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Characterization of Nanoparticles in Silicea 30c,200c and 1m Potencies Using Raman Spectroscopy

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ABSTRACT
The homoeopathic medicine Silicea was purchased in three different potencies, namely, 30C,200C,1M prepared as per the method advised by Dr. Samuel Hahnemann and characterization was done using Raman spectroscopy technique. It scientifically proves that homoeopathic dilutions of Silicea 30C,200C,1M, are having individual physiochemical characteristics and supra molecular chemistry which can be ascribed to their unique biochemical or biophysical functionalities that arise due to their unique supramolecular characteristics evident from the Raman profiles. This study highlights the advantages of Raman spectroscopy over traditional analytical techniques, such as its non-invasive nature, minimal sample preparation, and rapid data acquisition. The spectral variations of each Homeopathic potency are analyzed using Raman spectroscopy. The results were plotted in different graphs. The result obtained shows us that various scattering profiles are obtained by Raman spectral analysis.

Keywords: Silicea, Homoeopathic medicine, Raman spectroscopy, Nanoparticles

INTRODUCTION:

Raman spectroscopy is a spectroscopic technique typically used to determine vibrational modes of molecules, rotational and other low-frequency modes of systems. This method is commonly used in chemistry to provide a structural fingerprint by which molecules can be identified.(1) Raman spectroscopy relies upon inelastic scattering of photons, known as Raman effect. Raman techniques referred for both qualitative as well as quantitative analysis of samples. Qualitative analysis can be performed by measuring the frequency of scattered radiations while quantitative analysis can be performed by measuring the intensity of scattered radiations.(2) Potentization is a process that involves successive dilutions and succussions (vigorous shaking); it was first introduced by the German physician Samuel Hahnemann, who observed that solutions of substances that have undergone this process have a biological effect in humans - with therapeutic evidence(3) Drugs at ultrahigh dilution (UHD) are frequently used in homeopathy. The Concentration of original drug molecules in the 12^{th} centesimal dilution reaches to a dilution beyond 10^{th} therefore, UHDs (beyond Avogadro) are likely to be devoid of original drug molecules(4) .

Homoeopathy is a wonderful system of medicine developed by Dr. Samuel Hahnemann in which medicines are prepared by truly scientific process in three scales of potencies, namely, 2 Centesimal (C) and 5o millesimal (LM) such that the concentration of medicine exceeds Avogadro's limit. The concentration of the medicine in each dilution is divided by 10, 100, and 50,000 respectively.

LITERATURE SURVEY

1.QUALITY ASSESMENT OF PHYSICAL RESEARCH IN HOMEOPATHY:

Research conducted by Claudia Becker witt, Rainer Ett,all , states that Most physical experiments of homeopathic preparations were performed with inadequate controls or had other serious flaws that prevented any meaningful conclusion. Except for those of high quality, all experiments should be repeated using stricter methodology and standardization before they are accepted as indications of special features of homeopathic potencies. (5)

2. THE DEFINING ROLE OF STRUCTURE (INCLUDING EPITAXY) IN THE PLAUSIBILITY OF HOMEOPATHY:

Research conducted by Richard Hoover, Rustum Roy Ett, all, states that Preliminary data obtained using Raman and Ultra-Violet–Visible (UV–VIS) spectroscopy illustrate the ability to distinguish two different homeopathic medicines (*Nux vomica* and *Natrum muriaticum*) from one another and to differentiate, within a given medicine, the 6c, 12c, and 30c potencies. Materials science concepts and experimental tools offer a new approach to contemporary science, for making significant advances in the basic science studies of homeopathic medicines. (6)

3. RAMAN SPECTROSCOPY SHOWS DIFFERENCE IN DRUGS AT ULTRA HIGH DILUTION PREPARED BY STEPWISE ULTRA HIGH DILUTION:

Research conducted by Tandra sarkar, Atheni Konar Ett, all, states that R1(Sulphur) provides information about the relative number of OH groups with strong and weak hydrogen bonds. R2(Natrum mur) suggests the relative number of OH groups with broken and weak hydrogen bonds. Judged from R1 values the lower is the rank of HD, the stronger is the H-bond of the OH groups. In the light of R2 values the higher is the HD rank the more abundant is the free OH groups. So, hydrogen bond strength and free OH groups together make an effective HD rank relating to Sulphur and Natrum mur. (7)

4.DETERMINATION OF THE CONCENTRATION OF BRYONIA DIOICA TINTURE BY RAMAN SPECTROSCPY:

Research conducted by Janetta Miliea, E,Culiea Ett, all, stated that Dilutions of a tincture of Bryonia Dioica in ethanol were prepared and investigated by Raman spectroscopy. The Raman line at 881 cm -1 was found to depend linearly versus the concentration of Bryonia Dioica. This permits to obtain a calibration curve that may be used to determine the concentration of Bryonia Dioca in ethanol. The method may be extended to determine the concentration of various homoeopathic dilutions.(8)

MATERIALS AND METHODOLOGY:

Study design: Experimental study

Medicines:

- SILICEA 30C
- SILICEA 200C
- SILICEA 1M

SAMPLE SIZE: 3

Coding of samples:

Homoeopathic drug Silicea of 3 potencies of was purchased from the pharmacy and was sent to the research department for coding into 3 sample groups - A, B, C.

