

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

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## 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 (As<sup>5+</sup>) 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 Et<sub>50</sub> (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 (As<sup>5+</sup>) and the homeopathic preparation *Arsenicum album* is suitable to further investigate factors influencing the quality and effects of potentized substances [4].

**Keywords:** homeopathy; duckweed; yeast; arsenic; *Arsenicum album*

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