimentos sanos y baratos. Los fármacos homeopáticos al igual que los plaguicidas botánicos y los microbianos, constituyen una alternativa en la defensa de los cultivos agrícolas encaminados a la producción de vegetales libres de agrotóxicos, al preservar los recursos naturales y al reducir los costos de producción. Por tal motivo la aplicación de la Agrohomeopatía constituye una alternativa de actualidad, a pesar del escaso conocimiento que existe sobre su uso, por la alta compatibilidad de esta con las concepciones tecnológicas de la agricultura sostenible. La aplicación de la terapéutica homeopática en la agricultura es limitada y en Cuba es casi desconocida, no obstante los resultados positivos obtenidos en el control de enfermedades fungosas y virales en los vegetales en otros países. Ante la manifiesta destructividad de las enfermedades de cultivos tan importantes como el tomate, el trigo, el tabaco, el mango, entre otros, obteniéndose en todos los casos resultados muy alentadores, ya que se ha logrado controlar las enfermedades que atacan estos cultivos e incidir en la obtención de cosechas sanas y con mayores rendimientos. Es además importante evaluar todo efecto bioestimulador en la germinación de semillas de acuerdo a parámetros establecidos para ello. La Homeopatía es una rama de la medicina, no es herbolaria, ni naturismo. Es un tratamiento médico, farmacoterapia o terapéutica, que se

descubrió hace 200 años en Alemania por el médico Samuel Hahnemann, cuya práctica se ha difundido en Francia, Inglaterra, Alemania, EUA, Italia, India, México, Argentina, Brasil, entre otros países y recientemente en Cuba. Actualmente nuestro grupo de investigación, perteneciente a la Facultad Agropecuaria de Montaña del Escambray, se ha dedicado a la aplicación de la Agrohomeopatía, obteniendo ya resultados muy alentadores en café, disminuyendo el tiempo de germinación y potenciando esta, estamos trabajando en la aplicación de esta terapéutica en otros cultivos como el plátano, hortalizas y forestales. Además hemos incursionado en la aplicación de la homeopatía para el control de la contaminación en Biofábricas.
Link to abstract/paper: <http://agris.fao.org/agris-search/search/display.do?f=2007/CU/CU0705.xml;CU2007102095>

Int J High Dilution Res. 2004 Apr-Jun;3(7):12-13.

Experiências básicas de homeopatia em vegetais: Contribuição da pesquisa com vegetais para a consolidação da ciência homeopática.

[Basic experiences of homeopathy in plants: Contribution of research with plants for the consolidation of homeopathic science].

[Article in Portuguese]

Rossi F, Ambrosano EJ, de Melo PCT, Guirado N, Mendes PCD.

Abstract

O que está em moda na mídia, atualmente, é a cobrança em provar que a homeopatia funciona. Qual homeopata não escutou a frase: “Eu não acredito em homeopatia!” Arrisco-me a dizer que provavelmente todos. Mas por quê? Essa é a questão! A resposta básica a essa pergunta é que as pessoas, de uma maneira geral, não conhecem a ciência homeopática.

Link to paper: <http://www.feg.unesp.br/~ojs/index.php/ijhdr/article/view/107/100>

Rev Bras Pl Med. 2004;6(2):20-27.

Efeito da homeopatia na recuperação de plantas de artemísia [Tanacetum parthenium (L.) Schultz-Bip] submetidas à deficiência hídrica.

[Effects of homeopathy on the recovery of feverfew plants, Tanacetum parthenium L. Schultz Bip, under water stress].

[Article in Portuguese]

Carvalho LM, Casali VWD, Cecon PR, Lisboa SP, Sousa MA.

La homeopatía de México. 2004;628:3–7.

Influencia del Arsenicum album en la germinación de las semillas de cafeto (Coffea arabica L.).

[Influence of Arsenicum album on germination of seeds of coffee (Coffea arabica L.)].

[Article in Spanish]

Moreno N, Pérez C, Méndez G, González G, Álvarez L.

La homeopatía de México. 2003;622:11-12.

Acción de 4 fármacos homeopáticos en el control de la contaminación por bacteria.

[Action of 4 homeopathic drugs in the control of contamination by bacteria].

[Article in Spanish]

Moreno NM, Alvarez LRG.

Homeopathy. 2003 Oct;92(4):195-202.

Effects of homeopathic arsenic on tobacco plant resistance to tobacco mosaic virus. Theoretical suggestions about system variability, based on a large experimental data set.

[Betti L](#), [Lazzarato L](#), [Trebbi G](#), [Brizzi M](#), [Calzoni GL](#), [Borghini F](#), [Nani D](#).

Department of Agro-Environmental Science and Technology, Faculty of Agriculture, Bologna University, Italy. lucietta.betti@unibo.it

Abstract

CONTEXT: This research aimed at verifying the efficacy of homeopathic treatments by plant-based bioassays, which may be suitable for basic research, because they lack placebo effects and provide large datasets for statistical analyses.

OBJECTIVE: To evaluate the effects of homeopathic treatments of arsenic trioxide (As₂O₃) on tobacco plants subjected to tobacco mosaic virus (TMV) inoculation as biotic stress.

DESIGN: Blind, randomized experiment using tobacco leaf disks.

MATERIALS AND METHODS: Tobacco plants (*Nicotiana tabacum* L. cultivar Samsun) carrying the TMV resistance gene N. TMV inoculated leaf disks were floated for 3 days in the following: Distilled water (control). H₂O 5 and 45 decimal and centesimal potencies. As₂O₃ 5 and 45 decimal and centesimal potencies. The main outcome measures is the number of hypersensitive lesions observed in a leaf disk.

RESULTS: Homeopathic treatments of arsenic induce two effects on the plant: (i) increased resistance to TMV; (ii) decrease variability between experiments (system variability).

CONCLUSIONS: In this experimental model two actions of homeopathic treatment were detected: decrease in system variability and enhancement of the natural tendency of the system towards an 'equilibrium point'.

Link to paper: <http://www.comenius.edu.mx/Betti%20et%20al%202003.pdf>

Homeopathy. 2003 Jul;92(3):140-144.

Homeopathically prepared gibberellic acid and barley seed germination.

[B Hamman](#), [G Koning](#), [K Him Lok](#)

Abstract

The potentiation process by which homeopathic preparations are produced raises the concern that these medicines have placebo effects only, since they theoretically no longer contain active molecules of the diluted substance. Plant models offer a method of examining the efficacy of homeopathically prepared solutions. This study examined the effects of homeopathically prepared gibberellic acid (HGA₃) on the germination performance of barley (*Hordeum vulgare* L.) seeds. The effect of HGA₃ (4–200 cH) on seed germination rate and seedling development was compared to that of the most commonly used form of gibberellic acid (GA₃), 0.5 g l⁻¹, and control (distilled water). The extent and type of response was dependent on the vigour level of the seedlot. Treating seeds from three vigour groups in HGA₃ consistently resulted in larger seedlings. High-vigour seeds treated with HGA₃ 4, 30 and 200 cH germinated faster, and roots of medium-vigour seedlots treated in HGA₃ 15 cH were longer. Biphasic effects of HGA₃ were also demonstrated. As a plant model, germinating barley seeds successfully demonstrated the ability of HGA₃ to produce a biological response.

