

## REVIEW

# A review of machines and devices to potentize homeopathic medicines

Abhirup Basu<sup>1</sup>, Akkihebbal Krishnamurthy Suresh<sup>1,2</sup>, Shantaram Govind Kane<sup>1</sup> and Jayesh Ramesh Bellare<sup>1,2,\*</sup>

<sup>1</sup>Department of Chemical Engineering, Indian Institute of Technology Bombay, Adi Shankaracharya Marg, Powai, Mumbai 400076, Maharashtra, India

<sup>2</sup>Department of Biosciences and Bioengineering, Indian Institute of Technology Bombay, Adi Shankaracharya Marg, Powai, Mumbai 400076, Maharashtra, India

**Background:** Potentization, consisting of serial dilution and succussion, is a key step in the manufacture of homeopathic medicines. Originally prescribed as a manual process, several attempts at mechanization have been published, patented and even commercialised in order to remove the human element and introduce reproducibility without drudgery. Various machines have been used over the years to prepare homeopathic medicines. Although these machines follow the same principles, i.e. energetically mixing the medicines and diluting them significantly, their mode of operation is different from each other.

**Methods:** This review paper surveys the main methods of preparation of homeopathic medicines. The main machines discussed are: Boericke's potentizer, Tyler Kent's instrument, John Alphonse's machine and the fluxion potentizer, which were used in the past, as well as more recent potentizers like arm-and-weight instruments, the K-Tronic potentizer and Quinn's machine. We review the construction and operating principle of each of these machines, along with their advantages and limitations. A scheme for relative performance assessment of these machines is proposed based on the parameters mechanical efficiency, physico-chemical efficiency, turbulence generation, energy dissipation, and accuracy of dilution.

**Results:** Quinn's machine and the arm-and-weight potentizer perform well for generating turbulence due to high impaction forces, while John Alphonse's machine is much more accurate in diluting the homeopathic medicines at every step.

**Conclusions:** Both the commercial potentizers, Quinn's machine and the K-Tronic potentizer, are completely automated and therefore reduce the manual labour and variation in succussive forces during each step, which may produce uniformity in physico-chemical changes within the resulting homeopathic medicines. *Homeopathy* (2017) ■, 1–10.

**Keywords:** Succussion; Dilution; Fluxion; Parameters; Performance assessment

## Introduction

Homeopathy, an important form of alternative medicine, after its discovery in Germany in the late eighteenth century by Dr Samuel Hahnemann, is now popular in many countries<sup>1</sup> because homeopathic practitioners and patients believe they can cure many diseases.<sup>2</sup> Approximately 200 million people across the world take homeopathic medicines on a daily basis.<sup>3</sup> According to the World Health Organization (W.H.O.), almost 10% of the population in India use homeopathy and almost 30,000 practitioners prescribe

\*Correspondence: Jayesh R. Bellare, 110, Silicate Technology Lab, Department of Chemical Engineering, Indian Institute of Technology (IIT) Bombay, Adi Shankaracharya Marg, Powai, Mumbai 400076, Maharashtra, India.

E-mail: [basuabhirup93@gmail.com](mailto:basuabhirup93@gmail.com), [aksuresh@iitb.ac.in](mailto:aksuresh@iitb.ac.in), [sgkane@gmail.com](mailto:sgkane@gmail.com), [jb@iitb.ac.in](mailto:jb@iitb.ac.in)

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homeopathic medicines.<sup>4</sup> In spite of its high demand, the mechanism responsible for a curing effect of homeopathy has still not been established. The potency/dilution relationship is formed during the process of manufacturing of these medicines. The controversy stems from the fact that the potency of the medicines is claimed to increase with increasing dilution. The homeopathic medicines undergo serial dilution with, at every step, a forceful shaking called succussion, which is said to increase the activity of medicines. In many cases, the dilution factor is  $10^{60}$  or even  $10^{400}$  (30c and 200c respectively) and is far above Avogadro's number, which leads to doubts about the presence of active materials in the medicines. Many hypotheses like water memory,<sup>5-7</sup> epitaxy,<sup>8,9</sup> clathrate formation<sup>10</sup> and quantum theory<sup>11,12</sup> attempted to explain the retention of information of original active materials at ultra high dilution, but there has been no widely accepted physical evidence to validate the retention of the information of the original active materials, as a result of which this remained as a mystery until the recent detection of nanoparticles of the original material in the final medicine.<sup>13</sup>

