

The influence of some alcoholic plant extracts on orange juice

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Abstract

Vitamin C has a important benefit for the human body, intervening in oxide-reduced processes. Has anti-infectious, recuperative role and she participate to the detoxification of human body. She also participate on the usage of iron reserves, protect the vitamin A and E and save the vitamin of B complex. In this article is presented the influence of alcoholic products of underbrush, brier and red currant on nourishing qualities of orange juice. The determination was: identification of poliphenolics substances, vitamin C and determination of acidity. By these analyses the improvement of juice quality was observed (the orange juice content a meaningful quantity of vitamin C, through the addition of alcoholic extract of plants the content increases).

Key words: orange juice, underbrush, brier, red currant, Soxhlet extraction

Rezumat

Vitamina C are o importanță capitală pentru organism, intervenind în procesele de oxido-reducere. Are rol anti-infecțios, tonifiant, participă la detoxifierea organismului și la folosirea rezervelor de fier, protejează vitaminele A și E, economisește vitaminele din complexul B. În această lucrare s-a urmărit influența extractelor de cătină, măceșe și coacăze asupra calității nutritive a sucului de portocale cu pulpă. Determinările efectuate au fost: identificarea substanțelor polifenolice, vitaminei C și aciditatea prin metoda titrimetrică. Prin analizele efectuate s-a observat îmbunătățirea calității sucului (de exemplu: deși sucul de portocale conține o cantitate însemnată de vitamina C, prin adăugarea acestor extracte, conținutul în vitamină crește).

Cuvinte cheie: suc de portocale, coacăze, cătină, măceșe, extracție

1. Introduction

By fruit juice are definite those drinks obtained from same fruits species by mechanic process (pressing, centrifugation) or by diffusion and after that they are conserved by different processes (concentration, chemical conservation, pasteurization).

The statistical from all over the world suggest the fact that all types of juice, under all forms, have a important nourishing and agreeable role, the juice can be consume easily that fruit itself (Brekke *et al.*, 1975).

Orange juice, against other juices, is much adequate for all ages and exist the advantage that it can be used in the treatment of same disease (heart disease, scrag disease, child disease etc.). Against other juices, this one is superior concerning the quantity of calcium. This one contains sodium, phosphor, magnesium, copper and sulfur.

Citrus fruits and juices are excellent sources of vitamin C containing more than the minimum daily requirement of 60 mg of vitamin C in 240 ml of juice. Citrus fruit are also a good source of folic acid, vitamin B1 thiamine and potassium (Nagy *et al.*, 1993; Brown, 2000; USDA, 2000a).

The values for 100 ml juice are: water: 87.6%, proteins: 0.7%, grease 0.2%, mineral substances: 0.3%, fibers: 0.3%, carbohydrates: 10.9%, calcium: 26 mg, phosphor: 20 mg, iron: 1.0 mg, vitamin C: 30 mg. The additions used were alcoholic extracts of underbrush, brier and red currant.

The active substance of underbrush has antioxidant action, retards the ageing process of human body, is an antianemical general tonic, vitamin supplier, has synergetic action with interferon and is the coronaries protector. Improve the detoxification function of the liver and assure the trophicity of hepatic cell. (Brody and Lord, 2000)

Brier fruits are very appreciate for their content in vitamin C and quantity of vitamin A, B1, B2, P, K, nicotinic acid, etc. Under vitamins, the briers content sucrose, citric and malic acid, pectin, tannins, etc.

In therapeutic it is used like tonic, having the propriety to invigorate the humane body. Because of P vitamin, the briers preparations maintain the permeability and fragility of capillary blood vessel, normalizing the blood circulation. The briers have the propriety to increase the biliar secretion, being indicate in liver affections. Prevent the influenza and the cold, tiredness, agitation of the peripheral circulation, etc. They are recommended in inflammation intestinal estate (Brody *et al.*, 2001).

