Optimization of Desired and Undesired Flavor Aroma Compounds in Virgin Olive Oil

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The most distinguishing feature of olive oil is its unique colour, taste, aroma and flavour content. In this study, desired and undesired aroma compounds in olive oils produced from fruits being at three maturity stages were investigated. Desired aroma content of olive oil was maximized as undesired one was minimized using response surface methodology (RSM). Aroma composition is the most important quality parameters of virgin olive oils and changes depending on fruit’s maturity index. Head space – solid phase micro extraction (HS-SPME) method was used for extraction of aroma compounds from oil samples and aroma profile was determined by gas chromatography mass spectroscopy (GC-MS). Full quadratic second order regression model was proposed for the prediction of process responses. Adequacies of models were evaluated by checking regression coefficient for each model.

Percentages of desired aroma contents of oil samples were found to be in the range of 61.92-91.77 (%), 42.21-89.36 (%), 41.63-79.69 (%) depending on maturity stage, being spotted, purple and black, respectively, whereas undesired ones varied from 5.1 to 35.33 (%) for spotted stage, from 9.01 to 34.3 (%) for purple stage, and from 18.99 to 54.88 (%) for black stage.

The optimum conditions of temperature and time pairs to maximize desired aroma compounds and to minimize undesired ones in oil samples extracted from spotted, purple and black fruits were found as 27°C / 48.2 min, 29°C / 39.3 min, and 29°C / 39.6 min, respectively.
Key Words: Aroma profile, desired flavour, undesired flavour, maturity index, response surface method (RSM), malaxation.