Chemical and Sensory Characterization of Monocultivar Extra-virgin Olive Oils

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Sensory properties and health benefits represent factors motivating olive oil purchase and consumption for both experienced and emergent market consumers. Both these factors depend on oil microcomponent composition which in turn is influenced by cultivars, pedoclimatic conditions, agricultural practices, olive ripening stage and extraction techniques. Investigating the relationships between agronomic/processing variables and chemical/sensory characteristics would be helpful in managing factors marking the perceived quality of extra-virgin olive oils.

In this work phenol profile, head space aroma composition and sensory properties of two mono cultivar (Moraiolo and Frantoio) extra-virgin olive oils from Tuscany (Italy) were investigated. Two harvesting times were considered. Chemical and sensory data sets were analysed by Principal Component Analysis (PCA).

Bi-plot resulting from phenol profile showed a clear cultivar effect on sample positioning. Oils from Moraiolo showed a positive association on PC1 (50% expl variance) with the most part of phenol compounds irrespective to harvesting time. A spread positioning on the opposite bi-plot side was observed for samples from Frantoio. Sample positioning on PCA computed on head space volatile compounds indicated a specific aroma profile for each cultivar at each harvesting time. Sample positioning along PC1 (46% expl variance) was mainly associated to harvesting time while positioning along PC2 (31% expl variance) resulted related to cultivar. Oils from the two different cultivars showed different sensory profiles as indicated by their positioning along PC1 (51%expl variance). Intensity of odour and flavour green notes resulted higher in samples from Moraiolo than in those from Frantoio cultivar. Harvesting time did not influence sensory properties of both oils.

Specific chemical composition and sensory profile characterize extra-virgin olive oils from Moraiolo and Frantoio cultivars irrespective to harvesting time. Effective strategies for communicating the sensory typicality of extra-virgin olive oils with origin certification labels could be envisaged based on these relationships.