Link to abstract/paper:

<http://www.sciencedirect.com/science/article/pii/S1475491603000456>

Homeopathy. 2003 Jul;92(3):129-30.

Plant models for fundamental research in homeopathy.

[Betti L](#), [Borghini F](#), [Nani D](#).

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/12884893>

Horticultura Brasileira. 2003 Jul;21(2):270.

Aplicação de solução homeopática *Carbo vegetabilis* e produtividade da alface.

[Application of homeopathic solution *Carbo vegetabilis* on lettuce yield.]

[Article in Portuguese]

Rossi F, Ambrosano EJ, Guirado N, Casali VWD, Tessaroli Neto J, Melo PCT, do C Arenales M, Schammas EA.

Link to abstract/paper: <http://www.worldcat.org/title/aplicacao-de-solucao-homeopatica-carbo-vegetabilis-e-produtividade-da-alface/oclc/709877373>

Radiats Biol Radioecol. 2003 May-Jun;43(3):370-4.

[Effect of electronic homeopathic copy of biohumus fertilizer on tomato sprout development].

[Article in Russian]

[Korenbaum VI](#), [Chernysheva TN](#), [Apukhtina TP](#), [Shin SN](#), [Demeniuk VN](#).

Pacific Institute of Oceanology, Far East Division, Russian Academy of Sciences, Vladivostok, 690041 Russia. v-kor@poi.dvo.ru

Abstract

Electronic homeopathic copies (EHC) are remedies prepared without traditional dilution/potentialiation but by means of so-called "imprinting" of initial substance to water (or other carriers) with the help of M. Ray's devices. EHC are interpreted by modern homeopathic medicine as functional analogs of biologically active substances (BAS) in supersmall doses (SSD). The authors have undertaken 3 blind randomised experiments concerning BAS aqueous solution of fertilizer biohumus, its EHC and placebo influence on tomatoes' sprouts development. Filtered and intermixed water have been encapsulated in 1.5-liter polyethylene containers. The solution of fertilizer has been prepared in accordance with the instruction. EHC has been "transferred" from the concentrated fertilizer with the help of Simulator (Metabolics, GB) apparatus. "Deleting" of information have been made for placebo. Seed of tomatoes (kind "Yasniye") have been pre-soaked in preparations and landed in accordingly numbered plastic boxes (97 x 15 x 14 sm) by 40-44 plants in each one. The seedbed was from one well intermixed portion. The plants were top-dressed by preparations (200-300 ml) one time per week. The boxes were exposed in one room (rotation was made twice per week). The plants have been cut up on the 38th day from pre-soaking. The height of a green part and its mass have been measured for each plant. The differences between independent samples (preparations studied) have been estimated. The differences between EHC and placebo have appeared to be reliable, in the first experiment ($p < 2 \times 10^{-4}$ --mass, $p < 10^{-9}$ --height), in the second one ($p = 0.014$ --mass), in the third one ($p < 3 \times 10^{-6}$ --mass, $p = 0.028$ --height) The results obtained verify a reality of EHC phenomenon. Thus it is quite within reason to suggest an existence of uniform physical (instead of chemical) mechanism of BAS's EHC/SSD structuring and acting on biological objects.

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/12882000>

Revista Brasileira de Milho e Sorgo. 2003;2(2):1-8.

Homeopathic treatments and population density of *Spodoptera frugiperda* (J. E. Smith, 1797) (Lepidoptera: Noctuidae) in corn plants in the field.

[Tratamentos homeopáticos e densidade populacional de *Spodoptera frugiperda* (J. E. Smith, 1797) (Lepidoptera: Noctuidae) em plantas de milho no campo].

[Article in Portuguese]

Almeida A A, de Galvão JCC, Casali VWD, Lima ER, de Miranda GV.

Abstract

O objetivo deste trabalho foi avaliar a densidade populacional da lagarta-do-cartucho, *Spodoptera frugiperda*, em plantas de milho tratadas ou não com três preparados homeopáticos: *Doru* CH4, *Euchlaena* CH6, *Spodoptera* CH30. A diluição utilizada foi de 10 gotas do preparado por 500 mL de água. Os tratamentos foram aplicados com pulverizador costal de cinco litros, no intervalo de quatro dias. As avaliações foram feitas a partir do estágio de quarta folha completamente desenvolvida, até o aparecimento da oitava folha. Foi avaliado o número de plantas atacadas pela lagarta-do-cartucho. Os preparados homeopáticos *Spodoptera* CH30 e *Euchlaena* CH6 reduziram a população de *S. frugiperda* nos estádios de quatro, seis e oito folhas completamente desenvolvidas, com nível satisfatório de controle.

Link to abstract/paper:

<http://rbms.cnpms.embrapa.br/index.php/ojs/article/viewArticle/53>

Acta Scientiarum - Agronomy. 2003;25(2):259-263 .

Effect of the homeopathic solution *Sulphur* on the growth and productivity of radish.

Bonato CM, da Silva EP.

Abstract

A study was conducted in Parana, Brazil during 3 September to 25 October 2002 to determine the effect of the homeopathic solution sulfur on some growth parameters of radish. The treatments consisted of 5 concentrations of homeopathic sulfur, viz., 5, 12, 30, 200 CH and 1 MCH, including water as the control. The radishes were observed for changes in leaf length, plant height, and fresh and dry matter of the shoot and root system. Results showed that the 5, 12, 30 CH and 1 MCH concentrations had better responses for all growth attributes. However, water and 200 CH presented mostly negative results. The results indicate that the homeopathy sulfur could be an alternative to improve the productivity and appearance of commercial agricultural products, with substantial reduction in agricultural input.

Link to abstract/paper:

<http://www.cabdirect.org/abstracts/20053129622.html;jsessionid=0DC1CD42ABAF41E5030470088B07A4C4?gitCommit=4.13.11-15-g9672536>

Rev Bras Pl Med. 2003;6(1):46-50.

Efeito de potências decimais da homeopatia de *Arnica montana* sobre plantas de *artemisia*.

[Effect decimal powers of homeopathy *Arnica montana* on plants of *Artemisia*].

[Article in Portuguese]

Carvalho LM, Casali VWD, Cecon PR, Souza MA, Lisboa SP.

