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SIGNIFICANCE OF BLANCHING IMPACT ON THE PRODUCTION PROCESS OF HALF-FINISHED FROZEN VEGETABLE PRODUCTS

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Abstract

Freezing as an advanced preservation method is analyzed. Focus is on significance of pre-treatment, blanching is evaluated. Different kinds of blanching are analyzed – water and vapour, quality loss is determined, blanching with the least losses is analyzed. The best way is obtained for maintenance of vegetable sensoric properties.

Key words:*blanching, water, vapour, vegetables*

1. INTRODUCTION

The rapid freezing of food is the most: a progressive method of canning. In the frozen proproduct making its debut is better than in any other way of canned, preserved the basic components that determine the nutritional value, including labile, such as vitamins, polyphenols, etc. On the organoleptic characteristics - taste, aroma, color, appearance, frozen food practically little different from fresh. The most effective application of freezing preservation method for processing fruits and vegetables, as well as the production of food and semi-finished products(Blija, 2008).

As one of the most important pre-treatment process is blanching. Under the preliminary blanching means a short-term treatment, respectively, prepared (washed, selected, and if necessary, peeled, diced) vegetables or fruit with hot water or vapour(Zariņš,2002).

It is particularly important when rapid freezing blanching vegetables. Rapid freezing of vegetables has been developed since 1928 and completely contrary to the previously accumulated experience in dealing with vegetables. This experience has testified that vegetables are not suitable for quick freezing, as in them at such treatment, there are many harmful changes. Last repeatedly reaffirmed everyday experience: left on the fields at freezing spoiled vegetables (potatoes, pumpkin, red pepper), and flatten. The first laboratory experiments, the freezing of vegetables, not give good results, as it was found that at -18 ° C, which can be maintained in refrigerated storage, after a 6 week acquired a foreign flavor vegetables (taste of hay). This flavor is even vegetables stored at -30 ° C if they were given thaw before cooking.

As established in 1927 Kohlin, freezing and thawing shift in unwanted side functioning of plant enzymes, which is accompanied by the formation of the taste. He also showed that vegetable enzymes are deactivated after a brief boiling and then they taste after freezing remains unchanged for a long time (Almasi, 1981). Regardless of its Joslyn and Kryuss in 1929 came to the conclusion that the vegetables before freezing to blanch. Even then, the birth of the idea of blanching, having two different points of view. Kohlin invites blanching in water, and Joslin and Kryuss-vapour. Seychas, however, the issue in a differentiated approach and believe that some vegetables should be treated with water, others - vapour.

2. MATHERIALS AND METHODS

To blanch use mechanized equipment of different construction, continuous or periodic operation. When you work on it to pay attention to the following. If the heating is steam inlet pipe should be covered with a layer of water of not less than 150-200 mm, otherwise the fruit may burn. Inflow steam pipe should be located closer to the bottom of the bathtub side wall. This reduces the risk of scorching and improves the condensation of steam in the water. To prevent contamination of an overflow pipe, before it advisable to set up a filter of mesh fabric. We can not allow the steam out of blanching vehicles fell into the room, a bath should have a cover in the form of rotary valves, removing the entire length, the accumulation of vegetable or fruit before and after treatment in the bathrooms should be equipped with a hood and pipes that provide local ventilation. All moving parts of blanching vehicles (wheels, gears, axles) must be closed. Usually used for blanching, boiling water, but sometimes it is enough to maintain the temperature of 85 ° C. Vapour used for cooking at atmospheric pressure, which allows for simple construction equipment. Long believed that with the help of cooking to fully deactivate the respiratory enzymes, and this criterion was the complete cessation of action of enzymes - catalase and peroxidase. Containing protein portion (apoferment), catalase and peroxidase are usually deactivated at a temperature of 60-70 ° C. There is a close relationship between temperature and time of deactivation. At high temperatures during decontamination is less at low - more. For example, the deactivation of enzymes of green pea varieties Olderman required 30 s at 90 ° C, 50 s at 88 ° C, 105 s at 71 ° C. Of course, it also plays a role in the difference of heat transfer at different temperatures, since more high temperature heating is faster.