Red currant is a good antianemical product, because it has the property to increase the fabrication capacity of red cell. They invigorate the muscular and nervous system and for that it is prescript in asthenia, tiredness physically and psychically.

Flavonoid derivatives from group of P vitamins, rudozyd, increase the capillary fragility. The rudozyd is the active substance from red currant and is known by his effect to prevent the cerebral vascular accident and to liquefy the blood.

By antocyanic pigment contents the red currant increase the visual acuteness. (Arthey and Ashurst, 1996).

The abundance in C vitamin of red currant plants, briers, underbrush for 100 g fruit is:

- underbrush: 2500 mg
- brier: 2000 mg
- red currant: 2000 mg

The extraction from solid substances with solvents can be realized by:

- discontinued processes: maceration, digestion, percolation;
- continued processes: Soxhlet processes, percolation continue.

The extracts were obtained by Soxhlet process, using a Soxhlet apparatus. The efficacy of the extraction from solid substances with a liquid is determinate by solubility, by contact surface between the phases and by diffusion speed of liquid in solid material. The solvent used was alcohol of 70° v/v.

The juice was obtained from fresh orange by pressing.

2. Materials and methods

The experiments were done for four tests: test 1 - 100 ml orange juice, test 2 - 60 ml orange juice and 40 ml alcoholic extract of underbrush, test 3 – 60 ml orange juice and 40 ml alcoholic extract of brier and test 4 – 60 ml orange juice and 40 ml alcoholic extract of red currant. Therefore, the addition of alcoholic extract of plants was 40%.

2.1. Determination of the poliphenolics substances

The poliphenolocs substances have a remarkable importance in juice characterizations. They determine the color of the extract (juice) and impress specifically organolepic characteristics. By their nature are reduced substances with a important role in oxido-reduction reactions.

Determination of potassium permanganate parameter

The principle of the method is to titrate at cold the poliphenolisc and other oxidables substances from juice with KMnO_4 , against a conventional tartaric and alcoholic substances in the presence of indigo carmine like oxido – reduction indicator

- Reactives: - KMnO_4 0.01n solution;
- Alcoholic – tartaric solution: 10% alcoholic volums and 5 g/l acid tartaric neutralized with KOH;
- Indigo carmine solution, 0.5g/l.

In a Erlenmeyer pot of 100 cm^3 is dropper 50 cm^3 of indigo – carmine solution 0.15% and 2 cm^3 of juice. It is titrated with KMnO_4 0.01 n until the blue color receding and the yellow color appear. The volume of KMnO_4 0.01 used at the titration is noted with V_1 .

The titrate test is maintain for the comparison with the color of the next tests.

In other Erlenmeyer pot are added 50 cm³ indigo carmine solution and 2 cm³ alcoholic – tartaric solution. It is titrate until the color is identical with the color of previous test. The volume of potassium permanganate used at the titration is noted with V₂.

Calculus

The results expression it's made by the number of cm³ of KMnO₄ solution spent:

$$\text{KMnO}_4 = 5 \times (V_1 - V_2)$$

where:

- V₁ – KMnO₄ volume used at the juice titration
- V₂ – KMnO₄ volume used at the alcoholic solution

2.2. Determination of the tannin substances

The tannins that contain proantocyanidines are transformed in antocianidins, at warm and acid medium.

Work mode used was Sov's mode who use for the determination of tannins the reduced action of this one about KMnO₄ solution 0.1 N.

Calculus

$$T\% = n \times 0,004157 \times 500$$

But the tannins quantity may be calculated with the help of KMnO₄ parameter, who can be expressed likeness tannins knowing that 1 g tannins correspond at a value of 25 ml KMnO₄ parameter.

2.3. Determination of the vitamin C (ascorbic acid)

Reactives: H₂SO₄ diluted, I₂ in KI 0.1n, Starch 0.1%, indicator.

