

EFFECT OF STORAGE ON ASCORBIC ACID CONTENT OF SOME FRUIT JUICES

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Abstract: *The effect of storage on ascorbic acid content of some fruit juices was evaluated. The preparation of fruit juices, the applied technologies, seeks to extract and preserve in them the most valuable substances in fruit. This will provide food value and organoleptic characteristics, as they were in the raw fruit. Therefore, fruit juices and fruits are called liquids. Fruit juices and fresh fruits were selected randomly from supermarkets, selected by smell, shape and color. Fruits were selected at different stages of maturity, and fruit juices to different periods of validity. Fresh fruits were squeezed by hand with a mini plastic juicer. The laboratory method chosen is the dosage of ascorbic acid with 2,6-dichlorofenolindofenol. Once opened conventional juices lose potential vitamin. Compared to bottled natural juices, natural juice, freshly squeezed, has the advantage that it contains no preservatives. As long as the juice will be consumed fresh, it will keep its properties and nutrients.*

Keywords: *storage, fruit juices, ascorbic acid*

1. Introduction

Fruit and vegetables contain many antioxidant compounds, including phenolic compounds, carotenoids, anthocyanins and tocopherols. Fruit peels are especially rich in polyphenolic compounds, flavonoids, ascorbic acid and many other biologically active components having positive influences on health. [1]

The antioxidant activity of fruit and vegetables is assumed to be of greatest importance in combating a number of degenerative diseases. When the level of reactive oxygen species (ROS) exceeds the antioxidant capacity of the cell, the intracellular redox homeostasis is altered, and the resulting oxidative stress may destroy all major classes of biomolecules in the vicinity of their source, including

lipids, protein and DNA, with concomitant changes in structure and function. [2]

Fruits have a short life, due in part to a high respiration rate and a rapid ripening process. To extend the shelf life of fruits different preservation methods have been developed including canning, freezing, drying and packing in controlled atmospheres. However, the processing can change the concentration of nutrients. Any loss of nutrients in fruits and vegetables will depend on the type, temperature and time of processing and storage conditions.

The concentration of vitamin C can be reduced with various percentages, depending on the type of processing of raw material containing this vitamin. [3]

The inefficient blanching causes some loss of vitamin C by oxidation, as well as by leaching. The storage of vegetables for a

year at a temperature around -10°C can lead to vitamin C loss of 80-90%. [4]

The addition of bicarbonate, used to soften some vegetables, contribute to diminution of vitamin C concentration. The addition of anthocyanins, sugar and even starch seems to have a protecting action on vitamin C. [5]

Retention of ascorbic acid is better in rapid drying at high temperatures than in slower drying at lower temperatures. Drying methods that expose the food to air result in losses of vitamin C due to oxidation. The freeze drying, which is carried out in the absence of oxygen, does not cause loss of vitamin C. [6]

2. Materials and methods

The preparation of fruit juices, the applied technologies, seeks to extract and preserve in them the most valuable substances in fruit. This will provide food value and organoleptic characteristics, as were the fruit raw. Therefore, fruit juices and fruits are called liquids. Fruit juices and fresh fruits were selected randomly from supermarkets, selected by smell, shape and color. Fruits were selected at different stages of maturity, and fruit juices to different periods of validity. Fresh fruits were squeezed by hand with a mini plastic juicer. The laboratory method is chosen by 2,6-diclorfenolindofenol ascorbic acid dosage. Natural can not be associated with any processed product obtained from a natural product on which there was an intervention in various physical or chemical activities. So, no juice, even the one freshly squeezed, can be called natural 100%, as long as the fruit has occurred (physically) by squeezing.

3. Results and Discussion

Six juices were selected on the market, whose values of pH are listed in 'Table 1'. The juices are natural (samples 1, 2),

As to microwave heating, the ascorbic acid content is higher in vegetables cooked by microwave heating than by conventional methods. [7]

Some preservation methods are also believed to be responsible for depleting antioxidants naturally occurring in food, with a subsequent decrease in the lower health protecting capacity of fresh foods.

Juice is the liquid that is naturally contained in fruit or vegetables tissues. [8]

The aim of this study was to evaluate the effect of storage on ascorbic acid content of fruit juices.

conventional (samples 3, 4) and organic (samples 5, 6).

