VARIETAL AND PROCESSING EFFECTS ON THE VOLATILE PROFILE OF RAPESEED OILS

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Background

Virgin rapeseed oil is a cold-pressed rapeseed oil. Virgin rapeseed oil is appreciated for its unique fresh and mild taste that resembles asparagus, cabbage or fresh green vegetables. These flavour properties are directly correlated with the value of the oil for the consumer and determine the success or failure of this product on the market. The chemical composition of the volatiles depends on the major components of the vegetable oils which are genetically determinant, climate and soil type as well as the seed ripening cycle and different processing methods.

Objectives

The aim of the present study was to understand the development of volatile compounds of rapeseed oils produced by different varieties, obtained by cold pressing with different pretreatment process including thermal treatment, microwave radiation of seeds as well as obtained by pressing the seeds without any additional treatment. Ten different varieties of rapeseeds of two species (*Brassica napus* and *Brassica carinate*) were used in this study.

Methods

The headspace composition was studied by solid phase microextraction (SPME) and gas chromatography (GC) coupled with mass spectra (MS) detection. Our goal was also to relate results obtained by principal component analysis (PCA) of chromatographic data to results of sensory analysis based also on PCA.

Results

The volatile compound content is influenced by the different fatty acids and glucosinolates compositions of different cultivars and the enzymes involved in the lipoxygenase and hydrolysate pathway. 3-buten-1-yl isothiocyanate was found to be the major volatile compound produced by *Brassica napus* rapeseed oils obtained by cold pressing without any additional treatment; while allyl isothiocyanate was found to be the major volatile compound of rapeseed oils produced by *Brassica carinate* rapeseed oils. Both of the two compounds were considered to be produced from hydrolysed of different glucosinolates by the myrosinases. By using the olfactory detector port, 3-buten-1-yl isothiocyanate was considered to be seed-like dour attributes; while allyl isothiocyanate was considered to be the acridness dour attributes. The volatile compound of 3-buten-1-yl isothiocyanate and allyl isothiocyanate were decreased remarkably from the rapeseed oils obtained by cold pressing with thermal treatment or microwave radiation of seeds which can be attributed to the inactivation of the myrosinases by thermal treatment because that the amount of volatile compounds is influenced by enzyme activity; while the effect of thermal treatment increases the content of aldehydes such as heptaldehyde, octyl aldehyde and nonanal which are considered to be lipoxygenase enzyme products. And roasted dour arise.

Analysis of the principal components is able to distinguish different types of oil. Further, our goal was also to relate results obtained by PCA of chromatographic data to results of sensory analysis based also on PCA. PCA showed similarities in clustering of the data obtained by SPME-GC-MS and sensory analysis.

Conclusion/Application to practice

It can be concluded that, the flavor of the rapeseed oils were different produced by different varieties, obtained by cold pressing with different pretreatment process. And different varieties of rapeseeds and different pretreatment processes can be chosen by the manufacturer according to the consumers' preferences.