

Homoeopathic dilutions: is there a potential for application in organic plant production?

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Keywords: plant pathology, detoxification, homoeopathic potencies

Introduction

Homoeopathy and Anthroposophical Medicine are well known methods of complementary medicine which, due to their effectiveness and the absence of harmful side-effects, are widely used in human and veterinary care. Both medical systems rely, among other things, on the use of homoeopathic potencies consisting of highly diluted natural substances such as plant extracts or minerals. Dilution may be so high that there is no possibility of any direct material effect. The therapeutic principle must therefore rather be regarded as some sort of “information therapy” as outlined by Bastide (1998), which is thought to modulate the internal life forces and the self-regulation system of living organisms. An overview of homoeopathy and its principles can be found in several textbooks, e.g. by Bellavite and Signorini (1995); an introduction to anthroposophical medicine can be found in articles such as that by Heusser (1999).

Medical treatment with homoeopathic potencies can be of great interest to organic agriculture since this way of treatment relies totally upon natural substances and inherent self-regulation principles. One might therefore ask whether homoeopathic potencies could also be of any use in organic plant production. However, the main condition for such use is that plants or microbes are actually able to react to homoeopathic dilutions at all. This is not evident a priori, since preparation of homoeopathic potencies involves successive logarithmic dilution steps (1:10 for x (D) potencies, 1:100 for c (C) potencies), some of which end up as quite high dilution ratios. Whilst Arnica 6x (D6), for instance, still contains material Arnica compounds at a concentration of 10^{-6} , Arnica 30c (C30) with a concentration of 10^{-60} surely does not. Sensitivity of plants or microbes to highly diluted homoeopathic potencies therefore has to be investigated thoroughly.

Sensitivity of plants and microbes to homoeopathic dilutions

Following the pioneering work of Kolisko (1923) which was stimulated by ideas of Steiner (1920), a large number of experimental studies investigating the effects of homoeopathic dilutions on plants or microbes was published. These experiments were mainly undertaken with the aim of developing an experimental model to test and detect homoeopathic potencies. This work has been reviewed in detail by King (1988), Righetti (1988) and Majerus (1990), but mainly from a pharmaceutical viewpoint. We know only of two reviews which examine the results from an agricultural point of view: the compilation by Scofield (1984) and the Masters thesis by Emde (1994), which Emde also published in abridged, booklet form (1995).

Summarising these reviews one has to conclude that only a few experimental studies correspond to modern scientific standards. In addition, successful experiments have never been replicated by another research team until now. Nevertheless, there is evidence from published experimental work (see table 1) and from our own more recent experiments (reported at the IFOAM 2000 conference) that plants are indeed able to react to homoeopathic potencies. One may observe stronger reactions to homoeopathic potencies (up to 24% growth increase) with plants that have been exposed to poisonous substances than with healthy ones (\pm 5% growth modulation). There are also some indications that the effects of homoeopathic dilutions are time-dependent (see table 1).

The work of Thun (1980) deserves interest, though to our knowledge her results have never been reproduced under controlled experimental conditions. Starting from a suggestion by Steiner (1924) for weed control, she investigated possible reduction in weed-growth through administration of potentised weed seed ash. Strong inhibitory effects were observed after application of seed ash 8x and other higher potencies.

There are fewer publications concerning the possible influence of homoeopathic dilutions upon micro-organisms like fungi and bacteria. Some evidence emerges from work done in India as reviewed by King (1988). Unfortunately these publications are quite difficult to access, and this may be why these experiments were ignored in the western world and have never been replicated.

Investigation	Plant	Potency	Effect [%]	Time Dependency	Poisoning
Auquière et al. (1982)	mustard	CuSO ₄ 14x	ΔL + 14/20%	yes (0–45%)	CuSO ₄ 0.01/0.02%
Betti et al. (1997)	wheat	As ₂ O ₃ 45x	ΔL + 24%	–	As ₂ O ₃ 0.1 %
Kovac et al. (1991)	wheat	CuCl ₂ 10x–30x	ΔL + 10%	yes (0–20%)	CuCl ₂ 0.02%
Basold (1968)	wheat	AgNO ₃ 10x–30x	ΔL ± 1%	yes	no
Betti et al. (1994)	wheat	As ₂ O ₃ 25x–45x	ΔGR + 2%	–	no
Lauppert (1995)	wheat	CuSO ₄ 5x–30x	ΔL ± 3%	no	no
Novic et al. (1990)	wheat	Au 18x–30x	ΔL ± 5%	yes	no
Pelikan et al. (1965)	wheat	AgNO ₃ 8x–19x	ΔL ± 3%	no	no
Pelikan (1968)	wheat	PbNO ₃ 8x–19x	ΔL ± 2%	no	no