Table 1
pH values of juice samples

No	Sample	pH
1	Freshly squeezed orange juice	4
2	Freshly squeezed grapefruit juice	3
3	Orange juice Tymbark	4.5
4	Grapefruit juice Tymbark	3.5
5	Orange juice Biotta	4
6	Blackcurrant juice Biotta	3.5

Freshly squeezed grapefruit juice is the acid juice of the review, followed by grapefruit juice brand Tymbark conventional, organic blackcurrant juice then Biotta. Grapefruit juice is more acidic than the orange or the kiwi, whether the juice is natural, organic or conventional. Freshly squeezed juice can be associated with any processed product, it was obtained from a natural product on which there was an intervention in various physical or chemical activities.

Conventional juices have the following characteristics, which are mandatory under STANDARD: appearance of homogeneous liquid, clear to opalescent, without suspended sediment or impurities in the

raw materials used, color, smooth texture, fragrant, aromatic, characteristic odor of fermented fruit, the mold, pleasant taste, sweet or sweet-sour fruit characteristic, without taste.

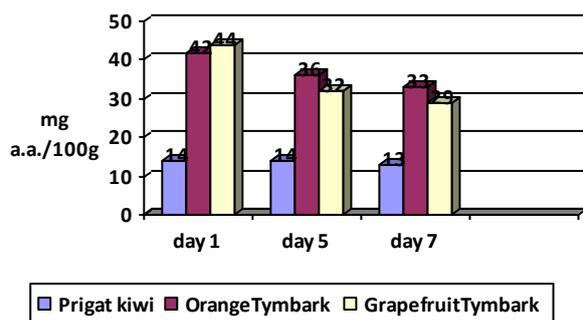


Figure 1. The evolution of ascorbic acid in conventional nectar

The data presented in Figure 1 indicates that the juice Prigat kiwi has a constant content of vitamin C, the largest differences being the orange juice and grapefruit juice Tymbark.

Freshly squeezed orange juice is made from 100% fruit juice (100% juice) by squeezing them. The juice is not subject to dehydration (not remove water from fruit juice) and is always kept cold. The shelf life is very short - the juice should be consumed in 10 days of production.

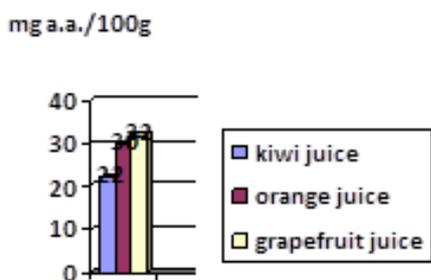


Figure 2. Ascorbic acid in some freshly squeezed juices

Figure 2 shows the vitamin C content of freshly squeezed juices, orange, grapefruit

and kiwi. Kiwi juice contains only 22.176% ascorbic acid, compared with grapefruit juice containing 32.4%. Grapefruit juice has a very high food value, characterized by: good taste, fruity and refreshing, increased sugar content directly assimilated and organic acids, significant proportions of minerals, enzymes and vitamins, especially ascorbic acid.

Biotta organic orange juice is rich in vitamin C. Biotta produces this 100% natural orange juice, fresh, preserving the original flavor and taste. Very important to maintain a high nutritional value is the quality of processing methods and retention of natural purity and Orange juice is Biotta quality and taste of freshly pressed orange juice.

Biotta blackcurrant juice is made from organic and fresh blackcurrant. Black currants are rich in vitamin C and flavor of this juice is enhanced with an infusion of rose petals tea.

Biotta uses light pasteurization methods, thus keeping large amounts of vital nutrients. The juice is then heated and cooled quickly; the process is repeated as many times as possible. Oxygen is removed thus preventing oxidation and loss of vitamins. An important role for maintaining the content of vitamin C is tightly closed glass container with 100% waterproof against air. Glass protects best Biotta juicestaking unwanted elements (eg oxygen) on the outside, thereby achieving a high retention of vitamins. Another enemy of vitamin C is the UV rays that can destroy vitamins, but the products are packed in cartons Biotta closed for transport and storage. Organic juices are consumed liquid to quench thirst and also have to produce a cooling effect to combat the sensation of heat. They are produced in the water, to be a more pleasant and refreshing mix of substances that print pleasant taste and aroma, beautiful color. Lately the industry has passed the introduction of substances into drinks

necessary for man: vitamins, iron, lecithin, honey, caffeine, phosphorus, sodium, potassium, etc.

The study allowed the observation of the evolution of ascorbic acid content of juice and freshly squeezed unconventional juices.

