

Series of experiments performed with the droplet evaporation method on low potencies

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Introduction: Homeopathic preparations in low potencies, containing still measurable quantities of the starting substance, constitute a unique research field in homeopathic basic research. Here a series of experiments is presented carried out by means of the droplet evaporation method (DEM), investigating the specificity of the method, and presumed effects of the succussion procedure applied in the production of homeopathic preparations.

Methods: DEM analysis consisted in the evaporation of droplets of the potencies *per se* placed on microscope slides. Resulting patterns were photographed. Images were evaluated by means of ImageJ software, by measuring grey level distribution, texture, and fractality. The experimentation consisted of four series:

- (i) screening (1x–6x potencies from 19 substances),
- (ii) differentiation experiments (2x–6x potencies of Echinacea, Baptisia, Luffa, and Spongia),
- (iii) differentiation between succussed (100 or 10 times) and unsuccussed samples (Echinacea 2x, Baptisia 3x, Baptisia 4x, Luffa 4x, and Spongia 6x).
- (iv) investigation of the influence upon the patterns of single compounds present in a remedy complex.

The experimental set-up stability was examined by systematic positive control experiments.

Results:

- (i) Homeopathic preparations of mineral origin showed the greatest form variety, whereas those of vegetal origin created fractal patterns in the potency range 2x–4x.
- (ii) Differentiation of potencies of different origin at the same dilution level was possible from 2x to 4x.
- (iii) In all potency levels, succussed (100 and 10 times) and unsuccussed variants could be significantly differentiated. Significant differences between all variants were found in some cases in potency levels 4x and higher. In general, application of succussion reduced size, homogeneity, and complexity of the DEM patterns.
- (iv) Patterns of a remedy complex *Luffa 4x - Mercurius bijodatum 9x* showed a clear predominance of the Luffa 4x; however also the second component, present in a much lower concentration, influenced significantly the pattern of the remedy complex as also differed significantly from the pattern of succussed water control.

Conclusions: The results suggest that DEM is a suitable tool for scientific investigation of homeopathic preparations in the low potency range. DEM might be applied to assess further research questions, such different potentization procedures (vessel shape, overhead volume, material), storing time, and difference between batches.

Keywords: droplet evaporation method, crystallization, homeopathy, low potencies