Table 1: Overview of some experimental studies with plants and homoeopathic potencies under hors-sol conditions. ΔL: growth modulation (shoot length), ΔGR: germination rate modulation. Column 4 gives the average effect of the potency studied or, if more than one potency was included in the investigation, of the potency with the most marked effect. All studies yielded statistically significant effects. Numerical values were estimated from graphs if not explicitly indicated in the text.

The sparse number of publications concerning possible effects of homoeopathic dilutions on phytopathological plant/microbe-systems was also reviewed by King (1988). Results were sometimes spectacular, as in the post-harvest experiments of Khanna et al. (1978): mango fruit-rot was virtually reduced to zero after treatment with *Lycopodium clavatum* 190c. In another experiment by Khanna et al. (1976), tomato fruit-rot was diminished to zero by application of *Kali iodide* 149c. But again, these results have not been reproduced.

Thus it can be concluded that plants – and perhaps also microbes – are indeed able to react to homoeopathic potencies, but the effects may be modulated by chrono-biological factors or other still unknown circumstances. The reaction seems to be stronger when the organisms are stressed, e.g. by exposure to poison. This observation accords with general homoeopathic experience that sick organisms are more likely to react to homoeopathic dilutions than healthy organisms. Homoeopathic potencies therefore might be an interesting perspective for organic plant production, especially for the treatment of plant diseases. But only very few agricultural pot or field experiments have been conducted until now. Since research needs to begin from scratch, we wish to give an outline of possible applications to stimulate further investigations.

Main potential application areas

Many problems in organic plant production do arise from unfavourable environmental conditions and inappropriate cultivation techniques which hamper the plant's development. It is therefore the very first rule of organic agriculture to ensure good soil structure with sufficient humus content, adequate organic fertilisation, regular crop rotation, soil- and climate-adapted crops and varieties, etc. We are not of the opinion that homoeopathic potencies should be used to cure plant diseases caused by disregard of these “fundamentals” of organic plant production. Nevertheless there may be extreme weather and climate conditions, such as very high or low humidity, high or low temperature, air pollution and other external factors which cannot be regulated by the farmer himself and which influence the plant's development. This may ultimately lead to plant diseases such as viral, bacterial or fungal infections, or to problems with weeds or noxious insects. Such conditions may be indications for the use of homoeopathic potencies. The selection of the right homoeopathic remedy is not trivial, however.

From an empirical standpoint, the most promising application area for homoeopathic dilutions is detoxification. As shown in table 1, there are at least some experiments with plants which show a significant detoxification from using homoeopathic dilutions of the toxic substance. In addition, Linde et al. (1994) performed a meta-analysis of toxicological experiments with animals: treatment with mercury 15c resulted in a 40% reduction in mortality of mercury-intoxicated mice, and application of arsenic 7c increased faecal arsenic excretion by 30% in the case of rats which had been intoxicated with arsenic. These observations may encourage further investigations with plants. Heavy metal detoxification of plants growing on contaminated soils may be only relevant in certain localised instances, but forestry suffering from heavy metal release through acid rain could be an application area of more general interest. Fungi like *Pythium* and *Phytophthora* impede the plant's development through secretion of enzymes and toxic substances. Potencies of the toxic and enzymatic compounds should be tested for possible application in organic plant production. Since the secretions are not always known or easily obtainable, one could try to produce potencies of

infected plant tissue which contains the fungus, and all secreted substances. The same approach could be tested for plant diseases caused by other fungi, bacteria or viruses.