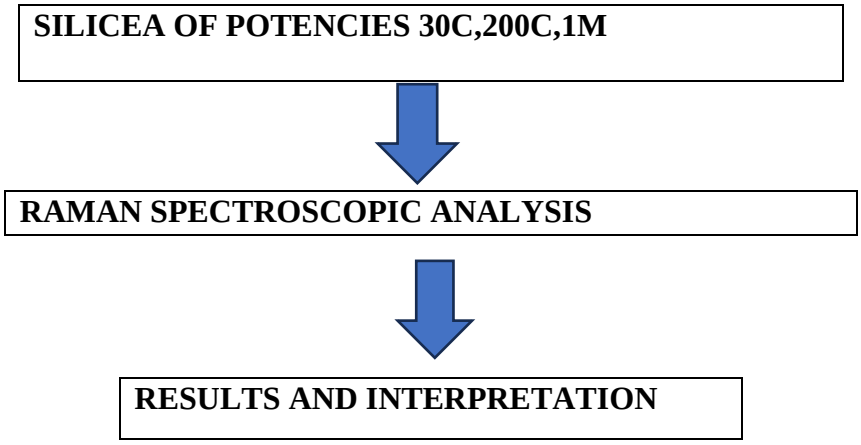
TABLE : 1 Coding of samples

Sample A	SILICEA 30C
Sample B	SILICEA 200C
Sample C	SILICEA 1M

Study setting:

The experiment was conducted in characterization laboratory, Department of Nano Technology, Noorul Islam Centre of Higher Education established in the year 2009. The Raman spectra of samples were analyzed at room temperature using a Raman spectrometer. The samples were analyzed for spectral analysis and the results from Raman spectroscopy were obtained and compared to obtain our objectives. The results were interrupted by the subject.

FLOWCHART OF PROCEDUR:



METHODOLOGY IN DETAIL:

In this study homeopathic medicine SILICEA of different potencies i.e., 30C,200C, 1M was collected from pharmaceutical companies. The experiment is conducted in Characterization laboratory, Department of Nano Technology , Noorul Islam Centre for Higher Education. Raman spectroscopy was performed by shinning an intense monochromatic laser on 3 samples. Radiation emitted from the sample was collected, with the laser wavelength of 785nm. The results were interpreted by the subject expert.