Abstract

Quarenta e cinco dias após o transplante em vasos, plantas de *Tanacetum parthenium* (L.) Schultz-Bip., obtidas de sementes, receberam preparados homeopáticos de *Arnica montana*, escala centesimal (CH1, CH2, CH3, CH4 e CH5). As aplicações, semanais, foram feitas sempre no mesmo horário, vertendo-se o preparado no solo ao redor da planta, após ser diluído em água desmineralizada. A altura das plantas foi determinada a cada 15 dias, enquanto que a massa fresca da parte aérea e o teor de partenólídeo foram determinados apenas no final do experimento. Apesar da altura e massa fresca nas plantas não terem sido alteradas em função da aplicação dos preparados homeopáticos, o teor de partenólídeo diminuiu, especialmente com a aplicação das potências CH3 e CH5.

Link to paper:

http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0CDgQFjAB&url=http%3A%2F%2Fwww.sbpmed.org.br%2Fdownload%2Fissn_05_3%2Fartigo5_v7_n3.pdf&ei=b4KCUZzFK8OyPMX2gcAP&usg=AFQjCNG90ULCFmjn4K4Mg2Fe25i9UBpv0g&bvm=bv.45921128,d.ZWU

Statistica. 2002;62(3):515-522.

Analisi esplorativa dell'effetto di soluzioni ultramolecolari di triossido di Arsenico sullo sviluppo vegetativo in vitro di plantule di grano.

[Exploratory analysis of the effect of ultramolecular solutions of arsenic trioxide on the vegetative development of in vitro plantlets of wheat].

[Article in Italian]

Brizzi M, Biondi C, Lazzarato L, Betti L.

English Abstract

This paper deals with an experiment in which wheat seeds were stressed with a material dose of As₂O₃, and then treated with ultra-molecular dilutions of the same substance, with and without potentization. We focused our analysis on seedling stem length during 7 days of treatment, and tried to give a thorough statistical description of the data. We applied simple nonparametric tests for comparing treated and control groups: it seems to be a significant stimulating effect when seeds are treated with the 45th decimal potency of As₂O₃. A similar effect was obtained in a previous experiment (Betti et al., 1997), and shows that our model allows a proper reproducibility of results.

Link to paper: <http://rivista-statistica.unibo.it/article/view/423/415>

Allelopathy J. 2001;8(1):65-72.

Nematotoxic effect of *Acacia auriculiformis* and *Artemisia nilagirica* against root-knot nematodes.

Sukul NC, Sinha Babu SP, Dutta SC, Nandi B, Sukul, A.

South Indian Horticulture. 2001;49:292-295.

Influence of biodynamic farming on the potato cyst nematodes, *Globodera* spp.

Devrajan K, Selvaraj N, Balasubramaniam P, Ramaraj B.

Link to abstract/paper: <https://getinfo.de/app/Influence-of-biodynamic-farming-on-the-potato-cyst/id/BLCP%3ACN042183556>

South Indian Horticulture. 2001;49:249-251.

Effect of biodynamic treatments on yield and yield attributes of cabbage.

Selvaraj N, Ramaraj B, Devrajan K, Selvi BS, Raghu R.

Abstract

A preliminary trial was carried out in Ooty, Tamil Nadu, India, during the winter and autumn seasons of 2000 to evaluate the effect of biodynamic organic farming on yield and yield attributes of cabbage cv. Questo. The number of unfolded and

wrapper leaves under the biodynamic treatment recorded the highest values of 18.0 and 96.2, respectively, whereas in the control, it was only 9.2. Similarly, the biodynamic treatments were superior than the conventional and combination of conventional and biodynamic treatments in increasing the size of the head. In the control, the curd weight was only 0.370 g, whereas in the biodynamic treatment, it was 1.580 g (the highest). The head yield was only 12.48 kg in the control. In biodynamic-treated plot, the head yield (59.68 kg) was nearly 5 times higher than the absolute control, and two and a half time higher than the conventional treatments. The least percentage of leaf spot [*Alternaria brassicicola*] incidence (10.5) on the 70th day, and the least percentage of spoilage of cabbage heads (8.1) were recorded from the plants with biodynamic treatments. The results also revealed that the biodynamic system is incompatible with conventional chemical method of farming. Link to abstract/paper:

<http://www.cabi.org/isc/Default.aspx?site=144&page=2540&LoadModule11=CABISEARCHRESULTS&LoadAction=LoadAbstract&term=sn%3A%220038-3473%22&AbstractSearchTerm=sn%3A%220038-3473%22&query=sn%3A%220038-3473%22&AbstractID=20013163278>

Fit.Bras. 2001 Aug;26(supl.):435-6.

Controle de oídio da macieira por preparações homeopáticas.

[Control of apple tree powdery mildew with homeopathic preparations].

[Article in Portuguese].

Rolim PRR, Brignana Neto F, Silva JM.

Abstract

O uso da homeopatia tem reconhecida eficiência na saúde humana e constitui um processo preconizado pela agricultura orgânica para a manutenção do estado sanitário das culturas, conforme estabelecido nas Instruções Normativas do Ministério da Agricultura que disciplinam essa produção. Visando desenvolver tecnologia para a produção orgânica, realizou-se um ensaio em casa-de-vegetação, para se conhecer a ação de preparações homeopáticas sobre oídio da macieira, causado pelo fungo *Podosphaera leucotricha*. Plantas jovens da variedade Fuji, mantidas em sacos plásticos, apresentando sintomas de oídio nas folhas, receberam duas pulverizações, em intervalo de doze dias, com as seguintes preparações homeopáticas, nas respectivas potências na escala centesimal: Kali iodatum 30 e 100, Lachesis trigonocephalus 30 e 100, Staphysagria 30 e 100, Sulphur 30 e *Oidium lycopersici* 100. O delineamento estatístico inteiramente casualizado constou de nove tratamentos e quatro repetições, cada parcela constituída por uma planta. Avaliação realizada uma semana após a última aplicação apontou menor incidência da doença nas parcelas tratadas com Staphysagria 100CH, que diferiu significativamente da testemunha e do Sulphur, que foi equivalente a esta. Os demais apresentaram ação intermediária, porém não diferiram estatisticamente da testemunha, evidenciando, assim, possibilidade de controle satisfatório da doença somente por Staphysagria 100CH entre as preparações testadas.

Link to abstract/paper:

http://www.cesaho.com.br/biblioteca_virtual/arquivos/arquivo_435_cesaho.pdf

Rev Bras Pl Med, Botucatu. 2001;4(1):19–28.

Efeito de homeopatas no crescimento e na produção de cumarina em chamba (*Justicia pectoralis* Jacqu.).

[Effect of homeopathy on the growth and production of coumarin in chamba (*Justicia pectoralis* Jacqu.).]

[Article in Portuguese]

Andrade F, Casali V, DeVita B, Cecon P, Barbosa L.

Fit Bras. 2001;26(1):436.

Controle de oídio da macieira por preparações homeopáticas.

[Control of apple powdery mildew by homeopathic preparations].

[Article in Portuguese]

Rolim PRR, Brignani Neto F, Silva JM.