Another approach to treating plant diseases relies on the strictly phenomenological simillimum-rule of homoeopathy. This rule states that the substance, which in a healthy organism produces symptoms that correspond most to those of a particular sick organism, is chosen as homoeopathic remedy in potentised form. Human homoeopathy is therefore based upon the “Materia Medica”, i.e. a catalogue of symptoms which healthy humans develop after administration of the respective substances, e.g. minerals or plant extracts. For the treatment of plants, it would be necessary to establish a “Materia Medica” for plants – a compilation of symptoms which plants show after poisoning with a given substance. Such a catalogue could at least partially be compiled by consulting standard literature about plant toxicology. This work still has to be done, however. Another approach used in veterinary homoeopathy is the extrapolation of human symptoms to the animal level. Whilst such a procedure seems at least partially feasible for animals, it is somewhat more complex for plants, but could perhaps help to narrow a possible selection of remedies for a given plant disease. Emde (1994) reports on some successful individual case examples which were based upon purely phenomenological homoeopathic remedy selection. Such a treatment demands thorough knowledge of homoeopathy, however, and may be too complicated for daily agricultural practice.

The third approach is based upon the well-known phenomenon of systemic acquired resistance, a kind of general plant immunity, which may be induced in nature through contact with pathogenic micro-organisms. Systemic acquired resistance is non-specific and generally reduces the impact of a broad range of plant diseases of diverse nature (viral, bacterial and fungal) for several weeks. In extension of the work of Bastide (1998), who stimulated the immune system of mice and chickens with potencies of endogenous immune-modulating substances, one could try to induce systemic acquired resistance in plants through application of potencies of salicylic acid for instance, which plays a key role in inducing plant immunity. It may also be possible that treatment with potencies of pathogens, infected plant tissue or pure solutions of secreted toxic or enzymatic substances (see above) could induce systemic resistance.

The fourth potential application derives from the idea of Steiner (1924) and the work of Thun (1980) mentioned above. The idea of using weed ash or potencies of weed ash for weed control, or corresponding ash or ash potencies to expel noxious insects or animals could be generalised to pathogenic micro-organisms. But we do not know of any experiments of this kind that have been carried out.

Open questions and possible secondary effects

Several restrictions limit the practicability of the four above-mentioned approaches. There is no certain knowledge about the most effective potency level or potency type (x, c). Not much is known about the optimal production parameters such as solvent nature, succussion time, vessel form and material, necessary contamination precautions and stability. In addition, neither adequate doses nor application frequencies of homoeopathic dilutions for plants are sufficiently known.

Human medical experience shows that higher homoeopathic dilutions (above 30x/30c, e.g. 200c, 1000c etc.) are especially powerful remedies in human and veterinary medicine. A single dose of a few drops over some months is the standard treatment in classical homoeopathy: minute amounts of homoeopathic potencies are enough to induce considerable reactions in humans. One therefore has to carefully consider possible adverse effects for cattle and consumer health. Remains of the homoeopathic remedy itself, as well as processes induced in plants, might cause reactions in animals and humans. Given the fact that the exact nature of the action of homoeopathic potencies is still not known and that there do not exist any analytical methods to detect higher homoeopathic potencies, it would be advisable to proceed with caution. As long as there is no way to trace applications of homoeopathic dilutions we would recommend refraining from using homoeopathic dilutions higher than 30x/30c in plant production for the consumer market. Potencies lower than 30x/30c (e.g. 6x, 12x, etc.) are applied in higher doses and regularly over a longer period of time in human medicine. The possibility of secondary effects in cattle and humans is therefore somewhat reduced. In any case, successful application of homoeopathic potencies in organic plant production should be tested thoroughly before any products are sold to the public. We explicitly recommend including investigations with image-forming methods (capillary dynamolysis, copper chloride crystallisation etc.) as done by Balzer-Graf (1987) to monitor changes in the plants' vital organisation, since Selawry (1975) observed pronounced changes in copper chloride crystallisation pictures of seedlings grown in various homoeopathic potencies.

Conclusions

Evidence exists that plants are in principle able to react to homoeopathic potencies. Some interesting potential applications can be outlined, such as detoxification and stimulation of systemic acquired resistance. However, a good deal of research needs to be done before any practical applications to organic plant production can be envisaged.

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