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**Poster Abstract – B.16**

# APPLICATION OF FOOD GENOMICS TO OLIVE OIL TRACEABILITY

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Olive oil is one of the most important agricultural product of European Union. About three-quarters of global olive oil production comes from European Union member states; 77% of the European production comes from Spain, Italy, and Greece. The European Union occupies the first place in the world, with a production of 80% and a consumption of 70%. Since 1992, with the aim of protecting the typicalness of food products and discouraging similar products competition, European Commision has created certification labels known as Protected Designation of Origin (PDO) and Indication of Geographical Provenience (IPG) (EEC Regulations n. 2081/92). The introduction of quality labels has led to the need of controlling the product compliance to specific regulations about production.

To assess the geographical and varietal origin, fatty acids, triglycerides, sterols and general chemical composition were analyzed for olive oil. These parameters are often variable and they are influenced by environmental factors, while plant DNA sequence in olive oil should be independent from the environment, and it might be used to trace specific plant genotypes in this complex food matrix. Promising results come from the application of molecular markers, especially those based on PCR such as: Random Amplified Polymorphic DNA (RAPDs), Amplified Fragment Length Polymorphisms (AFLPs) and Simple Sequence Repeats (SSRs). In the present study we demonstrated that SSR markers are useful for the traceability of olive oils. SSRs are used in genetic analysis and in fingerprinting studies, they are characterized by an high degree of polymorphism and can be applied to high-throughput analytical systems.

At present DNA from olive oil has been extracted and analyzed with molecular markers by several research groups. To improve the applicability of SSRs to traceability of DNA extracted from olive oil, we performed a detailed evaluation of the entire methodology. Twenty one types of monovarietal oils were analyzed with nine nuclear microsatellite markers. We estimated for every marker the correspondence of allelic profile with reference cultivar, the reproducibility of profiles in different DNA extractions and the discrimination power of analytical system. The markers applied demonstrated different analysis efficiency depending on the matrix effect of each olive oil and on the different quality level of DNA extracted. To overcome the problem of degraded DNA we reduced the size of SSR fragments to below 150 bp using the mini-STR technology. Significantly better results were reported using this approach. We also evaluated the problem of paternal contribution in the analysis of olive oil produced by crushing whole olives. No significant differences were reported in analysis of DNA extracted from olive oils made from stoned and destoned olives.