3. RESULTS AND DISCUSSION

Blanching is necessary not only for the decontamination of respiratory enzymes, but it does have other important functions (Skrupskis, 1992). So, after cooking the vegetables greatly reduces the number of spores of microorganisms. If we apply a sufficiently high temperature and prolonged exposure can achieve complete sterilization of products. If spinach blanching to 3 minutes, then the number of spores is reduced by 99%. Effects of blanching is manifested in the fact that it reduces the loss of vitamins A, B_1, B_2, and C in vegetables during of storage. Blanching effect on the chlorophyll content in vegetables and their color. Some of the chlorophyll of green peas form pheophytin, as when melting of the chlorophyll molecule is lost by etsya magnesium. On the other hand, the formation of a small amount of pheophytin slows subsequent transition of chlorophyll pheophytin during cooking of quick green peas after thawing. Therefore, the color of quick green peas is still green. The higher the temperature of the water prior blanching, the less change the color of green peas during cooking after thawing. In addition to the above factors, this phenomenon is explained by the fact that blanching removes most of the water-soluble or volatile components, which interact with chlorophyll during cooking, causing discoloration. Yellow-green green beans due to the presence of flavonols. Under the influence of heat treatment increased green tint, so the yellow-green color turns into blue-green. Blanching also significantly alters tissue vegetables. Useful tissue changes fast freezing vegetables during cooking after thawing partially arise already in the process of pre-blanching. Therefore, the time of cooking frozen vegetables is one half or one third the usual time of cooking fresh vegetables. Of course listing all the good properties of blanching, should also be noted that blanching products they lose the vitamins, proteins and minerals. It is therefore important to choose the right type of blanching.

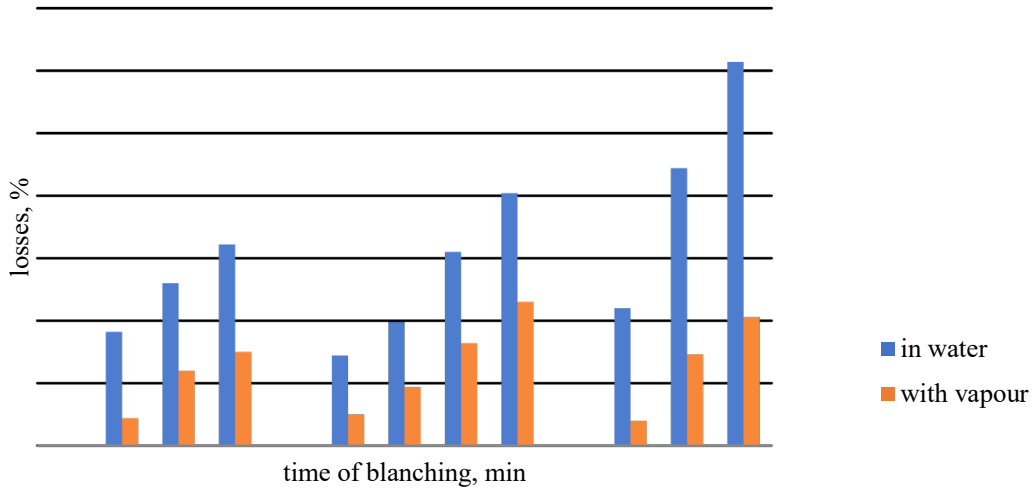


Figure 1.Dry matter losses(%) of vegetables.

