

GAS-CHROMATOGRAPHIC ANALYSIS OF SOME VOLATILE CONGENERS IN DIFFERENT TYPES OF STRONG ALCOHOLIC FRUIT SPIRITS

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Abstract

Beside ethyl alcohol, the major active component of alcoholic beverages, almost all alcoholic drinks contain volatile and non-volatile substances called congeners. They are present in different concentrations depending on beverage type and manufacturing methods. In the current study, the major volatile compounds besides ethanol as: methanol, ethyl acetate, 1-propanol (n-propanol), 2-propanol (i-propanol), 1-butanol (n-butanol), i-butanol (2-methylpropan-1-ol), n-amyl alcohol (n-pentanol), i-amyl alcohol (3-methyl-1-butanol) were characterized by gas chromatography (GC-FID) on HP-Inowax column and Supcowax column, respectively. For that purpose, hundred samples of three types of grape brandies (lozova rakia, komova rakia and vinjak) and thirty samples of plum brandies (slivova rakia) from domestic producers were analyzed. In order to evaluate the difference in composition regarding the type of brandy it has been compared the mean value (MV) obtained for each volatile. When compared the mean values of volatiles in plum vs grape brandies, for methanol, ethyl acetate and n-propanol, the MV of plum brandies were significantly higher. Mean value for methanol in plum brandy was 1903 mg/100 mL anhydrous alcohol a.a, in grape brandy lozova was 464.7 mg/100 mL a.a, in grape brandy komova was 721 mg/100 mL a.a and in grape brandy vinjak was 169 mg/100 mL a.a. Mean value for ethyl acetate in plum brandy was 132.5 mg/100 mL a.a, which was 2.2 as high as mean value for ethyl acetate in grape brandy lozova (60.3 mg/100 mL a.a.). Mean value for n-propanol in plum brandy was 110.4 mg/100 mL a.a, in grape brandy lozova was 28.52 mg/100 mL a.a, in grape brandy komova was 42 mg/100 mL a.a., and in grape brandy vinjak was 33.2 mg/100 mL a.a. The highest mean value for i-amyl alcohol content was found in grape brandy komova rakia 176.6 mg/100 mL a.a.

The content and the type of volatile congeners in some strong spirits which are produced by process of fermentation of fruits and distillation could be considered as a marker of fermentation and (or) botanical origin. Ethyl acetate in fruit brandies is formed by enzymes' reactions during fermentation. Higher alcohols and fusel alcohols (1-propanol, 2-methylpropan-1-ol, 2-methyl-1-butanol, 3-methyl-1-butanol and phenyl ethyl alcohol) are formed in biochemical reactions by yeast on amino acids and carbohydrates. The amounts in different beverages vary considerably. Methanol represented the major volatile component, characteristic to fruit brandies which is released by enzymatic degradation of methoxylated pectin's and is not a by-product of yeast fermentation. Therefore this molecule can be considered not only a parameter of distillate safety, but also as an indicator of natural origin of distillate.

Key words: Congeners, Methanol, Ethyl acetate, Higher alcohol, Fusel alcohol, Gas chromatography (GC-FID).