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**Shandic Kumar S**  
Department of Materia  
Medica, Sarada Krishna  
Homoeopathic Medical  
College, Kulasekharam  
Kanniyakumari, Tamil Nadu,  
India

**Fareed Ahmed K**  
Department of Materia  
Medica, Sarada Krishna  
Homoeopathic Medical  
College, Kulasekharam  
Kanniyakumari, Tamil Nadu,  
India

**Nandhini G**  
Department of Materia  
Medica, Sarada Krishna  
Homoeopathic Medical  
College, Kulasekharam  
Kanniyakumari, Tamil Nadu,  
India

**Winston Vargheese V**  
Department of Materia  
Medica, Sarada Krishna  
Homoeopathic Medical  
College, Kulasekharam  
Kanniyakumari, Tamil Nadu,  
India

**Corresponding Author:**  
**Winston Vargheese V**  
Department of Materia  
Medica, Sarada Krishna  
Homoeopathic Medical  
College, Kulasekharam  
Kanniyakumari, Tamil Nadu,  
India

## Characterization of nanoparticles in gunpowder 3x, 6x, 12x and 24x potencies using Raman spectroscopy

**Shandic Kumar S, Fareed Ahmed K, Nandhini G and Winston Vargheese V**

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### Abstract

**Background:** According to the literature of homoeopathy the remedy gun powder has the property to cure Abscesses, Acne, Bites, Blood-poisoning, Boils, Carbuncles, Cuts - poisoned, Ivy (Hedera) poisoning, Osteo-myelitis, Tonsillitis – septic, Vaccinosis, Worms. Homoeopathic system of medicine uses ultra-high dilutions as their medication. Avogadro's Limit is a threshold limit where there is no possibility of presence of original molecules over the dilution of Avogadro's constant which is  $6.02254 \times 10^{23}$ . When the potency goes above 23x in Decimal scale of potentization, it crosses the Avogadro's limit. So, this study is done to find the presence of nano particles of the source materials in the homoeopathic medicine gun powder in 3x, 6x, 12x and 24x potencies using Raman spectroscopy.

**Method:** Gun powder 6x, 12x, and 24x were prepared from 3x potency. Then the source materials such as, sulfur, charcoal, potassium nitrate and lactose were tested separately under Raman spectroscopy along with gun powder 3x, 6x, 12x, and 24 potencies. The values of lactose were subtracted from the 3x, 6x, 12x, and 24x potencies. A line graph of all the values obtained were plotted and then compared

**Result:** The peaks of potassium nitrate and Sulphur coincides with all the triturations of gun powder tested.

**Conclusion:** The presence of nano-particles of the source materials of gunpowder in the homoeopathic triturations of the same till 24x potency is found. This may indicate that even other homoeopathic trituration up to 24x potency have the nano particles of its source materials.

**Keywords:** Charcoal, gunpowder, nanoparticles, potassium nitrate, potencies, raman spectroscopy, sulphur, trituration

### Introduction

Gunpowder, also known as black powder to distinguish it from modern smokeless powder, is the earliest known chemical explosive. It consists of a mixture of sulfur (S), carbon (C), and potassium nitrate (saltpeter,  $\text{KNO}_3$ ). The sulfur and carbon (in the form of charcoal) act as fuels while the saltpeter is an oxidizer. Black Gunpowder is a mixture and not a chemical compound [12].

According to the literature of homoeopathy the remedy gun powder (Carbon-Sulphur-Kali-Nitricum) have property to cure Abscesses, Acne, Bites, Blood-poisoning, Boils, Carbuncles, Cuts - poisoned, Ivy (Hedera) poisoning, Osteo-myelitis, Tonsillitis – septic, Vaccinosis, Worms [13].

Homoeopathic system of medicine uses ultra-high dilutions as their medication. These are prepared by successive dilution with a vehicle which is known as potency and the process is called as Potentization or Dynamization. During this process the dilution breaches the Avogadro's limit [14].

Avogadro's Limit is a threshold limit where there is no possibility of presence of original molecules over the dilution of Avogadro's constant which is  $6.02254 \times 10^{23}$ . When the potency goes above 23x in Decimal scale of potentization, it crosses the Avogadro's limit [15].

Raman spectroscopy is a scattering technique. It is based on Raman Effect, i.e., frequency of a small fraction of scattered radiation is different from frequency of monochromatic incident radiation. It is based on the inelastic scattering of incident radiation through its interaction with vibrating molecules. It probes the molecular vibrations. In Raman spectroscopy, sample is illuminated with a monochromatic laser beam which interacts with the molecules of sample and originates a scattered light. The scattered light having a frequency different from that of incident light (inelastic scattering) is used to construct a Raman spectrum [16].

