

Pre-processing low temperature treatment on different olives cultivar for oil production

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Global warming is predicted to have a negative effect on plant development due to the harming impact of high temperatures. These impacts involve the high temperature of the fruit that can trigger an autoxidative process in addition with an increase of the respiration rate. To mitigate these negative effects of environmental higher temperature and modify the quality of the oil, low temperature post-harvest treatments (1°C for 30 seconds) have been tested in different *Olea europaea* L., cultivars (Frantoio, Leccino and Morellino). The trial has been performed immediately before the crashing stage, the in two consecutive growing seasons (2019 and 2020). Oil volatile and non-volatile metabolites have been analyzed by H-NMR and HS-SPME-GC/MS approaches. In addition, oil sensory traits were determined by means of panel test. Low temperature treatment seems to induce different effects in different cultivars, suggesting a genotype-dependent response. Low temperature applied on Frantoio and Morellino leads to oil characterized by C₆ aldehydes, which are linked to herbal/green flavor. In contrast, Leccino cultivar showed a less pronounced effect of its volatiles, showing a decrease of several positive considered aromas. Generally, oil made from cooled olive showed a decrease of 1-penten-3ol, 1-penten-3-one and ethyl alcohol, generally associated with oil off flavours. Our results suggest that low temperature applied on fruit just before crushing by reducing oil off-flavours related compounds and increasing green and fresh attributes, can have important benefits for oil quality.

Keywords: Olive oil quality, VOCs, NMR, olive ripening, pre-processing conditioning.