RESEARCHES CONCERNING THE OPTIMIZATION OF THE METHOD OF OENOCOLORANT EXTRACTION FROM GRAPE SKINS CABERNET SAUVIGNON VARIETY FROM THE "DEALU BUJORULUI" VINEYARD

CERCETARI PRIVIND OPTIMIZAREA METODEI DE EXTRACTIE A OENOCOLORANTULUI DIN STRUGURII SOIULUI CABERNET SAUVIGNON IN PODGORIA "DEALU BUJORULUI"

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Abstract: *The oenocolorant was extracted from fresh grape skin Cabernet Sauvignon variety-"Dealu Bujorului" vineyard. For extraction were used tartaric and citric acid solutions. The type of solvent and concentration were the important factors in the extraction operation. Comparative study was conducted by using sulphur dioxide as solvent. The citric acid was more efficient than the tartaric acid but the extraction in the presence of sulphur dioxide still remain an effective solvent for anthocyanin extraction.*

INTRODUCTION

Food quality close to its microbiological and nutritional characteristics is greatly influenced by sensorial properties such as colour, flavour, taste and texture. Colour is one of the most important properties of foods and beverages and is a basis for their identification and acceptability (Hardy, 2000).

Food colour is due to naturally occurring pigments, but artificial or synthetic colorants are often used in order to confer the desired colour to the final product. Because of the increasing in consumer demand for natural foods, the production of natural colorants is very important.

Epidemiological studies have suggested some associations between the consumption of polyphenol rich foods or beverages and prevention of diseases (Yang and others 2001).

Anthocyanins are one of the main classes of flavonoids and are an important source of the naturally colorants of red fruits. Restrictions in the use of synthetic colorants in foods increased the interest for the potential use of anthocyanins like oenocolorants as a natural colorant in beverages, fruit juices, jellies, ice-creams, syrups, candies and yogurts but also in tooth paste, cosmetics and pharmaceuticals (Durante and others 1995). Pigments present in the skin of red grapes are traditional extracted by using sulphur dioxide solutions as solvent. Many researches have been made to replace the sulphur dioxide extraction process due to health risks.

The aim of this study was to develop a method for anthocyanins extraction from grape skins by using tartaric and citric acid solutions as solvents and to compare with the use of sulphur dioxide.

The optimal solvent concentration and the yield of each extraction were also investigated and compared with the traditional method of extraction.

MATERIALS AND METHODS

Grapes (*Vitis vinifera, Cabernet Sauvignon* variety) were purchased directly from "*Dealu Bujorului*" vineyard in 2004, October. Physico-chemical characteristics of grapes were: sugar content 221 g/l, total acidity 5,8 g/l, weigh of 100 berries 109 g and anthocyanins content 1475 mg/kg.

10 g of fresh skin were soaked in 25 ml of an aqueous tartaric, citric acid or sulphur dioxide solution with different concentrations (between 0,25 and 1%) and stirring at 25 ^{o}C for 20 minutes. Immediately the extract was transferred to a dark glass bottle and stored at 2 ^{o}C. Subsequently a new 25 ml of solvent was added to the skins and the extraction process described above was repeated, until the extract formed was clear. The pH values in all extractions varied with the concentration of tartaric, citric acid.

All extractions were made in duplicate and the results are reported as the arithmetic mean.

The extracts obtained were analysed for total anthocyanins content, total, polyphenols, colour intensity and tint. The stability in time was also investigated for the samples extracted with 1% solvent concentrations.

RESULTS AND DISCUSSION

Tartaric and citric acid were effective for anthocyanins extraction from fresh grape skins. The anthocyanins extraction as a function of solvent concentration is depicted in Fig. 1.

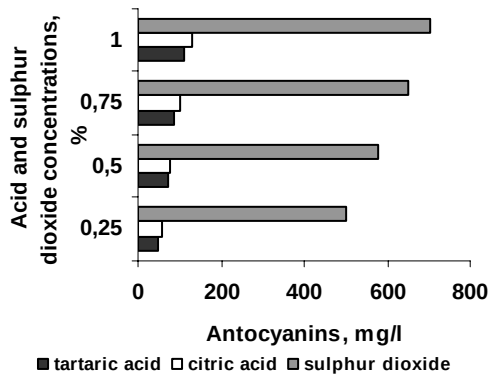

Figure 1. Anthocyanins extraction yield using different solvent concentrations

If we compare all three solvents is clear that the presence of sulphur dioxide like solvent has an important influence on anthocyanins extraction. On the other way we observed that the citric acid is more effective for anthocyanins extraction if we compare with tartaric acid extraction. The nature of acid affected the extraction yield. This difference could be due to the larger molecular size of citric with respect of tartaric acid. The extraction process is based on the stability of anthocyanins in polar solvents. Anthocyanins are found in nature as cations bound to organic acid anions.