Work mode is realized in accordance to STAS. A volume of 15 ml juice is added, than 5 ml diluted H₂SO₄ and a titration with I₂ in KI 0.1 n is done until a green color persists. As indicator, starch 0.1 % is used.

Calculus

Knowned that at 1 ml I₂ 0.1 n correspond 0.008806 g vitamin C we obtain different values for each test.

2.4. Determination of titrable acidity

The test analyzed is titrated with sodium hydroxide solution, in presence of phenolphthalein like indicator.

Reactives:

- NaOH 0.1 n;
- phenolphthalein solution 1%, in ethylic alcohol 95% vol.

Work mode: In a Erlenmeyer pot is added with dropper 50 cm³ juice, some drops of phenolphthalein and the composition is titrated with sodium hydroxyl until the color pink is observed. The volume used is noted.

Calculus

$$\text{Acidity} = \frac{V_1 \cdot V_3 \cdot 0,1}{V_2 \cdot V} \cdot 100$$

where: V₁ is the total volume of analyzed solution from measuring bottle, in cm³;

V₂ – solution volume taken in determination, in cm³;

V₃ – sodium hydroxide volume used at the titration, in cm³;

V – test volume taken for analyzed, in cm³;

In case that the acidity is express in g citric, malic, tarttric, lactic and acetic acid it is calculated by multiplication of the hereinbefore formula with the miliequivalent corespondent of each acid. Those miliequivalents are:

- 0.0070 for citric acid;
- 0.0067 for malic acid;
- 0.0075 for tarttric acid;
- 0.0090 for lactic acid;
- 0.0060 for acetic acid.

3. Results and discussion

Further are presented the values obtained in the case of different experiments performed. The values of potassium permanganate parameter are presented in figure 1.

In natural orange juice more potassium permanganate was used comparatively with the tests which contain extracts, that prove a highly quantity of poliphenolic and oxidizable substances than in the other cases.

The orange juice without extract added has the highest content in tannins. The values of the quantity of tannin are presented in figure 2.

For vitamin C, in our case, the quantity is of 53 mg for orange juice, following that this to increase to the vegetable extracts addition. The values of vitamin C are presented in figure 3.

From figure 3 it could be observed that the higher quantity of vitamin C, in the case of juice with alcoholic extract of underbrush.

The titratable acidity, in ml NaOH, used for each test is presented in figure 4.