Abstract

O uso da homeopatia tem reconhecida eficiência na saúde humana e constitui um processo preconizado pela agricultura orgânica para a manutenção do estado sanitário das culturas, conforme estabelecido nas Instruções Normativas do Ministério da Agricultura que disciplinam essa produção. Visando desenvolver tecnologia para a produção orgânica, realizou-se um ensaio em casa-de-vegetação, para se conhecer a ação de preparações homeopáticas sobre oídio da macieira, causado pelo fungo *Podosphaera leucotricha*. Plantas jovens da variedade Fuji, mantidas em sacos plásticos, apresentando sintomas de oídio nas folhas, receberam duas pulverizações, em intervalo de doze dias, com as seguintes preparações homeopáticas, nas respectivas potências na escala centesimal: *Kali iodatum* 30 e 100, *Lachesis trigonocephalus* 30 e 100, *Staphysagria* 30 e 100, *Sulphur* 30 e *Oidium lycopersici* 100. O delineamento estatístico inteiramente casualizado constou de nove tratamentos e quatro repetições, cada parcela constituída por uma planta. Avaliação realizada uma semana após a última aplicação apontou menor incidência da doença nas parcelas tratadas com *Staphysagria* 100CH, que diferiu significativamente da testemunha e do *Sulphur*, que foi equivalente a esta. Os demais apresentaram ação intermediária, porém não diferiram estatisticamente da testemunha, evidenciando, assim, possibilidade de controle satisfatório da doença somente por *Staphysagria* 100CH entre as preparações testadas.

Link to abstract/paper:

http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDEQFjAA&url=http%3A%2F%2Fwww.cesaho.com.br%2Fbiblioteca_virtual%2Farquivos%2Farquivo_435_cesaho.pdf&ei=sPAMUuPjHMHz0gW4o4GIAQ&usg=AFQjCNFGdKqd0pysoMDdSUHMvFbVjcy0Fw&sig2=a6YeGjSOPA7ezJpSza3qGA&bvm=bv.50723672,d.d2k

Suma Phytopathologica. 2001;27(1):129.

Ação de produtos homeopáticos sobre oídio (*Oidium lycopersici* Cooke & Mass) do tomateiro (*Lycopersicum esculentum* Mill).

[Action of homeopathic products on powdery mildew (*Oidium lycopersici* Cooke & Mass.) tomato (*Lycopersicum esculentum* Mill)].

[Article in Portuguese]

Rolim PRR, Brignani Neto F, Silva JM.

La Homeopatía de México. 2001;70(613):110-116.

Agrohomeopatía: una opción ecológica para el campo mexicano.

[Agrohomeopathy: an environmentally friendly option for the Mexican countryside].

[Article in Spanish]

Espinoza FJ.

Biol Med. 2000;29(3):125-131.

Einfluss ausgewählter Homöopathika auf die katalytische Aktivität der Urikase, der sauren Phosphatase und der zytosolischen Glutathion-S.Transferasen.

[Influence of selected homeopathic remedies on the catalytic activity of uricase, phosphatase acid and the cytosolic glutathione S.Transferasen].

[Article in German]

Dittmann J, Kanapin H, Harisch G.

Link to abstract/paper: <http://bibnet.org/vufind/Record/ccmed679802/Details>

Br Homeopath J. 2000 Apr;89(2):63-7.

Statistical analysis of the effect of high dilutions of arsenic in a large dataset from a wheat germination model.

[Brizzi M](#), [Nani D](#), [Peruzzi M](#), [Betti L](#).

Dipartimento di Scienze statistiche, University of Bologna, Italy.

Abstract

This paper describes the statistical analysis of a series of experiments using a simple biological model (wheat germination in vitro), where a large number of wheat seeds were treated with homeopathic potencies of Arsenic trioxide. Some potencies, such as As₂O₃ 40x, 42x and 45x, have repeatedly shown a significant stimulating effect on germination compared to controls, whereas As₂O₃ 35x has a significant inhibiting effect. In some experiments the seeds were stressed before the experiment with a sublethal dose of the same substance. We performed a statistical analysis, both for stressed and non-stressed seed groups, using Poisson distribution as a suitable model for representing the number of non-germinated seeds in a standard experiment with 33 seeds in the same Petri dish. Finally, we have considered the most repeated potencies (30x and 45x), computing the sample odds ratio (OR) and a 95% confidence interval (CI) for the population OR. Our results

show significant reproducible effects of some As₂O₃ decimal potencies, particularly As₂O₃ 45x. In stressed seeds, even decimal potencies of water seem to give significant results compared to control, whereas high dilutions of As₂O₃ without potentization never show significant effects.

Link to paper:

http://www.academia.edu/1308648/Statistical_analysis_of_the_effect_of_high_dilutions_of_arsenic_in_a_large_dataset_from_a_wheat_germination_model

American Journal of Alternative Agriculture. 2000;15(3):110-118.

Biodynamic preparations: short-term effects on crops, soils, and weed populations.

Carpenter-Boggs L, Reganold JP, Kennedy AC.

Abstract

Biodynamic agriculture is an organic farming system that utilizes fermented herbal and mineral preparations as compost additives and field sprays. This study was conducted to determine whether biodynamic preparations affect lentil and wheat growth and yield, soil fertility, or weed populations in the short run. Each of four nutrient treatments, biodynamically prepared compost, non-biodynamic compost, mineral NPK fertilizer, and no fertilizer, were tested with and without biodynamic field sprays. Crop yield, crop quality, and soil fertility were similar in plots treated with mineral NPK fertilizers, biodynamic compost, or non-biodynamic compost. Use of compost raised soil pH from 6.0 without compost to 6.5 with compost. Compost application reduced the broadleaf weed population by 29% and reduced the grass weed population by 78%. Biodynamic sprays altered soil and grain N chemistry, but the effects are of unknown biological significance. Use of the biodynamic field sprays correlated with higher yield of lentil per unit plant biomass, lower grain C and crude protein contents, greater content in soft white spring wheat, and greater content in soil. In general, soils and crops treated with biodynamic preparations showed few differences from those not treated. Application of composts with or without the preparations produced similar crop yields with lower weed pressure, compared with equal nutrients supplied by mineral fertilizer, but any additional short-term benefits from biodynamic preparations remain questionable.

Link to abstract/paper:

<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=6364468>

Research on Crops. 2000;1(2):255-257.

Effects of different homoeopathic drugs prepared from common weeds on radial growth of oyster mushroom (*Pleurotus membranaceus*) under *in vitro* conditions.

Gupta A, Thakur MP, Oudhia P.

