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DETERMINATION OF VOLATILE COMPOUNDS IN CANNABIS SATIVA L. USING ELECTRONIC NOSE BASED ON PEPTIDE AND HAIRPIN DNA Vs. SOLID-PHASE MICROEXTRACTION AND GC-MS

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Cannabis plants (*Cannabis sativa L.*) produce and accumulate a resin rich in terpenes in glandular trichomes, which are abundant on the surface of the female inflorescence. The volatile constituents of Cannabis have been studied because they represent a potential for fingerprints of different cultivars. Terpene molecules consist of the union of isoprene units in a "head to tail" configuration. The structure of the terpenes can be cyclic or open and may include double bonds, a hydroxyl, a carbonyl or another functional group. Several monoterpenes and sesquiterpenes are important components of cannabis resin as they define some of the unique organoleptic properties, influencing the qualities of different cannabis strains and varieties [1; 2]. Some terpenes, (mono and sesquiterpenes), are very important because they can be responsible for the anti-inflammatory activity (such as beta-caryophyllene which is the predominant sesquiterpene), or pinene (monoterpene) which has been reported as an acetylcholinesterase inhibitor which helps the memory inhibitor that helps memory. Terpenes have high vapor pressures, are extremely volatile and therefore are excellent candidates for analysis performed at the electronic nose or gas chromatography-mass spectrometry [3].

The aim of the work was to develop a methodology based on ZnO-peptide and hp-DNA based QCMs array of gas sensors for the characterization and fingerprint identification of various commercial hemp samples from different Italian companies. Samples have been ground and analyzed with the gas sensor array and a gas chromatography -MS SPME method in parallel.

The data set obtained were studied with multivariate analysis, mainly with the discriminant analysis (PLS-DA). As from literature, the most significant volatile compounds present in the hemp samples were: α-pinene, β-pinene, β-myrcene, D-limonene, linalool, α-terpineol and terpinolene [3]. However, all the volatile components that were identified, were used for the discrimination of the different samples coming from the different Italian companies.

The results obtained showed that the set of sensors based on peptides and hairpin DNA functionalized with nanoparticles allowed a good discrimination between the companies; the percentages of confusion matrix was around 80%. These results were confirmed with gas chromatography-MS SPME analysis.

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References

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