Characteristics and Influence to Fruit Distillates Quality of Rapid Induction of Ageing Character in the Presence of Mulberry Tree (Morus alba L.) Wooden Chips

Elena MUDURA¹, Teodora Emilia COLDEA*, Timea HORVATH¹, Carmen Rodica POP¹

¹Department of Food Engineering, Faculty of Food Science and Technology, University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca, Romania
* corresponding author: teodora.coldea@usamvcluj.ro

Abstract. Research on rapid induction of ageing character to double distilled traditional fruit brandies, from Transylvania region was conducted. Mulberry tree chips were used as an alternative to traditional ageing in wooden barrels. The aim of this study was to highlight the factors influencing the chemical composition of fruit brandies, both depending on the type of the wood used and the transformations occurred during the heat treatment. Fruit distillates were produced after the traditional method – double distillation in copper alambic. The evaluation of the brandies consisted in analyzing the chemical parameters and the phenolic compounds after two months of ageing with wood chips. Results were compared with a control sample (unaged distillate), and found that during the ageing process volatile and non-volatile compounds were extracted significantly. The heat treatment influenced the chemical composition of the wooden chips. The chemical composition of finished products varied due to the composition of the wooden chips used and to the heat treatment applied. Evaluation of volatile and non-volatile compounds formed was carried out by comparison with the samples of the unaged distillate. It was demonstrated the improvement of chemical characteristics and polyphenolic compounds content, by rapidly inducing of the ageing character.

Keywords: ageing, wooden chips, pălinca, Romania

Introduction. Traditional ageing process is expensive and require longer period. Thus, for reducing the prices and the ageing period, as an alternative to barrel ageing, is using of wooden chips for rapid ageing of fruit brandies (Caldeira et al., 2010). Phenolic compounds change their chemical structure during toasting, and due to the Maillard reaction, volatile and non-volatile compounds are formed, changing the colour of the rapid aged brandies, into a more pleasant one.

Aims and objectives. The study aimed to identify the chemical changes made on composition of traditional apple pălinca, both depending on the type of the wooden chips used for rapid ageing and the transformations occurred during their heat treatment.

Materials and methods. The processing of fruit brandies was in accordance to the method described in our previous study (Coldea et al., 2014) with some modifications regarding the ageing technology. Mulberry tree (Morus alba L.) wooden chips were heat treated at 175°C for 3 hours. The evaluation of the brandies consisted in analyzing the alcohol concentration, total acidity, ester contents, total dry extract by common analytical methods (Coldea et al., 2011). Total phenolic content (TPC) was evaluated using Folin Ciocalteau reagent according to Pop et al. (2015) with some modifications. A volume of 250 μL of sample was mixed with 120 μL of Folin Ciocalteau reagent and 1.8 mL of distilled water. The mixture was stored at dark place, 20°C for 5 minutes, then
340 μL of sodium carbonate solution 7.5 % were added, and maintain like above for 2 hours. The absorbance was measured at 750 nm on a UV-1700 PharmaSpec spectrophotometer (Shimadzu, Kyoto, Japan). Gallic acid standard solution ($r^2 = 0.9997$) was used for calibration curve. The concentration of TPC was expressed as mg GAE / 100 mL of sample. Analyses were conducted after two months of ageing with wooden chips. Each sample was analyzed in triplicate and mean values were considered.

**Results and Discussion.** Results were compared with a control sample (unaged apple pălinca) - CP, raw wooden chips added to apple pălinca (RP) and toasted wooden chips added to apple pălinca (TP) (Table 1). A slight decrease of ethanol content was observed in samples RP and TP, which can be as result of water content of wooden chips.

Dry extract increased in sample TP due to the unsoluble compounds of mulberry tree wood chips, which diffused in distillate during maturing process. An important role of rapid ageing technique is inducing the aged character to fruit distillates. After only few weeks distillates gain similar characteristics to the ones aged for years in wooden barrels (Caldeira et al., 2010). In accordance to previous studies (Morales et al., 2004), a significant increase of esters was remarqued when used toasted chips (TP). TPC content increased significantly - 60 times in TP sample - almost doubled when compared to RP. Toasting process of wooden chips produces antioxidant substances from Maillard reaction (Mosedale and Puech, 1998), which are responsible for the colour enrichment and the antioxidant activity of these fruit distillates (Rodríguez Madrera et al., 2010).

**Conclusion.** The study demonstrated the increasing esters and phenolic contents when roasted mulberry tree wooden chips were used for the rapid ageing of the traditional Romanian distillate – apple pălinca - as an alternative to barrel ageing procedure.

**REFERENCES**


