P9

Reuse of vine pruning residues in vinification: effect of their pre-treatment on the chemical composition of wine

C. Di Natale, M. Noviello, C. Porfido, R. Terzano, G. Gambacorta, I. Allegretta*

Department of Soil, Plant and Food Sciences, University of Bari, Bari, Italy

**E-mail: ignazio.allegretta@uniba.it*

The production process of wine causes the formation of large quantities of by-products and wastes, generated not only during the vinification process, but also by the agricultural practices for the care of the vineyard. Among these, pruning residues and in particular vine-shoots are the most abundant ones (from 2 to 4 tons per hectare) [1] which have a very low economic value. It follows that the pruning residues constitute a significant waste of production. The majority of this waste is buried or burned in the fields, which poses problems in terms of environmental sustainability. An alternative use of vine shoots which could transform a waste into a resource for producers should be therefore found. Recent works have shown that the chemical composition of the shoots is very similar to that of oak wood, in terms of compounds volatile and phenolic compounds [2,3]. This led recent research towards a concept of "circular viticulture", considering the reuse of vine shoots during the process of vinification or wine aging and in place of the most famous and largely employed oak chips.

This work aimed at understanding the effect of the pre-treatment of vine chips used in vinification on the chemical composition of the wine. Vine chips were prepared form shoots of Primitivo cultivar which were kept intact, in the dark and at room temperature for about 6 months. Then, vine-shoots were ground up to obtain pieces of a size of 2-20 mm (similar to the commonly used oak chips). The vine-shoots were divided in three aliquots ad processed as follow: 1) toasted at 180 ºC for 1 h; 2) subjected to a pre-treatment of boiling for 5 min and toasted to 180 ºC for 1 h; 3) steam-treated for 30 min and toasted at 180 ºC for 1 h. For comparison, oak chips were considered. To understand the effects of the treatments on the microstructural and chemical characteristics of the chips, they were analysed with X-ray computed microtomography (micro-CT) and scanning electron microscopy (SEM), total-reflection X-ray fluorescence spectroscopy (TXRF), and gas chromatography.

Oak and vine-shoots chips were added to Aglianico and Nero di Troia wines at a concentration of 12 g/L in two different steps of the vinification process: during the maceration phase (i.e., before the alcoholic fermentation) and during the aging phase at the end of the malolactic fermentation, for 35 days.

Wines have been subjected to basic physical chemical analysis considering alcohol content, pH, total acidity, volatile acidity, malic acid, lactic acid, dry extract and ash. Total flavonoids and anthocyanin, flavans reactive to vanillin, proanthocyanidins, total polyphenols, antioxidant activity and colour indices were evaluated through spectrophotometric analysis.

In addition, macerated and infused wines were subjected to the analysis of micro and macro elements by TXRF.

Results shows that, from the chemical point of view, all types of vine-shoots chips are significantly different from oak chips. Considering the individual treatments performed on vine-shoots chips, no particular variation in elemental concentrations is noted except in the case of boiled chips, where