

P-032: Development of a LC-qToF-MS based approach to verify the geographical origin of native olive oils

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According to Regulation (EU) No 29/2012 on marketing standards for olive oil¹, the labelling of native olive oils has to include information about the geographic origin of the product. For native olive oils with a protected designation of origin this information does not only comprise the country but also detailed information about the specific region. However, methods which allow to verify the given geographical origin are scarce. This work aims to develop an uHPLC-ESI-qToF-MS/MS based non-targeted approach to identify the geographical origin of native olive oils. The MS analysis was applied to the phenol rich methanolic extract (80:20 MeOH:H₂O v/v) of olive oils.

In the first part of the work the sample preparation was optimized in order to improve the extraction efficiency and repeatability. Finally a two-step liquid/liquid extraction was applied. In line with the method development it could be shown that an additional ultrasonic treatment will not enhance the extraction efficiency. Furthermore, a temperature of 30°C during evaporation of the extraction solvent will not affect the total amount of detected analytes. The repeatability of the optimized extraction procedure achieved sufficient results (rel. SD < 23%, n=3, within 5 days). Finally, a set of 95 native olive oils originating from Greece, Italy, Portugal or Spain was extracted and analyzed by uHPLC-ESI-qToF-MS/MS. Linear discriminant analysis based on more than 2000 features was used to build a classification model differentiating between the geographical origins. This model shows promising results by accurately classifying more than 88% of the oils, but with limitations in differentiating of samples from Spain and Portugal, probably due to the geographical closeness. Following steps are the identification of features predictive for the classification in order to improve the classification model.

References

- [1] Commission Implementing Regulation (EU) No 29/2012 of 13 January 2012 on marketing standards for olive oil. OJ L 012 14.1.2012, p. 14.