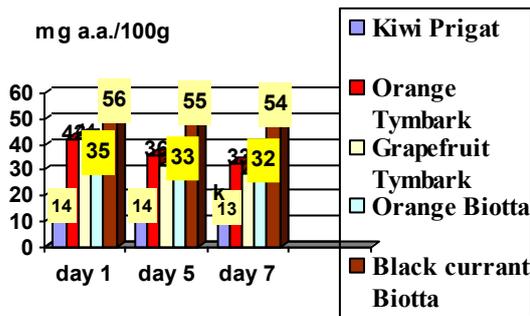


Figure 3. Evolution of ascorbic acid in organic and conventional fruit juices

In terms of conventional juices notice that:

- Juice made of kiwi has fared fairly constant ascorbic acid, not very large losses 14.4 on day 1 to day 7 13.68;
- Decreasing the amount of ascorbic acid per 100 g of product is evident in orange juice and grapefruit nectar, compared to 100 g product;
- Although the blackcurrant juice Biotta organic content is rich enough in ascorbic acid per 100 g product its evolution is constant;
- In general, organic juice Biotta, which is rich in vitamin C, shows a steady evolution in time.

Conventional juices, once opened, lose the potential vitamin, unlike the green ones. The data presented in Figure 3 show that Tymbark juices containing ascorbic acid, rich on the first days after opening, lose vitamin potential after only five, seven days while Biotta organic juice ascorbic acid levels during the 7 days is maintained approximately constant.

As shown in Figure 4, the content of vitamin C in orange juice freshly squeezed (30.096% compared to 100 g) is lower than

that of conventional orange juice Tymbark and juice Biotta organic oranges.

Conventional juices are treated with ascorbic acid, and the presence of vitamin C raises the nutritional value of juices.

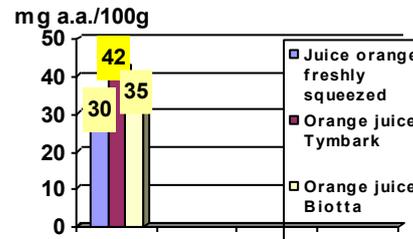


Figure 4. Evolution of ascorbic acid in fresh squeezed juices, conventional and organic

The antioxidant activity aims to prevent undue influence of atmospheric oxygen in contact with juice, respectively oxidizable substances therefrom, arising mainly from fruit crushing time, and until the last, that of bottling and pasteurization of juice. To choose a healthy product one must know the difference between different types of juices. The first category would be freshly squeezed juices such as grapefruit or orange ones. These are the only ones that actually can be called natural because they have gone through other processing improvements/conservation than fruit juice extraction. Compared to bottled juices, natural juice, freshly squeezed, has the advantage that it contains no preservatives. As long as the juice will be consumed fresh, it will keep its properties and nutrients. Another option is the most concentrated juice. In their case, the fruit is squeezed and then heated. The water content evaporates and results in a thick concentrate, which is pasteurization. Reintroduce water before packing, and loss of vitamin C is low. Pasteurized juices have a shelf life of two times that of fresh juice. Pasteurization destroys an insignificant amount of vitamin C.

4. Conclusion

Among the factors that influence the quality and quantity of unwanted flavors and colors of juices, the most important are the phenomena of oxidation, heat and handling. To preserve flavor and color of material it would be necessary to process fruits and juices at low temperatures and away from air. These conditions are practically difficult. The study allowed the observation of differences in the evolution of ascorbic acid in juices, organic juices and conventional juice. Evolution of ascorbic acid in organic juice was constant compared to conventional juices where vitamin C content decreased within seven days by about 20%. Once opened juices lose potential conventional vitamins. Significant differences exist between conventional and organic juices. Thus, conventional Tymbark juices containing ascorbic acid on the first day after opening lose vitamin potential after only five, seven days while Biotta organic juices have a fairly constant level of the vitamin C. In terms of vitamins, nothing can fully replace eating the fruit itself. Fresh juice, squeezed and consumed immediately only has a higher content of vitamins than the pasteurized one (although there is a loss of vitamins and spinning). Compared to bottled juices, natural juice, freshly squeezed, has the advantage that it contains no preservatives. As long as juice will be consumed fresh, it will keep its properties and nutrients. Juice with a high content of fruit - 100%, pasteurized or aseptic - can be considered a saving

variant; in the sense that it retains the taste and most of the vitamins of the fruit is done (pasteurization destroy an insignificant amount of vitamin C).

5. References

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