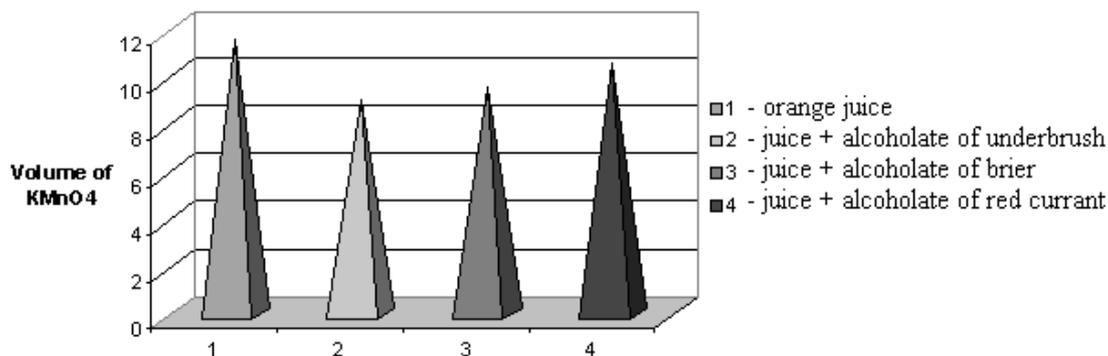


Figure 1. The determination of potassium permanganate parameter

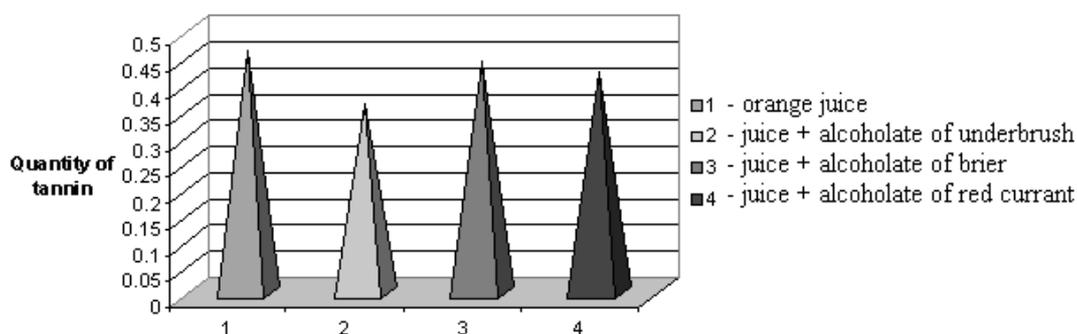


Figure 2. Quantity of tannin substances

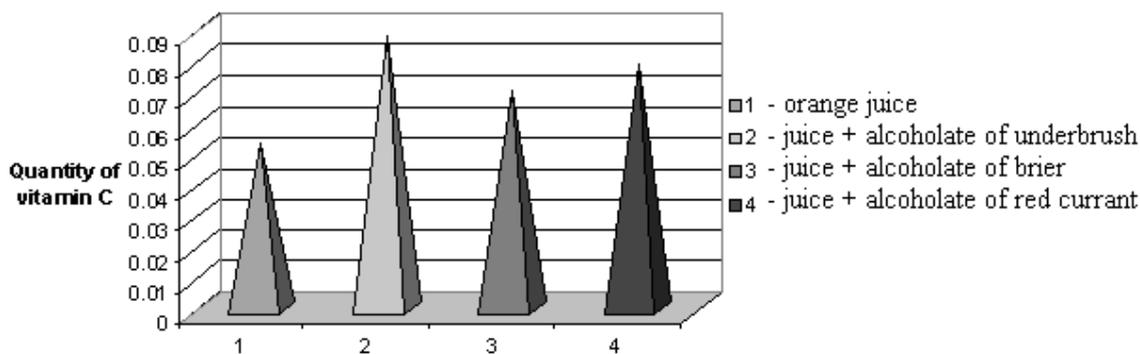


Figure 3. Quantity of vitamin C

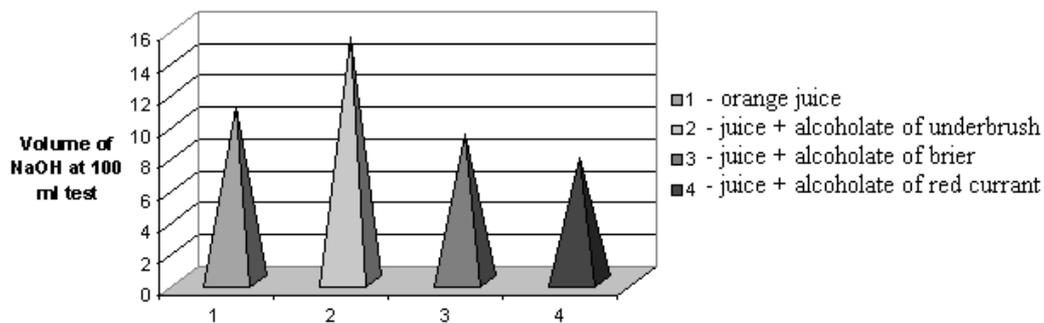


Figure 4. Representation of the NaOH volume use in determination

At the addition of extract a modification of juice acidity it could be observed. So, in case of alcoholic extract of underbrush addition the acidity was increased because of underbrush sensibility. It is known that this begin to acidulate more speedy than other extracts if the underbrush stay a long time in free air. Because of this is desirable that this be added in juice immediately after alcohol evaporation.

