

Highlights of Analytical Chemistry in Switzerland

Cannabis Profiling: Which Analytical Strategy to Apply?

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Cannabis sativa L. with its long history is an interesting example of the complexity of plants. In numerous domains, this plant occupies an important place in society. Indeed, besides its recognised pharmacological and toxicological properties, cannabis and derivatives are also implicated in social and economical aspects. For many years they have been subject to discussion and controversy in Switzerland, where political and legal institutions are currently debating legalization. In case of acceptance, a strict control would be performed to determine the plant origin as well as its quality. Only plants cultivated in Switzerland would be allowed and their content in Δ^9 -tetrahydrocannabinol (Δ^9 -THC), the psychoactive component, would have to be indicated.

The chemistry of cannabis is complex. Among the natural components, cannabinoids are abundant characteristic C_{21} compounds belonging to the class of terpenophenols. It is now largely accepted that the cannabinoid content varies with the geographical origin. Therefore, tracing a cannabinoid profile can be of prime impor-



Fig 1. Where was this cannabis plant grown? Cannabinoid profiling gives the answer.

tance not only to determine the Δ^9 -THC content but also for localization if plants are cultivated outdoors.

Cannabis chromatographic profiles can easily be performed by combining a solvent-free sample preparation technique, such as headspace solid-phase microextraction, with gas chromatography/mass spectrometry. In addition, chemometric tools such as principal component analysis and hierarchical cluster analysis allow the treatment and interpretation of the phytochemical fingerprinting determined on the basis of the cannabinoid content. **Thanks to these tools, discrimination of cannabis samples originating from different locations can be achieved.**

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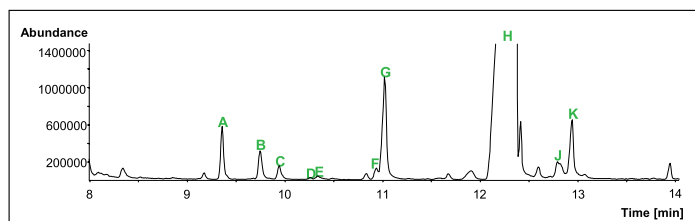


Fig 2. Cannabis GC/MS profile showing ten cannabinoids (A to K)

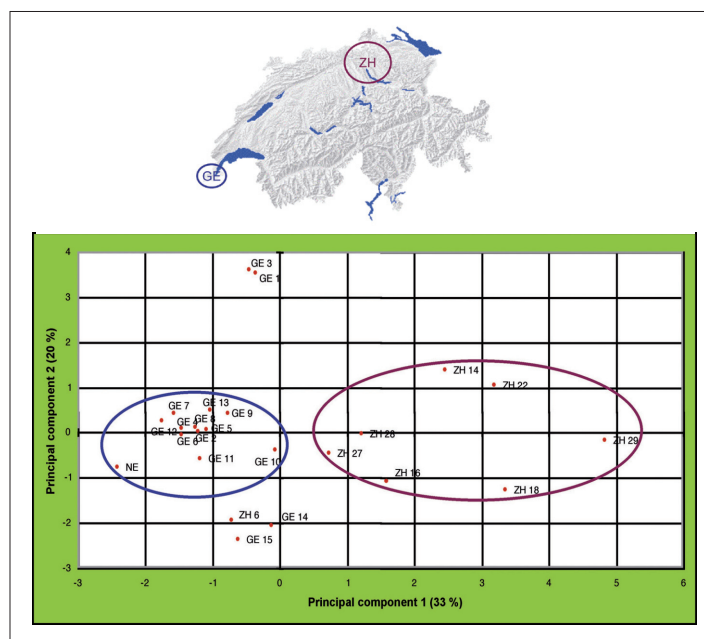


Fig 3. Discrimination of cannabis samples from different locations in Switzerland

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