Abstract

Five homoeopathic drugs prepared from the weeds *Achyranthes aspera*, *Boerhavia diffusa*, *Calotropis gigantea*, *Cynodon dactylon* and *Solanum nigrum* (mother tinctures comprising the ethanol extract of the plant) were supplied to the PDA

medium at 500, 1000, 1500 and 2000 ppm. A disc cut from a young, growing *P. membranaceus* culture was placed in the treated media and radial growth at each concentration was observed. The highest radial growth (90.0 mm) was observed in medium supplied with the drug from *S. nigrum* at 1500 ppm. Application of the drugs prepared from *A. aspera*, *B. diffusa* and *Cynodon dactylon* at 500 ppm, and those from *S. nigrum* and *Calotropis gigantea* at 2000 and 1500 ppm, respectively, resulted in the lowest radial growth of *P. membranaceus*. The results indicate the potential for using these drugs in edible fungus production.

Link to abstract/paper:

<http://www.cabdirect.org/abstracts/20013040469.html;jsessionid=A91D34382F0F964C16B5AD6A8E84313D>

Biological Agriculture & Horticulture. 1999;17(4):313-328.

Effects of biodynamic preparations on compost development.

Carpenter-Boggs L, Reganold JP, Kennedy AC.

Abstract

Biodynamic (BD) agriculture is an organic farming system that relies heavily on compost as a fertilizer. Six herbal preparations are added to composting materials in order to make BD compost. Proponents claim these additions produce higher quality compost under farm conditions. In this study, BD compost preparations were applied to 3.5 t compost piles made of dairy manure and woodshaving bedding. Application of the BD preparations also requires 6 l soil and 8 l water; therefore control piles received the same additions of soil and water as BD compost piles, but no BD preparations. Biodynamic-treated composts maintained an average 3.4 degrees C higher temperature throughout the eight-week active composting period, suggesting more thermophilic microbial activity and/or faster development of compost with BD treatment. Final samples were taken when active composting slowed and the piles entered a ripening stage. At the final sampling, BD-treated piles respired CO₂ at a 10% lower rate and had a larger ratio of dehydrogenase enzyme activity to CO₂ production. Microbial communities in the finished BD and control piles were differentiated by principal component analysis of microbial phospholipid fatty acids. Final samples of BD-treated composts also had 65% more nitrate than control piles. Biodynamic preparations thus effected discernible changes in compost chemical and microbial parameters.

Link to paper:

[http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CEoQFjAC&url=http%3A%2F%2Fafrsweb.usda.gov%2FSP2UserFiles%2FPlace%2F36450000%2FProducts-
Reprints%2F2000%2F865.pdf&ei=n6gDUtj4FIXHOfHwgEA&usg=AFQjCNGL8JI60vG3ljPrdHSvNSIjBgfydQ&sig2=qkzCtvuR6etSx6_1l85WUw&bvm=bv.50500085,d.ZWU](http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CEoQFjAC&url=http%3A%2F%2Fafrsweb.usda.gov%2FSP2UserFiles%2FPlace%2F36450000%2FProducts-
Reprints%2F2000%2F865.pdf&ei=n6gDUtj4FIXHOfHwgEA&usg=AFQjCNGL8JI60vG3ljPrdHSvNSIjBgfydQ&sig2=qkzCtvuR6etSx6_1l85WUw&bvm=bv.50500085,d.ZWU)

Plant Disease Research. 1999;14(2):177-178.

Control of greening disease of citrus through trunk injection with homoeopathic drugs.

Anju Bhatia Kapur SP, Cheema SS, Kang SS.

Link to paper:

<http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CDUQFjAA&url=http%3A%2F%2Fswfrec.ifas.ufl.edu%2Fh1b%2Fdatabase%2Fpdf%2F0000463.pdf&ei=zHkDUomBPIGGOOv4gWA&usg=AFQjCNELXh6eKU20tGqHsOB4CPDQkJqB6g&sig2=Z338r3bX2o1A8nU7QJWFkw&bvm=bv.50500085,d.ZWU>

Biol Med, 1999;28:188–194.

Aktivitätsbestimmungen der sauren Phosphatase in Gegenwart von Ubichinon-Einzelpotenzen und Ubichinon-Potenzmischungen.

[Determination of activity of acid phosphatase in presence of single potencies and potency mixtures of ubiquinone].

[Article in German]

Harisch G, Dittmann J.

Biol Med. 1999;28:4–8.

Aktivitätsbestimmung der sauren Phosphatase in Gegenwart von cAMP-Einzelpotenzen und cAMP-Potenzmischungen.

[Determination of activity of acid phosphatase in presence of single potencies and potency mixtures of cAMP].

[Article in German]

Harisch G, Dittmann J.

Ganzheitliche Tier. 1999;13(3):114-118.

Toxikologie und Umweltverträglichkeit von Homöopathika.

[Toxicology and environmental impact of homeopathic remedies].

[Article in German]

Reinhart E.

Env. Eco. 1999.17(2):269-273.

Potentized Cina reduces root knot disease of cowpeas.

Sukul NC, Sukul A.

Schweiz Rundsch Med Prax. 1998 Dec 3;87(49):1687-94.

[L'homéopathie est plus qu'un placebo?]

[Is homeopathy more than a placebo?]

[Article in German]

Brockow T, Franke A, Resch KL.

Biol Med. 1998;27(5):212-219.

Einfluß von cAMP-Potenzien auf die katalytische Aktivität der Sauren Phosphatase.

[Effect of cAMP potencies in the catalytic activity of phosphatase acid].

[Article in German]

Harisch G, Dittmann J.

Biol Med. 1998;27(2):55-62.

Unterschiedlicher Einfluß von cAMP-Potenzien und cAMP-Verdünnungen am Beispiel verschiedener Enzymsysteme.

[Different influence of potencies and dilutions of cAMP exemplified on several enzyme systems].

[Article in German]

Harisch G, Dittmann J.

Forsch Komplementarmed. 1998 Aug;5(4):172-177.

Versuche zur Detektion von Wirkungsunterschieden zwischen Potenz und gleichkonzentrierter Verdünnung.

[Tests to detect differences between potency and effect under the same dilution concentration].

[Article in German]

[Harisch G](#), [Dittmann J](#).

Link to abstract/paper: <http://www.ncbi.nlm.nih.gov/pubmed/9761997>

Forsch Komplementarmed. 1998 Jun;5(3):122-131.

In-vivo-und In-vitro-Versuche zur Erforschung der Wirkungsentfaltung von Homöopathika.

[In vivo and in vitro experiments to investigate the development of the effects of homeopathic remedies].

[Article in German]

[Harisch G](#), [Dittmann J](#).

Link to abstract/paper: <http://www.karger.com/Article/Abstract/21092>

Bhartiya Krishi Anusandhan Patrika. 1998;13(1/2):53-57.

The possibilities of preparing Homoeopathic drugs from the obnoxious weeds of Chhattisgarh.

Oudhia P, Joshi BS, Kosta VK.