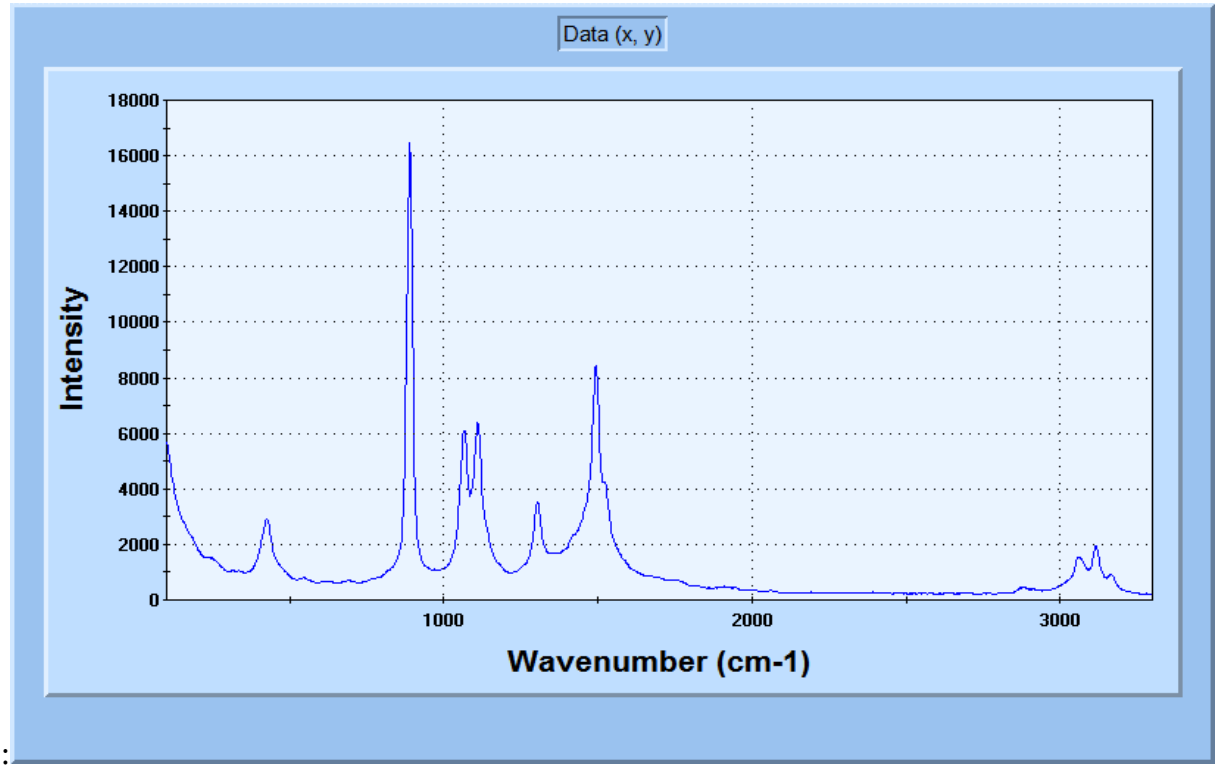
Figure:1

Doing Experiment by Dr.Kavibala

OBSERVATION:

The spectral variation of different potencies taken for the study was observed and the data were interpreted.Raman spectroscopy has been used to scientifically verify that Silicea in potencies 30C, 200C, and 1M does not show changes in the composition of its derivatives. However, the spectra reveal that homeopathic medicines exhibit different wavelengths at various potencies, accompanied by changes in energy intensity. This indicates that further research is needed in this field.

Figure:2



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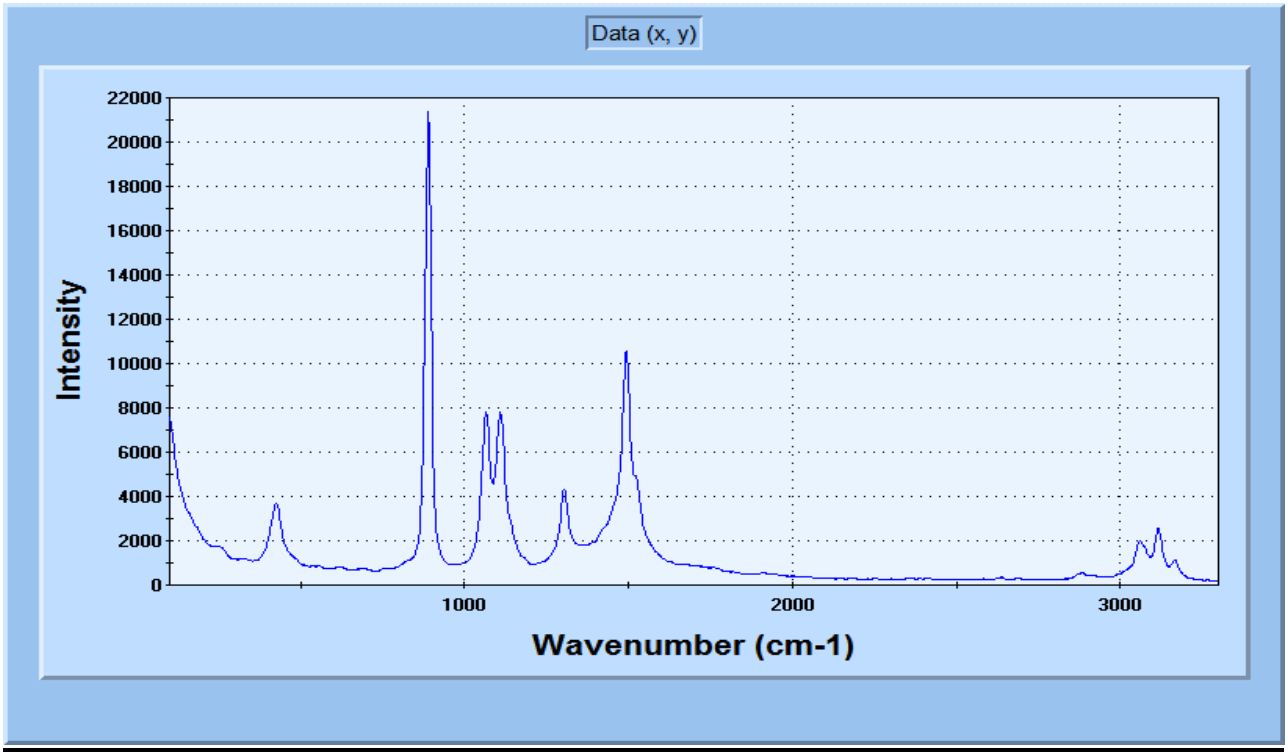
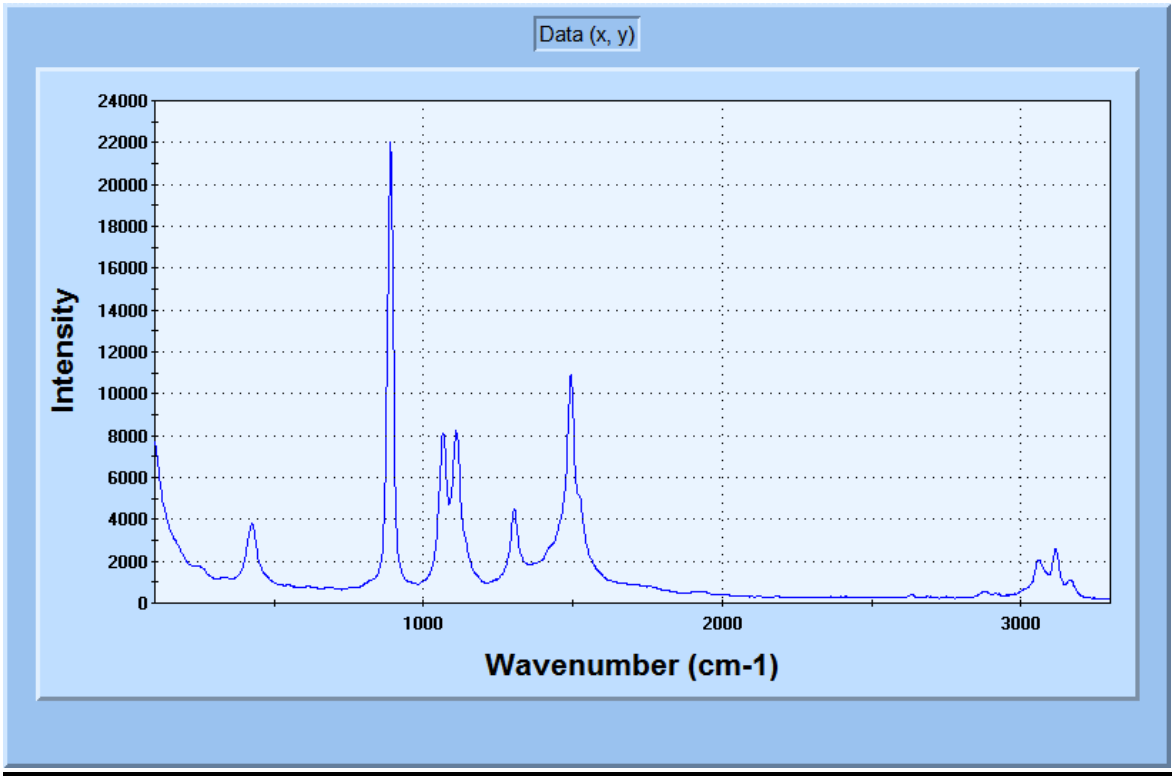
Raman spectra of 30C dilutions of Silicea at wave numbers 982nm and 1517nm.

