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

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

This investigation examined the hypothesis that more complex organisms show stronger reactions to homeopathic remedies than less complex ones.

We compared two Arsenic (As^{5+}) 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.

For duckweed, growth rates of leaf area and leaf number were evaluated. For yeast, growth kinetics were determined by measuring slope, yield and Et_{50} (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).

After screening 17 substances, three homeopathic preparations (*Arsenicum album*, *nosode*, *gibberellic acid*) were chosen for repeated experimental series. 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 ($p<0.001$). 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.

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 (As^{5+}) and the homeopathic preparation *Arsenicum album* is suitable to further investigate factors influencing the quality and effects of potentized substances.

Effectiveness of complex homeopathic medicinal products in the treatment of children with painful teething

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Background: Complex homeopathic medicinal products are sold over the counter for self-limiting diseases in children such as painful teething. The possible effectiveness of these complex products is predominantly based on the clinical experience with each of the individual homeopathic active substances in the product. So far, only a few clinical studies in children have been performed to investigate the effectiveness of complex homeopathic products as a whole.

Objective: To investigate the comparative effectiveness and tolerability of two complex homeopathic medicinal products, Dentokind versus Viburcol, in the treatment of children with painful teething.

Design: A multicentre, randomized comparative clinical study with two parallel groups. One group received Dentokind (tablets), containing five homeopathic active substances: Belladonna D6, Chamomilla D6, Ferrum Phosphoricum D6, Hepar sulfuris D12 and Pulsatilla D6. The other group received Viburcol (suppositories), containing six homeopathic active substances: Chamomilla D1, Belladonna D2, Solanum D4, Plantago D3, Pulsatilla D3 and Calcium Carbonicum D8. Children in the age of ≤ 6 years with symptoms of painful dentation were included in the study. Exclusion criteria were fever of ≥ 38 °C, severe comorbidity and/or oncological diseases. The main outcome parameter was total scores of subjective complaints and clinical symptoms as assessed by parents and physicians after 3 and 7 days of treatment. Other outcome parameters were parent satisfaction and the number of reported adverse events.

Results and Conclusions: At (outpatient) paediatric clinics in Russia, 200 children with symptoms of painful teething were included in the study, 100 in the Dentokind group and another 100 children in the Viburcol group. Demographics and outcome data are currently being analysed. Results and conclusions will be therefore be presented at the conference.