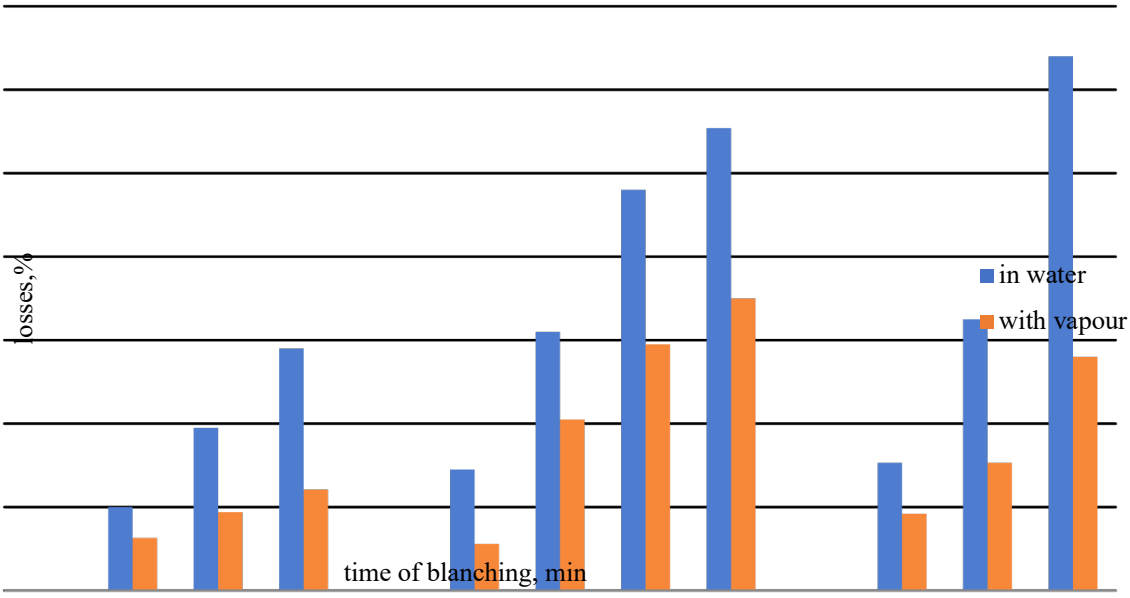


Figure 2. Vitamin C losses(%) of vegetables.

Figure 1 shows that the lower dry matter losses blanching paprika, green paes and spinach is a vapor. Blanching paprika dry matter losses in the vapor is from 2-7%, but blanching paprika in water weight loss is much greater from 9-16%. Blanching green paes with vapor the mass loss of 2-11%, but the water 7-20%. Particularly large weight loss blanching spinach water, where they are from 11-30%, but blanching with vapor 2-10%.

Figure 2 shows that the vitamin C losses to less blanching vegetables with vapor. Paprika are from 6-12% blanching with vapor and 10-29% blanching in water. Green peas vitamin C losses blanching with vapor is 5-35% and 14-55% water. Blanching spinach with vapor in vitamin C loss of 9-28%, while water from 15 to 64%.

