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MOLECULAR AND CHEMICAL CHARACTERISATION OF "COLLINA DI BRINDISI" PDO OLIVE OIL

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Apulia is the Italian region with the highest olive oil production. Part of this production is represented by oils that, owing to their typicality, have obtained marks of protected denomination of origin (PDO) at European level. These products have a higher economic value with respect to the corresponding conventional foodsftuffs so that it is important to avoid possible mixtures or substitutions of raw materials and to set up effective methods to enable checks during processing. DNA analysis enables genome fingerprinting with consequent identification of different individuals. In the agro-food industry this can have interesting applications for the identification of species and cultivars of both raw materials and processed food, very useful in case of PDO products.

Previous researches applied the analysis of microsatellite markers to the DNA extracted from virgin olive oils obtained from single cultivars (Pasqualone *et al.*, 2004). In this work, we applied microsatellite analysis to the characterisation of "Collina di Brindisi" PDO olive oil, one of the Apulian oils which typicality has been recognised at European level. Besides, the results of the molecular analysis were compared to those of chemical analyses.

Six samples of Collina di Brindisi PDO oil were collected from three different oil mills, together with six samples of monovarietal oils used for the preparation of the PDO mix (*Leccino, Ogliarola salentina, Coratina, Frantoio, Picholine, Cellina di Nardò*) according to the official production process. After oil centrifugation and DNA extraction from the remaining cell residues, the amplification reactions were carried out and eight microsatellite primer pairs taken from literature (Carriero *et al.*, 2002; Cipriani *et al.*, 2002) were tested. Good amplification levels were obtained even starting from filtered clear oils. A preliminary phase of identification was carried out on the monovarietal oils with comparison to an olive DNA data base composed of sixty olive cultivars native to Italy, Spain, France and Greece (Montemurro *et al.*, 2005). It indicated that in one case the putative cultivar identification effected in the olive mill was wrong (a sample that the olive miller attributed to *Leccino* was actually a *Ogliarola salentina* oil), thus remarking the need of more reliable and sophisticated means of cultivar checking. After that, the PDO oil characterisation proceeded by analysis of eight microsatellites. We expected a complex electrophoretic pattern due to the overlapping of the bands to the single cultivars. The obtained results showed, indeed, that the electrophoretic pattern of PDO oil was mainly consistent with that of *Ogliarola salentina* monovarietal oil. This was probably due to the fact that, in this kind of oil, this cultivar has to be

present in amounts higher than 70%, so that it is the prevalent cultivar and very often is almost alone. So, the eventual absence of the *Ogliarola salentina* pattern in case of oils sold with the Collina di Brindisi PDO mark can reveal a fraud.

Finally, the chemical analyses (both parameters foreseen by the current rules such as free acidity, peroxide value, UV spectrophotometric constants, sterols, and minor compounds analysis such as total phenol content) solely indicated the belonging to the extra virgin olive oil category but did not enable to evidence any significant difference between Collina di Brindisi PDO oil and other oils belonging to the same commercial class because of a great similarity in the law parameters and an important environmental effect on the minor compounds.