

APPLICATION OF GAS CHROMATOGRAPHY AND MASS-SPECTROMETRY FOR ANALYSIS OF WINE VOLATILE AND SEMI-VOLATILE COMPOUNDS

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ABSTRACT

Wine became popular among consumers and, subsequently, its production level increases. Wine is a product of food industry and influence on human health first-hand, so its production requires maintaining high quality on the all stages of production and the problem of food production and especially wine safety became important in our country and abroad. Analytical control of wine production includes development of different methods of analysis. The goal of this paper was to develop methodology for quantitative determination of volatile organic compounds and simultaneous qualitative determination of semi-volatile compounds in wines using solid-phase microextraction and gas chromatography-mass spectrometry. For quantitative determination of wine volatile organic compounds standard addition method was used and as standard additions were used four compounds such as 1-pentanol, isoamylol, isobutanol and ethyl hexanoate. We also used special sample preparation and it allowed us to make polar semi-volatile wine compounds such as propylene glycol, ethylene glycol and salicylic acids detectable for mass spectrometer.

Keywords: gas-chromatography, mass-spectrometry, volatile organic compounds, wine

INTRODUCTION

In recent years there is an expansion of wine consumption in the countries world over. At the same time there are more than thousand of volatile and semi-volatile constituents in wine. Most of them are the products of natural fermentation. However, some of them are added into wine in order to prolong its storage or improve such sensory characteristics as colour and flavour. In addition, some producers of wine use variety of ways to adulterate wine. Subsequently, wine composition differs from labeled on the bottle. All cases of wine adulteration are harmful for humans at the moral and health level. Therefore, analytical control of wine production quality is required, which means identification of VOCs (volatile organic compounds) and semi-volatile constituents in wines.

Variety of different methods is used for discovery of adulterated wine samples. These methods are time-consuming, include many hard operations and don't allow to determinate a number of volatile and semi-volatile constituents simultaneously during one analysis. Therefore, it is important to note necessity of development of method for determination of wine constituents, and subsequently, identification of adulterated wine samples.