The content in citric, malic, tartaric, lactic and acetic acid for orange juice and juice with extracts is presented in figures 5 (citric acid), 6 (malic

acid), 7 (tartaric acid), 8 (lactic acid) and 9 (acetic acid).

A higher quantity of citric acid at addition of underbrush alcoholic extract in the orange juice could be observed.

Also, from the figure 9 it could be observed that the juice with alcoholic extract of underbrush has the bigger quantity of acetic acid.

As a conclusion, the quantities of all the acids that have to be determined from orange juice and juice with alcoholic extract of plants are presented in figure 10.

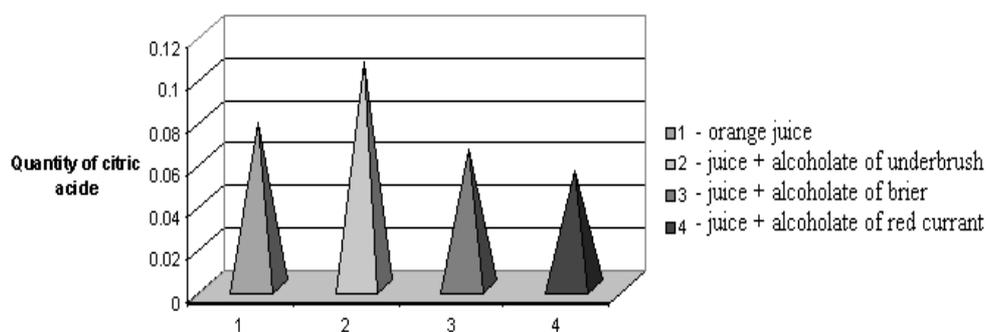


Figure 5. Quantity of citric acid

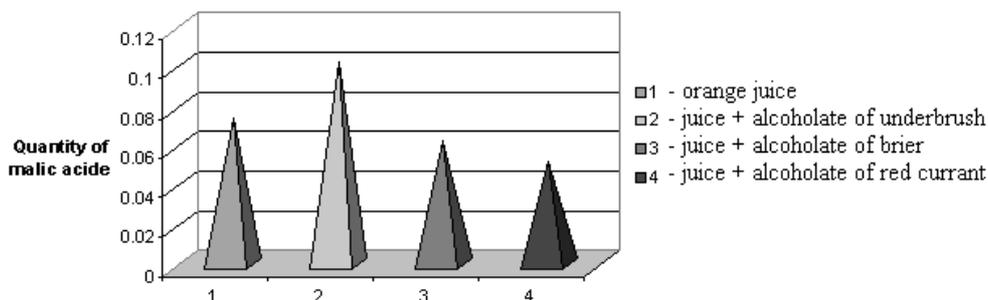


Figure 6. Quantity of malic acid

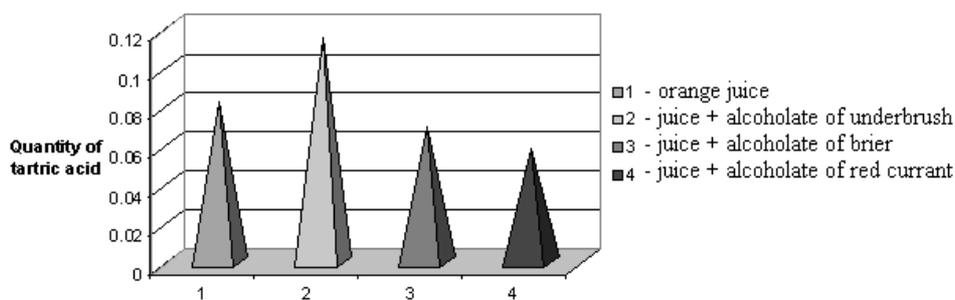


Figure 7. Quantity of tartaric acid

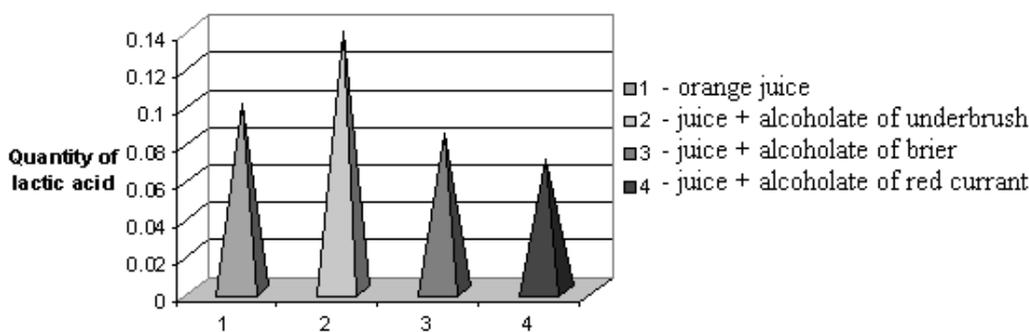


Figure 8. Quantity of lactic acid

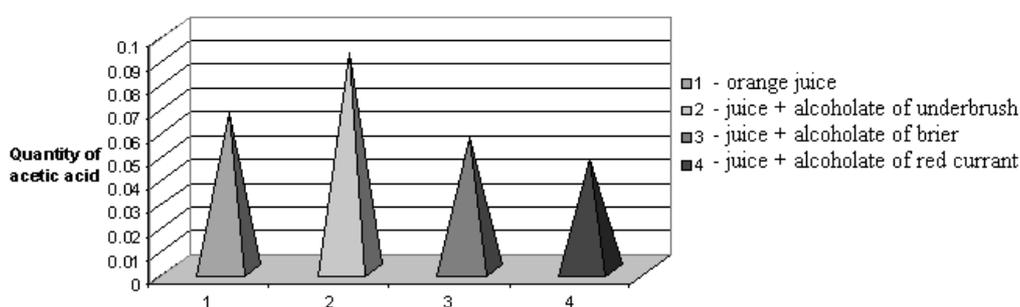


Figure 9. Quantity of acetic acid

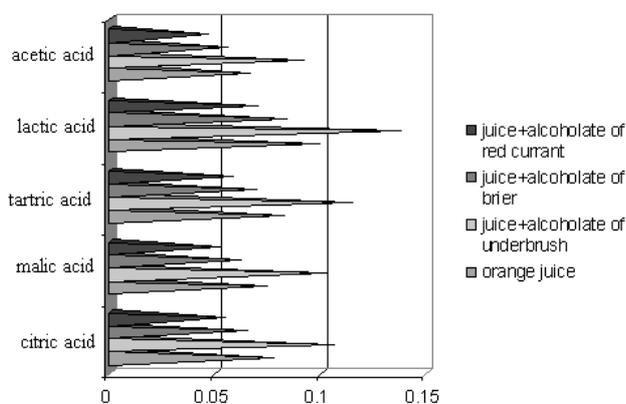


Figure 10. Quantity of all the acids

The orange juice with alcoholic extract of underbrush have a high quantity in those acids comparatively with the orange juice.

4. Conclusions

The conclusions that could be devolved from the determination realized are:

- in case of permanganate parameter was observed a decrease to extract addition, this influencing the bactericidal force on pathogenic micro-organisms. This was more marked in the case of juice without extract;

- in case of vitamin C, the higher content is observed to extract of underbrush addition in orange juice with pulp, followed by the juice with alcoholic extract of red currant;
- to addition of alcoholic extract of underbrush it observe a increase of his acidity.

Underbrush containing a big quantity of vitamins influenced favorable the orange juice bringing him a increase of quantity of difference vitamins. Also is augmented the nourishing value.

By the contain of betacarotene underbrush prevent the apparition of cancer. Increase the resistance of the effort, is a excellent protector against solar radiation or the radiation from other source.

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