

Herbs are present in everyday human life as spices, fragrances, herbal medicines or as a source of bioactive compounds. Essential oils are a well-known and valued herbal product – volatile with steam fraction contained in plant tissues, which is often an indicator of the quality of the plant material used to obtain it. However, in addition to essential oils, man uses whole plants on a massive scale, both fresh and dried, especially because of their aroma. Therefore, a very important issue is the relationship between the composition of the essential oil and the presence of plant matter (called also plant matrix). The correlation of these two elements in a real way creates a plant aroma that reaches human's nose. In view of the poor information in the scientific literature on this subject, the aim of this project is to examine the principles of the relationship among the composition of the essential oil, the aromatic profile of the whole plant, and a sensory evaluation of plant odour quality.

The project involves the use of various mint plants (*Mentha* spp.), in which changes in the essential oils composition will be forced by drying. Then the plants, both fresh and dried, and the essential oils obtained from them, will be subjected to a detailed chemical analysis of organic volatile compounds and in parallel the evaluation of the quality of the odour by a sensory panel consisting of qualified experts. During chemical analysis using gas chromatography (GC), mass spectrometry (MS), solid-phase microextraction (HS-SPME) and olfactometry (GC-O):

- the qualitative composition of the essential oil will be determined (taking into account the enantiomeric composition - pairs of chemical compounds that are their mirror image, which may have a different smell);
- key odour compounds will be designated (that means those, which from the entire mixture of chemicals, in fact are responsible for odour which human feels);
- the quantitative content of key odour compounds in the essential oil will be determined;
- the distribution of key odour compounds in the aromatic profile of the plant and essential oil (the effectiveness of releasing individual key odour compounds from the plant material) will be determined.

The results obtained in the chemical analysis will be compared with the sensory evaluation of the plants odour. In this way, differences in the assessment of pure essential oils and the whole plant (oils trapped in plant matter) will be determined. The results of such comparison will show how the presence of plant matter (matrix) affects the assessment of smell by people and will allow to determine whether the quality assessment of essential oils can be translated into the quality assessment of all plant material. In addition, the results will determine what enantiomeric composition is preferred by humans and will allow to determine what mutual influence volatile compounds contained in plant material have on each other.