

Organization report



Introduction to Use of Silica in Sampling of Plant Compounds

Liquid chromatography is the most widely accepted and fundamental methodology for the separation and sampling of plant compounds. Liquid chromatography has the abilities to separate and sample a huge variety and diverse range of organic compounds ranging from proteins and peptides to small molecule protein drugs. The liquid chromatography is a technique that works by placing or injecting a minute volume of liquid sample into a silicon tube which is packed with porous substances or particles. This phase is called the stationary phase. The next phase is the extraction phase where the individual compounds present in the sample are transported over a packed tube or column by a liquid which gains mobility through gravity. The HPLC or the high-performance liquid chromatography or the high-pressure LC. In this research paper the use of silicon tubing in the mobile phase of HPLC for the extraction of individual plant compounds would be discussed in detail. Flexible tubing has witnessed significant popularity amongst the HPLC analysis because of its ease of use, lesser costs and the CIP and SIP of the contaminated waste waters. Silicon tubing was first introduced in the year 1948 and since then have been used in many operations that help in the production of various pharmaceuticals. Silicones is the common name of linear polydimethylsiloxanes. The silicones offer many properties like the backbone flexibility, low surface tension, low inter-molecular interactions and also thermal stability. Silicon is also used for some complex structures which are modified to form elastomers.

The Properties of Silicon

The silicon has many properties that make it ideal for use in the sampling of plant compounds. The properties of the silicon include:

- Silicon Polymers: The silicones are usually made of the PDMS and have strong covalent bonds in its structure which are highly resistant to homolytic scission.
- Silicon Elastomers: The silicon polymers can be simply converted into elastomers that are 3-dimensional networks with the use of cross-link reactions.

The Advantages of Using Silicon in the Sampling of Plant Compounds

- High-Binding Energy: The silicon is formed by the siloxane compounds and is thus very stable. As a result the binding energy is very high, which is extremely beneficial in the HPLC analysis. As compared to the commonly used organic polymers, the silicon rubber provides higher electrical insulation due to its chemical stability and the heat resistance.
- The Low Intermolecular Force and High the Coil Formation Capacity: The intermolecular force in silicon molecules is low and hence they are helical which results in very high elasticity, very high resistance and high compressibility. In addition, the methyl groups present in the outer surface of silicon groups rotate freely resulting in enhanced compression characteristics.

Although there are many other technique available for the sampling of plant compounds such as terthienyl, their performance has not been very up to the mark. In fact it was found out that the using silicon tubing resulted in

much higher efficiency and enhanced results.

The objective of this research and experiment is the preparation of the pots with silicon tubing syringe and the large rods for monitoring the release of the lipophilic compounds like terthiophene from the roots of the plants.

References

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