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Characterization of home-made and regional fruit wines by evaluation of correlation between selected chemical parameters

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Keyword

Wine; biogenic amines; metals; chromatography; spectroscopy; cluster analysis

Abstract

Since the last decade of the 20th century, there has been rising interest in the production of fruit wines, as evidenced by the high number of published papers and books covering this matter. When aiming to produce quality fruit wines, it is essential to evaluate the analytical parameters of the beverage. In this context, there are a large number of analyses for the evaluation of wines and fruit wines. This article characterizes the fruit wines made from different fruits using selected parameters (BAs, metals, sulfates, phosphates) by the use of a traditional chemometric technique – hierarchical cluster analysis. To determine the organic compounds, an in situ derivatization coupled with dispersive liquid-liquid microextraction (DLLME) and gas chromatography-mass spectrometry (GC-MS) was used. The spectroscopy techniques such as flame photometers, AAS and GF-AAS were applied to determine the selected metals content. Wine made from grapes coming from Polish Vineyard (ANNA de Croy) were also analysed to compare the obtained results. The classification offered allows the identification of unknown wine samples with similar origin to be ordered in some of the patterns formed.

1. Introduction

Wine is an alcoholic beverage widely consumed throughout the world with a great social and economic importance. Wine is a distinctive product that influences major life events, from birth to death, victories, auspicious occasions, harvest and other events. The technique of winemaking is known since the dawn of civilization and has followed human and agricultural progress. In definition, wine is an alcoholic beverage produced from grapes, fermented without the addition of sugars, acids, enzymes, water, or other nutrients [1]. However, the word knows also other type of wine so called fruit wines which are fermented alcoholic beverages made from a variety of base ingredients (other than grapes), they may also have additional flavors taken from fruits, flowers and herbs. For historical reasons, mead, cider and perry are excluded from the definition of fruit wine [2,3].

Fruits produced by many indigenous trees are edible and can ripen within a very short span of time, generating surplus production [4]. Without a doubt many of fruits are consumed fresh, but unfortunately large quantities are wasted during peak harvest periods, due to many reasons such as high humidity fluctuations, temperature, improper handling, inadequate storage facilities, inconvenient transport and microbial infections [3]. Thus, utilization of ripe fruits or their juices for production of wines is considered to be an attractive means of utilizing surplus and overripen fruits. Furthermore, fermentation helps to preserve and enhance the nutritional

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