Abstract

The possibilities of preparing homeopathic drugs using weeds of Chhattisgarh, Madhya Pradesh, India, are discussed. A survey was conducted to identify the weeds present in different crops of the region. The study revealed that >10 weeds were useful as homeopathic drugs. These included *Anagallis arvensis*, *Melilotus alba*, *Solanum indicum*, *Chenopodium album*, *Argemone mexicana* and *Cynodon dactylon*.

Link to abstract/paper: <http://www.cabdirect.org/abstracts/19990308288.html>

J Indian Bot Soc. 1997;76:169-172.

Homeopathic drugs in the control of some post-harvest diseases of fruit.

Khanna R, Chandra S.

Ärztezeitschrift für Naturheilverfahren. 1997;38(11):823–826.

Die Wirkung von calcium carbonicum hahnemanni D 200 auf lathyrus odoratus.

[The effect of calcium carb hahne manni D 200 on lathyrus odoratus].

[Article in French]

Ohlen B.

Bulletin - Institute for Organic Agriculture. 1997;4:348-353.

Physical characteristics of potatoes depending on organic fertilizers and use of biodynamic preparations.

Koch K, Damerow L, Köpke U, Neuhoff D, Schulz DG, Kromer KH.

Br Homoeopath J. 1997 Apr;86(2):86–89.

Effect of high dilutions of Arsenicum album on wheat seedlings from seed poisoned with the same substance.

[L. Betti](#), [M. Brizzi](#), [D. Nani](#), [M. Peruzzi](#),

Abstract

A blind laboratory experiment was carried out to show the effect of a 45x potency of *Arsenicum album* (As₂O₃) on wheat seedlings whose seeds had been previously poisoned with a material dose of the same substance. The effect of the homeopathic treatment on stem growth was statistically significant. The experimental results were matched with a previous study concerning homeopathic treatment in the same species.

Link to paper: <http://www.comenius.edu.mx/Betti%20et%20al,%201997.pdf>

Boletin Mexicano de Homeopatia. 1996;29:44–46.

Acción De 9 Fármacos Homeopáticos Sobre La Germinacion De Esporas De Alternaria Solani Y Semillas De Trigo Y Tomate.

[Action of 9 Homeopathic Drugs From September on germination of spores of Alternaria solani and wheat seeds and tomato].

[Article in Spanish]

Rivas E, Ceceña C, Guajardo G.

Biol Agric & Hort. 1996;13(2):175-188.

Biodynamic preparations cause opposite yield effects depending upon yield levels.

Raupp J, König UJ.

Abstract

Crop yields of cereals, carrots, beetroots and potatoes from 28 different field plot and pot experiments (on a site near Marburg/Germany) were compared to determine the influence of the biodynamic preparations 500 and 501 on yields. Under generally low yields the preparations tended to increase the yields. When the yields reach a medium level this positive effect was smaller. At higher yield levels preparations tended to lower yields. For the yield effect of the preparations 500 and 501 (= Y) and the yield levels in the untreated control (= X) a significant linear regression could be calculated: $Y = 4.497 - 0.181 X$ ($r = -0.615$; $\alpha < 0.01\%$). In another experiment with spring wheat conducted for 9 years in Darmstadt/Germany the application of all eight biodynamic preparations modified yields similarly, but only at a high fertilization level. In this treatment the effects followed a significant linear regression $Y = 28.930 - 0.87 X$ ($r = -0.767$; $\alpha = 1.59\%$). Yields in the untreated control varied from 1.6 to 5 t/ha. These effects have previously been discussed as a normalization of yields or as a compensation of a non-optimal nutrient supply. A new model is suggested here based on the regressions of preparation effects and yield levels.

Link to abstract/paper:

<http://www.tandfonline.com/doi/abs/10.1080/01448765.1996.9754776#.Ugzrr206qgE>

Homöopathie in Österreich. 1994;5(2):14-15.

Wirkung von Mikrowellen auf homöopathische Arzneimittel.

[Effect of microwaves on homeopathic medicines].

[Article in German]

Pongratz W, Haidvogel M.

Pharm Pharmacol Lett. 1994;4:40-43.

Homeopathic potencies and equally concentrated conventional dilutions as inhibitors or stimulators of acid phosphatase from potato.

Dittmann J, Hentges A, Harisch G.

Br Homeopath J. 1994;83(4):195–201

A pilot statistical study with homeopathic potencies of arsenicum album in wheat germination as a simple model.

Betti L, Brizzi M, Nani D, Peruzzi M.

Abstract

A blind, randomized laboratory trial to study homoeopathic potencies of Arsenicum album on wheat germination is proposed as a simple model which allows a rigorous statistical analysis. The parametric tests show that the differences between the treatment groups cannot be explained as a mere effect of intrinsic seed variability.

Link to abstract/paper:

<http://www.journals.elsevierhealth.com/periodicals/brihj/article/PIIS0007078505807914/abstract>

Proc Natl Acad Sci Lett. 1993;63:353-360.

Suppression of *Fusarium oxysporum* Schlecht., a pathogen causing seedling blight and foot rot of wheat, with homeopathic drugs.

Khanna KK.

Plant Disease Research. 1992;8(2):110-114.

Efficacy of various bio-products and chemicals against tobacco mosaic virus in tomato and cucumber mosaic virus in bottle gourd.

Cheema SS, Kapila S, Kumar A.

Plant Disease Research. 1993;8(2):94-101.

Control of taro blight and corm rot caused by *Phytophthora colocasiae* homeopathic drugs.

Aggarwal A, Kamlesh T, Mehrotra RS.

Indian Phytopath. 1992;45(3):348-353.

Effect of homoeopathic drugs on respiration of germinating fungal spores.

Khanna KK, Chandra S.

Abstract

Effect of a number of homeopathic drugs on the respiration of germinating spores of eight fungal pathogens was investigated. Majority of drugs suppressed the respiration but the magnitude of suppression varied with the drugs, their potencies and the pathogens. A significant correlation between inhibition of spore germination and rate of respiration was recorded. Changes in the organic acid pool of the spores during germination were also affected by the drugs.

Link to abstract/paper:

<http://epubs.icar.org.in/ejournal/index.php/IPPJ/article/view/21700>

Berlin J on Res in Hom. 1991 Dec;1(4/5):275-278.

Synergism of Action between Indolacetic Acid and Highly Diluted Solutions of Calc carb on the Growth of Oat Coleoptiles.

Bornoroni C.

Abstract

This study demonstrated that Calc carb 5X significantly increased the growth stimulating effects of the plant growth stimulant, indole acetic acid.

Berlin J on Res in Hom. 1991 Jun;1(3):148-150.

Homoeopathic Effect of a Plant Hormone? A preliminary report.

Endler PC, Pongratz W.

Abstract

This study showed that Indole Butyric Acid, known at material levels to enhance the growth of new roots and leaves from plant slips, at a 33X potency, continued to provide an enhancement of growth.