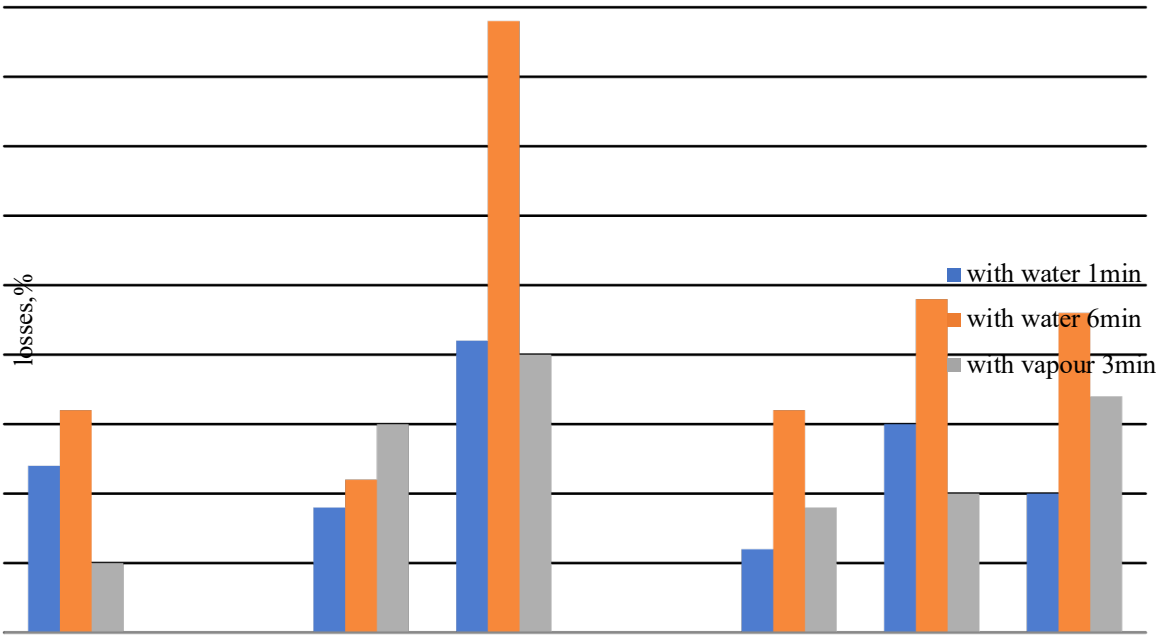


Figure 3. Mineral losses (%) of blanching vegetables.

Mineral losses are shown in figure 3rd. The picture shows the green peas smaller mineral loss (5%) is blanching with vapor 3min. Blanching whole green beans smaller losses blanching in water 1min. (9%) but a better cut blanched with vapor 3min (20%). Also, whole carrots , they would be better 1min blanched in water (6% loss), but better to cut the steam -10% loss.

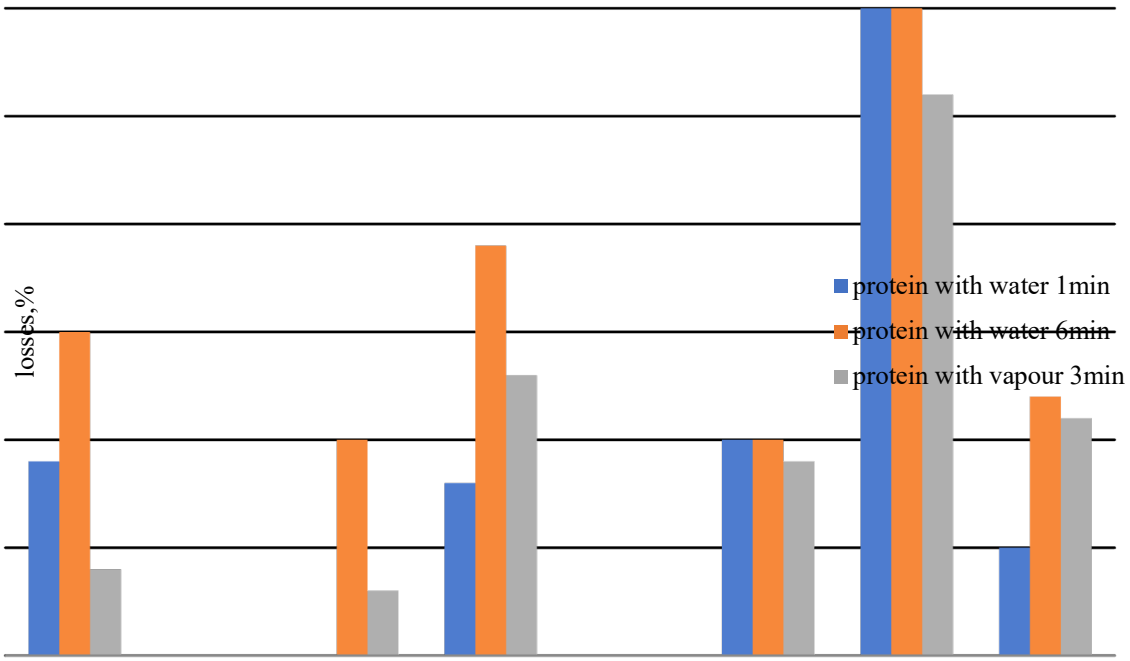


Figure 4. Protein losses (%) of blanching vegetables.

