P 244

DETERMINATION OF HEAVY METAL CONTENTS OF APPLE AND GRAPE VINEGARS BY USING ICP-MS (INDUCTIVELY COUPLED PLASMA-MASS SPECTROMETER)

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In this study, the general composition (pH, total acidity, total dry matter, ash content, residue alcohol content and acetyl methyl carbinol) and heavy metal contents (Fe, Cu, Pb, Zn, As, Hg, Sn and Cd) of 12 grape vinegar samples and 8 apple cider vinegar samples from Turkey were determined. pH, total acidity, total dry matter and ash content values of grape vinegar samples were varied between 2.33-3.06; 4.04-5.72 g/100 mL; 4.04-5.72 g/100 mL; 0.86-2.63 g/L, respectively. pH, total acidity, total dry matter and ash content values of apple cider vinegar samples were varied between 2.27-3.15; 4.05-4.77 g/100 mL; 12.20-38.86 g/L; 1.09-3.54 g/L, respectively. In terms of total acidity, residue alcohol content and acetyl methyl carbinol; all of the samples were in compliance with TS 1880 EN 13188 standard (Vinegar-product made from liquids of agricultural origin-definitions, requirements, marking). Heavy metal contents of samples were determined by Inductively Coupled Plasma-Mass Spectrometer (ICP-MS). The average concentrations of copper, zinc, arsenic, lead and iron in the grape vinegar samples were found as 89.59, 206.25, 34.32, 10.52, 3767.27 µg/L, respectively. The average concentrations of copper, zinc, arsenic, lead and iron in the apple cider vinegar samples were found as 123.05, 254.41, 20.86, 12.07, 1753.88 µg/L, respectively. Cadmium, stannum and mercury concentrations were under detection limits in all of the samples.

Keywords: Vinegar, composition, heavy metal

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