Link to abstract/paper:

<http://www.journals.elsevierhealth.com/periodicals/brihj/article/S0007-0785%2805%2980311-4/fulltext>

Mitteilungen des Instituts für Strukturelle Medizinische Forschung. 1991;3:43-63.

Das Wachstum von Weizenkeimlingen nach Zugabe von toxischen Substanzen.

[The growth of wheat seedlings after addition of toxic substances].

[Article in German]

Kovac H, Muhry F, Novic S, Moser M.

Br Homeopath J. 1991;80:157–160.

An agricultural application of homoeopathy.

Kayne S.

Abstract

A field trial in which four homœopathic sprays were applied to rye grass is reported. The aim of the trial was to determine whether any significant effect on growth could be achieved when compared with similar applications of nitrogen fertilizer, and a control. At the particular dosages and strengths chosen no such effect was perceived; however a method for testing homœopathic sprays were established. The results are presented and analyzed. Suggestions are made for further work.

Link to abstract/paper:

<http://www.sciencedirect.com/science/article/pii/S0007078505802273>

Mitteilungen des Instituts für Strukturelle Medizinische Forschung. 1990;2:64-67.

Zellkulturen unter dem Einfluß von Kinetin D24.

[Cell cultures under the influence of kinetin D24].

[Article in German]

Pongratz W, Kovac H.

Mitteilungen des Instituts für Strukturelle Medizinische Forschung. 1991;3:43-63.

Das Wachstum von Weizenkeimlingen nach Zugabe von toxischen Substanzen.

[The growth of wheat seedlings after addition of toxic substances].

[Article in German]

Kovac H, Muhry F, Novic S, Moser M.

Mitteilungen des Instituts für Strukturelle Medizinische Forschung. 1991;3:1–42.

Untersuchung der Wirkung von potenzierten Umweltschadstoffen (Metallen) und Schwefel auf das Wachstum von Weizenkeimlingen.

[Study the effects of environmental pollutants potentiated (metals), and sulfur on the growth of wheat seedlings].

[Article in German]

Lehner E, Muhry F, Kovac H, Novic S, Pongratz W, Moser M.

Mitteilungen des Instituts für Strukturelle Medizinische Forschung. 1990;2:14-43.

Untersuchung der Wirkung von potenziertem Gold (Aurum met. praep.) auf das Wachstum von Weizenkeimlingen.

[Study of the effect of potentized Gold (Aurum met. Praep.) on the growth of wheat seedlings].

[Article in German]

Novic S, Muhry F, Lehner E, Kovac H, Pongratz W, Grivetz S, Moser M.

Mitteilungen des Instituts für Strukturelle Medizinische Forschung. 1990;2:8-13.

Zuwachs von Zellkulturen von *Hypericum perforatum* unter dem Einfluss potenzierten Kinetins.

[Growth of cell cultures of *Hypericum perforatum* potentiated under the influence of kinetin].

[Article in German]

Pongratz W, Heydel B.

Mitteilungen des Instituts für Strukturelle Medizinische Forschung. 1990;2:3–7
Die Wirkung von potenziertem Silbernitrat auf das Wachstum von Weizen.
[The effect of silver nitrate potentized on the growth of wheat].

[Article in German]

Pongratz W, Bermardinger E, Moser M, Varga F.

Agribiological Research. 1990;43(1):65-73.

Wechselwirkungen zwischen organischer Düngung und der Anwendung des biologisch-dynamischen Präparates P500 im aeroben Inkubationsversuch.
[Relationships between organic amendments and the biodynamic preparation P500 in aerobic incubation trials].

[Article in German]

Dewes T, Ahrens E.

Abstract

The effects on dehydrogenase activity, protease activity and NO₃-N content of adding P 500 (a biodynamic preparation) to soils amended with straw, hornmeal, liquid manure and glucose and incubated aerobically at 20°C and 45% water holding capacity are presented in tables and graphs.

Link to abstract/paper:

<http://www.cabdirect.org/abstracts/19911959033.html;jsessionid=276FA4EF8880FC A9D99C448209050D0A>

Proc Natl Acad Sci Lett. 1990;60:345-348.

Homeopathic drugs in the control of fruit-rot of guava.

Khanna R, Chandra S.

ICCHOS Newsletter. 1989;2:2–8

Plant's responses to high homeopathic potencies in distilled water culture.

Dutta AC.

Natl Acad Sci Lett. 1989;12:39-41.

Effect of homeopathic drugs on seed mycoflora of wheat.

Khanna R, Khanna KK, Chandra S.

Indian Phytopath. 1989;42:436-440.

Further investigations on the control of storage rot of mango, guava and tomato fruits with homeopathic drugs.

Khanna KK, Chandra S.

Tierärztliche Umschau. 1988;43(3):196-198.

Zusammenhänge zwischen Standort, Boden, Pflanze und Krankheit.

[Homeopathy. Relationships between site, soil, plant and disease].

[Article in German]

Wolter H.

Indian J Mycol Plant Pathol. 1987;17:191-192.

Effect of certain homeopathic drugs on incidence of seed-borne fungi and seed germination of *Abelmoschus esculentus*.

Saxena A, Pandey ML, Gupta RC.

Proc Natl Acad Sci India. 1987;57:160-170.

Spore germination, growth and sporulation of certain fruit-rot pathogens as affected by homeopathic drugs.

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Homéopathie. 1986;3(3):51-54.

Platina - Observations expérimentales 'in vivo' et 'in vitro' avec Platina 7 CH et Platina 200. CH

[Platina - Experimental Observations 'in vivo' and 'in vitro' with Platina 7CH and Platina 200 CH].

[Article in French]

Taddei J, Giachetti D, Taddei E, Bellani LM, Franchi GG.

Indian J Virol. 1986;2:132-135.

Comparative efficacy of homeopathic drugs against papaya mosaic virus (PapMV) as foliar spray.

Cheema SS, Reddy RS, Kapur SP, Bansal RD..

Natl Acad Sci India. 1986;9:301-302.

Control of Botryodiplodia rot of guava with a homeopathic drug.

Kehri KH, Chandra S.

J Am Inst Hom. 1986;79:100-105.

A Biological Investigation of Succeded Serial Microdilutions.

Chou JY.

Cahiers de Biothérapie. 1985;88:21-27.

Effets curatifs et preventifs de dilutions homeopathiques de sulfate de cuivre appliquées à des racines de lentilles pré ou post-intoxiquées.

[Preventative and curative effects of homeopathic dilutions of copper sulphate applied to the roots of lentils pre or post-intoxication].

[Article in French]

Progetti ML, Guillemain J, Tétou M.

Ärztezeitschrift für Naturheilverfahren. 1985;26(10):670–682.

Reaktionen eines pflanzlichen Zellsystems auf die Zugabe eines homöopathischen Komplexmittels und seiner Bestandteile.

[Reactions of a plant cell system with the addition of a homeopathic agent and its components].