When Hahnemann conceptualized homeopathy, he manually pounded the vials containing the active materials in water-ethanol solution for preparation of homeopathic medicines.<sup>14</sup> But this process is extremely labour extensive and requires high manpower. Besides, during manual pounding, the force was not equally imparted on the vials for all the strokes. So to maintain uniformity in the force and to reduce manual stress, many researchers have built different machines for preparing homeopathic medicines. There is also difference of opinions among different researchers about the process of preparation of homeopathic medicines as discussed later.

Although there have been a few reviews of machines, none of these has discussed their advantages and disadvantages. Therefore, at this point, we feel that it is necessary to have a comprehensive picture of various machines and methods used to prepare homeopathic medicines and a basis for their comparison. It is also important to determine the efficiency of these machines in the light of the theories that have emerged recently. The most important of these theories are nanoparticle retention theory and the silica encapsulation theory.<sup>15,16</sup>

Recent research using sophisticated instruments has proved that medicinal substances are actually present even at high dilution at a measurable concentration of 10–1000 pg/ml as measured by ICP-AES (inductively coupled plasma atomic emission spectroscopy) and reach an asymptotic non-zero value.<sup>17</sup> The traces of original substances are also directly observed under transmission electron microscopy. Researchers have hypothesized that the particles remain in the solution through silica encapsulation and levitate to the surface of liquid through nanobubble formation, which are carried in each dilution step. Although in this paper, we do not deal with this issue any further, here we have tried to investigate the parameters of the machines, which govern the overall mechanism of preparation and are important in detecting

the performance of the machines. The performance assessment of these machines and the parameters that characterize them are discussed in the later part of the paper.

## Methods of potentization of homeopathic medicines

Homeopathic medicines are prepared based on the principle of ultra high dilution, where serial dilution is carried out several times such that the dilution factor has gone to  $10^{30}$  or even up to  $10^{400}$ , which is far beyond Avogadro's number ( $6.023 \times 10^{23}$ ).<sup>18</sup> Potentization, also known as dynamization, is the process of trituration, succussion and dilution or fluxion of medicines, which Hahnemann claimed to transform their properties and develop dynamic powers, helping in healing many diseases when taken in minute doses.<sup>19</sup>

### Trituration

Trituration is the method of dilution of insoluble solid substances by grinding them with lactose in a particular ratio for preparation of homeopathic medicines. Hahnemann proposed the ratio of solid substances to lactose to be 1:99 and the trituration was to be carried out for 2 h.<sup>20</sup> Thus 1 mg of solid substance, mixed with 99 mg of lactose, is triturated to prepare 1st potency while 1 mg of 1st potency can be mixed again with 99 mg of lactose and triturated to obtain 2nd potency. Maximum 3rd potency can be reached via trituration and the subsequent steps should be carried out via liquid dilution.

### Succussion

Succussion is the first method of potentization used by Hahnemann where the bottle containing the medicine and the solvent in a particular ratio was taken upward, stopped momentarily and then pounded on a rubber pad. Succussion creates a high turbulent regimen where vortices continuously form and disappear. Mechanical energy applied during succussion diffuses through the larger vortices and then through the smaller ones. Finally the energy gets dissipated from the fluid at the molecular level,<sup>21</sup> which might be taken up by the substances and can increase their activity.

According to different pharmacopeias, the main motive of succussion is to separate the fine particles attained by trituration from one another by forming an admixture in an inert liquid.<sup>22,23</sup> It is believed that grinding the substances alone or adding the particles to an inert liquid will not help to increase the medicinal activity of the substance. Rather, trituration and succussion both taken together will serve the purpose.

### Dilution

For dilution of homeopathic medicines, Hahnemann mixed one part from the top of the previous dilution with 99 parts of 95% (v/v) ethanol in a new fresh bottle which is succussed thoroughly to make the new potency.<sup>24</sup> Since the previous bottle contains the old dilution, it cannot be

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