

Effect of Reduced Oxygen Concentration on the Volatile Composition of Virgin Olive Oil during the Oil Extraction Process

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Olive oil is unique among plant oils since it can be consumed in its crude form called virgin olive oil (VOO). Oil properly processed from sound fruits provides a delicate aroma whose composition and biochemical origin are well established. The aim of obtaining a high quality product has stimulated the search for technological innovations which, however, must be carefully assessed before being applied on an industrial scale. Among those new technological procedures is the use of reduced oxygen concentration during VOO extraction in order to minimize the action of different oxidoreductases that promote phenolic oxidation and consequent oil oxidative stability loss.

Since oxygen is a key substrate of the lipoxygenase (LOX) pathway, responsible for the biosynthesis of main VOO aroma compounds, the aim of the present work was to determine the effect of reduced oxygen concentration during fruit milling and paste malaxation on VOO aroma profile. Data showed that VOO aroma biosynthesis occurred mainly during the fruit milling step and that a minimum oxygen concentration is needed during this step for the oil to attain aroma compound contents similar to those in control oils obtained at atmospheric oxygen concentration (21%). This minimum oxygen concentration requirement seems to be cultivar dependent. Moreover, results suggest that biosynthesis of VOO aroma compounds during the malaxation step depends on the inactivation degree of the LOX pathway enzymes by the oxidized phenolics occurring during the milling step.