

## Mechanism and Polyphenols Involved in the Browning Reaction of Olives

P. GARCÍA-GARCÍA\*, K. SEGOVIA-BRAVO, A. LÓPEZ-LÓPEZ, M. JAREN-GALÁN  
and A. GARRIDO-FERNÁNDEZ

*Instituto de la Grasa (CSIC), 41012 Sevilla, Spain, \*E-mail: pedrog@cica.es*

**Abstract:** The purpose of this work was to disclose the mechanisms of the browning reaction produced on the surface of the fresh Manzanilla olive cultivar due to the bruises caused during hand or mechanical harvesting. The role played by the different phenols in the browning reaction and the implication of the enzymes present in the olive flesh have also been studied. The reaction was reproduced in model solutions where olive phenol extracts were put into contact with crude enzymatic olive extracts (active or denaturated) in a solution buffered at the same pH of the olive flesh (5.0) added or not with ascorbic acid to prevent oxidation. The proposed mechanism would consist of two steps. First, there is an enzymatic release of hydroxytyrosol, due to the action of the fruits'  $\beta$ -glucosidases and esterases on oleuropein and hydroxytyrosol glucoside; additional hydroxytyrosol can also be produced (in a markedly lower proportion) by the chemical hydrolysis of oleuropein. In a second phase, hydroxytyrosol and verbascoside are oxidised by the fruits' polyphenoloxidase (mainly) and by a chemical reaction, which occurs to a limited extent due to the olive flesh pH 5.0. This hypothesis of the browning reaction mechanism is in agreement with the results in fresh fruits, because oleuropein is the compound that decreased in a higher proportion when the olives were bruised; and the sum of the concentrations of compounds that contain hydroxytyrosol in its molecule is mainly responsible for the decrease in total phenols in olives.

**Keywords:** browning; bruised olives; enzymes; harvest; phenols

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