Figure:3



Raman spectra of 200C dilutions of Silicea at wave numbers 898nm and 1446nm.

Figure:4



Raman spectra of 1M dilutions of Silicea at wave numbers 1081nm and 1529nm.

RESULT:

The results obtained showed that various scattering profiles were obtained by Raman spectral analysis. The intensities in the graph of almost all the potencies showed a slight variation. The observations noted upon comparing the 30C, 200C, and 1M potencies indicated a graph intensity of peak as compared. All these changes might have been depicted due to the absence of strict quality control during the preparation of homoeopathic medicine Silicea and its potencies. These changes in the preparation of medicines could have led to a reduction in their medicinal properties, which was a case of concern. The results obtained showed that the components present in the samples were the same. This indicated that the chemicals and base materials used in the medicines were the same. The intensity of Raman scattering was proportional to this polarizability change. Therefore, the resultant Raman spectrum or the scattering intensity was a function of the frequency shifts and depended on the rovibronic states of the molecule. The obtained results suggested that the number of molecules acting as the Raman scattering points increased with serial dilution. This might have been due to the formation of a large number of nano supramolecular scattering clusters in Silicea as a result of the serial dilution process. When the results from the same companies were compared, the dilution steps were clearly visible. A reduction in Silicea was noticeable as the concentration differences for each company. The graphical comparison of each potency of the same company showed differences in the intensities in Raman spectroscopy**.**

CONCLUSION:

In conclusion, Raman spectroscopy methods have shown that Silicea in potencies 30C, 200C, and 1M does not exhibit changes in the composition of its derivatives. However, the Raman spectra of homeopathic medicines reveal different wavelengths for the same medicine at varying potencies. This indicates a variation in the intensity of energy across different potencies. Consequently, this research underscores the need for further investigation in this area.

FUTURE SCOPE:

Raman spectroscopy could revolutionize quality assurance and provide insights on potentization in homeopathy, particularly in quality control and standardization.

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