Sulphur dioxide is widely used today in anthocyanins production and the concentration of 0,25% is the most commonly used in industrial production (Mazza and others 1999). Sulphur dioxide augments membrane permeability and binds itself with anthocyanins (Cappely and Vannucchi 2000).

Hydroalcoholic-choride solutions are commonly used for analytical purposes, in anthocyanins extraction from fruits and vegetables, as they are capable of extracting all pigments contained in the plan materials but is more expensive than tartaric or citric acid.

The extractions of total polyphenols with all three solvents were investigated and the results are presented in Fig. 2.

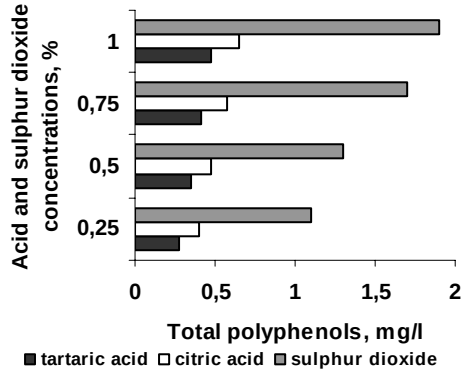

Figure 2. Total polyphenols extraction yield using different solvent concentrations

The extraction of total polyphenols content has the similar shape with anthocyanins extraction. In this case also the presence of sulphur dioxide increased the total polyphenols extraction. Citric acid is more effective than tartaric acid.

The dynamic of colour intensity and tint with solvent concentrations was investigated and is presented in Fig. 3 and 4.

Variation of colour intensity with solvent concentration was more effective by using citric acid solvent. The value of colour intensity is increasing with the concentration of acid solution increasing. The dynamic of this index is probable due of the pH solutions, which vary with the concentration of solutions.

Tint is decreasing with the concentration increasing except for the sulphur dioxide solution where at a concentration of 1% the tint is increasing (Fig. 4).

The colorant was very stable at low temperature (4 ^{o}C) than room temperature after storage for 2 months. Therefore, the combined effect of low pH of extract, low temperature, protection against light, high concentration of phenols and polyphenols resulted in a long and stable product.

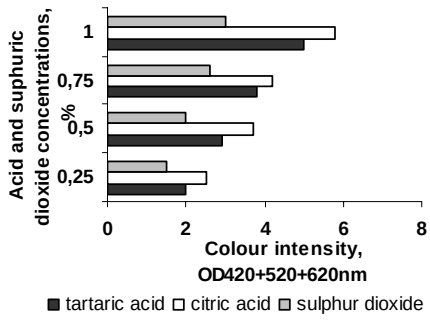

Figure 3. Colour intensity yield using different solvent concentrations

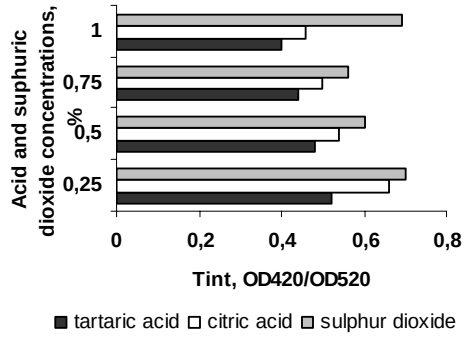

Figure 4. Tint yield using different solvent concentrations

CONCLUSIONS

The use of citric acid as solvent in antocyanin extraction has been shown to be a simple and inexpensive method, which provides a good extraction yield. The extraction yield was increasing with concentration of solvent increasing. The grapes Cabernet Sauvignon variety has be shown to be a good source for anthocyanins extraction. Citric acid could be suitable to substitute the commonly used sulphur dioxide used industrially.

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