Three-factor approach for modulating the content of phenols and taste attributes of Oliba cv. (Olea europaea L.) virgin olive oil

Trofaktorijalni pristup modulaciji fenola i svojstava okusa djevičanskog maslinovog ulja kultivara Oliba (Olea europaea L.)

INTRODUCTION

Phenols are responsible for virgin olive oil (VOO) taste characteristics and significantly determine VOO oxidative stability and shelf life, as well as its nutritive value. The content of phenols in VOO depends on many agronomic and technological factors and olive fruit ripening degree and paste malaxation duration and temperature are among the most important. The aim of this study was to investigate the main effects and interactions of these three key factors on the content of phenols and related taste sensory characteristics of Oliba cv. (Olea europaea L.) VOO.

MATERIALS AND METHODS

Oilies were picked at three ripening degrees as green (RD1), semi-ripe (RD2) and ripe (RD3), and processed by malaxation at 22 / 30 °C, for 30 / 60 min. The obtained oils were subjected to HPLC-DAD analysis of phenols and sensory analysis by the official IOO method.

RESULTS of three-way analysis of variance (ANOVA) for the concentrations of phenols in Oliba cv. virgin olive oils, with ripening degree, malaxation temperature and malaxation duration as factors (p < 0.05).

CONCLUSIONS

When considering the main effects of the three investigated factors, ripening degree exhibited the highest influence on VOO virgin olive oil chemical and sensory characteristics. Phenols were generally found to decrease during ripening, however an unusual evolution pattern with increasing concentrations was observed for 3,4-DHPEA-EA and p-HPEA-EA. Generally, higher malaxation temperature induced an increase in particular important phenols. The effects of the investigated factors were not univocal, but significantly interacted. Among many complex and specific interactions, the foremost were those observed between ripening degree and malaxation duration. The effect of temperature was most pronounced in the processing of ripe olives, especially for 3,4-DHPEA-EA and p-HPEA-EA. The observed complexity of the interactions resulted from the synergistic and contrasting effects of all the parameters involved, which were different for each treatment. Desirable taste sensory attributes correlated positively with particular main phenols. A decrease of bitterness and pungency, and an increase in sweetness was observed along ripening. Bitterness and pungency were enhanced by the higher malaxation temperature.

This study reported, for the first time, the results of the complex interactive effects of the three investigated factors. It showed how by manipulating these production parameters a wide range of phenol contents combinations from the same fruits can be obtained. This is of particular interest for olives with deficient or excessive phenol potentials, which has to be specifically processed to achieve a satisfactory balance.

Acknowledgements

This work has been supported in part by Croatian Science Foundation under the project UIP-2014-09-1194.