

**BIPM Capacity Building & Knowledge Transfer Programme**  
**2020 BIPM - TÜBİTAK UME Project Placement**  
**REPORT**

<b>Project Name</b>	GC-MS systems to develop method for the determination of organic contaminants
<b>Description</b>	This project was based on improving skills and knowledge transfer in area of GC and GC-MS Chromatography as well as studying the factors that influence the sensitivity of the method.
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### **Motivation & Introduction**

Chromatography is one of the most important analytical techniques. It allows the separation and subsequently the qualitative and quantitative analysis of complex mixtures, as long as the samples are volatile or soluble in a suitable solvent. Chromatography is versatile and can be highly efficient; full automation is possible. Some basic principles of its theory are presented by the project is necessary to take real advantage of all the possibilities offered by chromatographic techniques.

### **Research**

Sample preparation is an essential part of chromatographic and spectroscopic analyses. The process is intended to provide a representative, reproducible, and homogenous solution that is suitable for injection into the column for chromatographic analysis although many of the sample preparation protocols used in chromatography are similar.

During the program several important techniques were concerned. Based on Extraction System B-811 extraction sample preparation are studied (fig.1).

The extraction process consists of three individual steps - extraction, rinsing and drying. The sample is placed into the glass sample tube or thimble and put into the extraction chamber. One of available extraction methods can be chosen for the program such as Soxhlet Standard, Soxhlet Warm, Hot Extraction, Continuous Flow.

Once the extraction is completed, the glass valve opens and an efficient rinsing is performed. During the rinsing process, the condensed solvent washes final traces of soluble matter from the sample and from the interior of the extraction chamber.



Figure 1 - Extraction system

At the end of drying the entire solvent is evaporated and collected in the extraction chamber to be eventually re-used.

The following preparation method under consideration was planetary balls milling (fig.2). Planetary ball mills can be used for the sample preparation of a wide range of sample materials, with a starting size of 5-10mm, down to a final fineness of  $<100\text{ }\mu\text{m}$  and  $<1\text{ }\mu\text{m}$ . They can also be used to prepare dry powders, suspensions or sample materials under an inert atmosphere. By reducing the particle size of materials, mills can help researchers homogenize samples and achieve consistency and accuracy in testing.



Figure 2 - Ball milling system

### **Conclusions and Future Work**

During the project basics of chromatography and chromatographic techniques was studied. Unfortunately, the short time spent couldn't cover full scope of the project. With the knowledge gained during the study I can now optimise and develop my working skills.

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