Optimization of Major Aroma Compounds in Virgin Olive Oil

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In this study, optimization of major aroma compounds in olive oils produced from fruits at three maturity stages (spotted, purple and black stage) was aimed. A central composite design was used for optimization of malaxation conditions of temperature and times each at five levels with 13 runs including five central points. Being interested responses, trans-2-hexenal (Z1) and hexanal (Z2) were investigated and their yields were optimized. Head space – solid phase micro extraction (HS-SPME) method was used for aroma extraction from olive oil and aroma profile was analysed by gas chromatography mass spectroscopy (GC-MS). Response surface methodology (RSM) was utilized statistical tool for optimization using Minitab Software (Minitab 16.1.1). Full quadratic second order regression model including the linear, quadratic and two factor interaction effects was proposed for the prediction of process responses. Adequacies of models were evaluated by checking regression coefficient for each model. Models were found to work with high success for trans-2-hexenal prediction for oils from fruits at both purple and black stage, whereas model for hexanal only in black stage oil. Their regression coefficients were higher than 0.95. Influences of time and temperature of malaxation process was found to be significant on the transition of major aroma compounds from fruit matrix to olive oil. The optimum conditions of temperature and time pairs to maximize trans-2-hexenal and to minimize hexanal were found as 28.57 °C / 53.36 minute for spotted olive, 32.28 °C / 40.07 minute for purple olive, and 31.42 °C / 43.92 minute for black oil.
**Key Words:** Hexanal, trans-2-hexenal, maturity index, aroma profile, response surface method (RSM), malaxation.