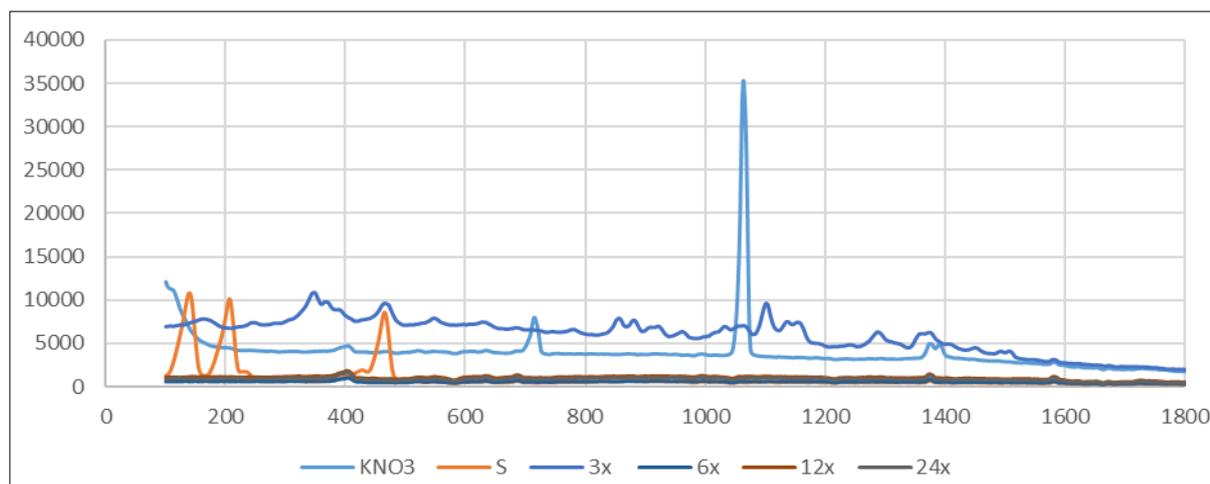
This study is done to find the presence of nano particles of the source materials in the homoeopathic medicine gun powder in 3x, 6x, 12x and 24x potencies using Raman spectroscopy.

### Method

As the availability of gun powder in crude state is uncertain, gun powder 3x was bought and further potencies such as 6x, 12x, and 24x were prepared from it through trituration, this process was carried out in the pharmacy lab of Sarada Krishna homoeopathic medical college and hospital. The conversion of trituration to liquid potency was not done after 6x potency, as it was difficult to characterize liquid potencies in Raman spectroscopy. Then the source materials

such as, sulfur, charcoal, potassium nitrate and lactose were tested separately under Raman spectroscopy along with gun powder 3x, 6x, 12x, and 24 potencies by using the Raman spectroscopy instrument present in the Nano-characterization lab at Nanotechnology Department, Noorul Islam Centre for higher education. The values of lactose were subtracted from the 3x, 6x, 12x, and 24x potencies. the values of charcoal were not obtained in the procedure due to the instrument's limitation of not reading on black samples. A line graph of all the values obtained were plotted and then compared

### Results



**Fig 1:** Comparative chart of gun powder 3x, 6x, 12x and 24x potencies with source materials

**Table 1:** Correlative table for KNO<sub>3</sub> peaks in gunpowder 3x, 6x, 12x, and 24x potencies

Wavenumbers which has KNO <sub>3</sub> peaks	Presence of the peaks in			
	3x	6x	12x	24x
402cm <sup>-1</sup>	Present With shift In 346cm <sup>-1</sup>	present	present	present
714cm <sup>-1</sup>	Not present	Present with shift in 686cm <sup>-1</sup>	Present with shift in 686cm <sup>-1</sup>	Present with shift in 686cm <sup>-1</sup>
1064cm <sup>-1</sup>	Present With shift In 1102cm <sup>-1</sup>	Not present	Not present	Not present
1384cm <sup>-1</sup>	Present With shift In 1374cm <sup>-1</sup>	Present With shift In 1374cm <sup>-1</sup>	Present With shift In 1374cm <sup>-1</sup>	Present With shift In 1374cm <sup>-1</sup>
1584cm <sup>-1</sup>	present	present	present	present

**Table 2:** Correlative table for Sulphur peaks in gunpowder 3x, 6x, 12x, and 24x potencies

Wavenumbers which has Sulphur peaks	Presence of the peaks in			
	3x	6x	12x	24x
140cm <sup>-1</sup>	Present With shift In 162cm <sup>-1</sup>	Not present	Not present	Not present
206cm <sup>-1</sup>	Present With shift In 244cm <sup>-1</sup>	Not present	Not present	Not present
464cm <sup>-1</sup>	present	Present With shift In 402cm <sup>-1</sup>	Present With shift In 402cm <sup>-1</sup>	Present With shift In 402cm <sup>-1</sup>

## Discussion

So, in this experimental study, it was found that there is the presence of source materials such as potassium nitrate and sulphur in homoeopathic triturations of gun powder. But the presence of carbon in the triturations were not found, because of the limitation in the instrument used of not reading black coloured samples. So, as a further study, it is decided to test these samples under High Resolution Transmission Electron Microscopy. And it is also to find the antiseptic activity of the same in LPS induced Sepsis in Zebra Fish.

## Conclusion

The peaks of potassium nitrate and sulphur coincides with all the triturations of gun powder tested. This shows the presence of nano-particles of the source materials of gunpowder in the homoeopathic triturations of the same till 24x potency. This may indicate that even other homoeopathic triturations up to 24x potency have the nano particles of its source materials.

## Conflict of Interest

Not available

## Financial Support

Not available

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## How to Cite This Article

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