[Article in German]

Weingärtner O, Scholz W, Wolf R, Nagl W.

Hahnemannian Gleanings. 1985;52(1):24–28

Effects of Thuja occidentalis on the mitotic activity of plant cell.

Jana B.

Biological Agriculture and Horticulture. 1985;2:245-269.

Effects of very small amounts of highly active biological substances on plant growth.

Syltie PW.

Abstract

Since the advent of the Industrial Revolution modern agriculture has gravitated towards the use primarily of macronutrients such as nitrogen (N), phosphate (P₂O₅), potash (K₂O), and lime for crop production, with an emphasis on micronutrients only when they became yield-limiting. The values of plant quality and soil conditions were minimized. The importance of soil organic matter and humic substances in crop growth were concurrently deemphasized. Yet, it is understood that nearly all soil processes tie closely to soil biological activities such as mineralization, immobilization, N-fixation, and nitrification. The organic fraction of soils, and the rhizosphere zone with its root exudates, contain organic substances in very low concentrations which can stimulate plant growth substantially. These substances include humic substances, growth regulators, vitamins, antibiotics, organic acids, and other materials. Certain added organic substances can also benefit plant growth

in very low concentrations, sometimes with as little as 2×10^{-4} kg/ha for triacontanol. The very important link between soil organic matter and active soil biological processes in aiding plant growth thus becomes even more important when it is understood that many organic substances present in very low concentrations can produce significant plant responses. Macronutrients, micronutrients and other common soil amendments cannot be considered exclusively when attempting to maximize soil fertility and plant growth.

Link to paper:

<http://www.tandfonline.com/doi/abs/10.1080/01448765.1985.9754437#.Uiin1j9HCgE>

Science Letters. 1984;7(3):75-76.

Effect of homeopathic drugs on growth of *Drechslera tetramera* (Mckinney) Subram. & Jain and *Curvularia lunata* (Wakker) Boedijn.

Prasad P, Ambasta KK, Kumar K, Sinha M.

Biological Agriculture & Horticulture: An International Journal for Sustainable Production Systems. 1984;2(1):1-50.

Homoeopathy and its Potential Role in Agriculture—A Critical Review.

Scofield AM.

Abstract

Homoeopathy is a therapeutic system in which diseases are treated with substances, usually in extreme dilutions, which, when given to healthy individuals, produce the same symptoms as the disease being treated. Homoeopathy is an holistic method of treatment in that the whole organism is treated in an attempt to raise its level of resistance and stimulate its ability to throw off disease. In this respect it is well suited to the holistic concepts of biological agriculture. Because of the extreme dilution of the remedies they are relatively cheap, have little or no ecological side-effects and, on the whole, are harmless. This review introduces the basic principles of homoeopathy, discusses the experimental evidence for the efficacy of homoeopathic treatment of disease and considers its potential role in agriculture. The conclusion is that despite a great deal of experimental and clinical work there is only a little evidence to suggest that homoeopathy is effective. This is because of bad design, execution, reporting or failure to repeat experimental work and not necessarily because of the inefficacy of the system which has yet to be properly tested on a large enough scale. It is suggested that there is sufficient evidence to warrant the execution of well-designed, carefully-controlled experiments, particularly in naturally diseased organisms, to investigate the efficacy of homoeopathy further. Some of the experimental work already done suggests that homoeopathy may be of value in the treatment and prevention of diseases in crops as well as domestic animals.

Link to abstract/paper:

<http://www.tandfonline.com/doi/abs/10.1080/01448765.1984.9754413>

Br Homeopath J. 1983;72(3):143-147.

Comparison of Wheat and Yeast as in vitro Models for Investigating Homoeopathic Medicines.

Jones RL, Jenkins MD.

Hahnemannian Gleanings. 1983;50:411-413.

Effect of homeopathic drugs on the growth of two plant pathogens.

Dua VK, Atri DC.

Hahnemannian Gleanings. 1983;50:154-156.

Sensitivity of keratinophilic fungi to some homeopathic medicines.

Singh BG.

Natl Acad Sci Lett. 1983;6:139-141.

Inhibition of *Aspergillus niger* van Tiegh. by homeopathic drugs causing deterioration of coriander and cumin seeds in storage.

Mishra N.

Sugarcane Pathol New. 1982 Nov;29:48-50.

Inhibition by some homeopathic drugs of sugarcane mosaic virus in sorghum.

Shukla K, Joshi RD.

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Ann Homéop Fr. 1982;24(1):29-34.

Probleme de l'optimum de succussions en fonction du moment de la preparation de dilutions cuivriques.

[Problem of the optimum of succussions in function of moment of dilutions preparations].

[Article in French]

Graviou E.

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Recherche de l'action de dilutions homéopathiques sur les végétaux. II.

[Research of the action of homeopathic dilutions on plants. II.].

[Article in French]

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Recherche de l'action de dilutions homéopathiques sur les végétaux.

[Research of the action of homeopathic dilutions on plants].

[Article in French]

Auquière JP, Moens P.

Adv Homeopath. 1981:117-121.

Effect of homeopathic drugs on the growth of *Alternaria tenuis* Auct and *Corvularia lunata* (wakker) Boeidjn, the common leaf spot pathogens of ornamental and cultivated plants.

Singh BS, Gupta G.

Br Homeopath J. 1981 Jul;70(3):120-146.

Plant Responses to Homeopathic Medicines.

Jones RL, Jenkins MD.

Abstract

The authors of this work set out to study the effects of various homeopathic potencies of Silver nitrate on the growth characteristics of the leaf sheaths of wheat. On analysis of the results they found that potencies of silver nitrate were in fact able to either inhibit or stimulate growth, depending upon the potency applied.

Beitr Erw Heilk. 1981;2:69–77.

Vom Studiengang am Weizenkeim-Test.

[The wheat germ test of course].

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Krüger-Woernle C.

Link to abstract/paper:

<http://www.merkurstab.de/index.php5?page=108&lang=0&artikel=2462>

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Abstract

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2. The growth rate of *Chlorella* in Chu 10 culture medium was greatly reduced by a concentration of copper sulphate of 10^{-5} Molar (M). Algae grown in Moyses culture medium, which contain 3.2×10^{-7} M copper sulphate, were less sensitive to copper sulphate. *Chlorella* whose growth had been inhibited by copper sulphate was, when resuspended in fresh culture medium, more sensitive to further added copper sulphate than normal algae.

3. Potencies of copper sulphate prepared in the laboratory, in the concentration range 4c (4×10^{-8} M) to 15c had no effect on the growth of either normal or poisoned algae.

4. Several batches of a 15c potency prepared by A. Nelson & Co., Ltd. increased the rate of growth of both unpoisoned and poisoned algae. These results are attributed to the fact that the batches of potency contained a general growth stimulant, rather than to a stimulatory homoeopathic action of the potency itself which would have affected the poisoned algae only.

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Abstract

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