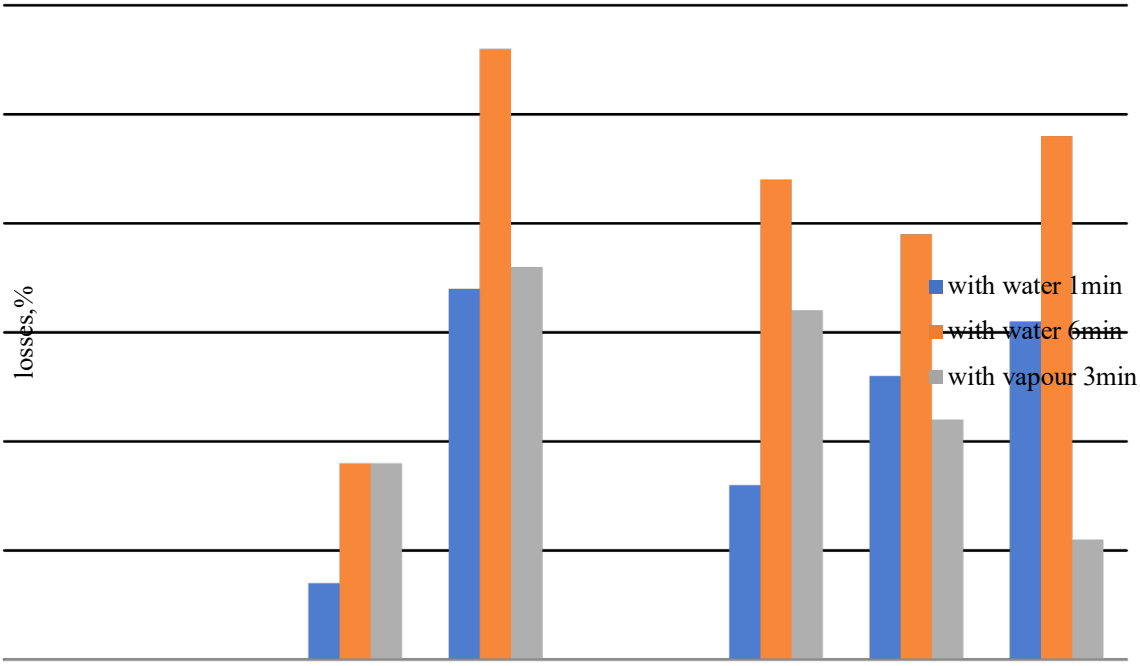


Figure 5. Vitamin C losses(%) of blanching vegetables.

Protein losses are different, the better blanched green peas with the vapor (4% loss), then the blanched green beans better water for 1min, where the loss of whole beans 0%, 8% cut, blanched carrots recommended by steam 3min, where losses are whole 9% and cut 26%. While the Brussels sprouts blanched in water suggests 1min, where losses are 5%.

Vitamin C losses in blanching vegetables are also a variety of different vegetables. Green beans blanched in water better 1min., Whole beans losses of 7%, cut 34%, whole carrots smaller losses of vitamin C is blanching in water 1min -16% losses, cut recommended by steam blanched -22% loss. Brussels sprouts less vitamin C loss is blanching them with steam-3min loss of 11%.

4. CONCLUSIONS

- The rapid freezing of food is the most: a progressive method of canning. In the frozen proproduct making its debut is better than in any other way of canned, preserved the basic components that determine the nutritional value, including labile, such as vitamins, polyphenols, etc.
- Effects of blanching is manifested in the fact that it reduces the loss of vitamins A, B_1, B_2, and C in vegetables during of storage.
- Blanching vegetables losses are very different for each vegetable
- Each vegetable has its own application form blanching, blanched else better to water but others blanched with vapour. Green peas lowest quality losses of blanching them 3min. steam green beans whole better use of water for blanching 1min., well cut will be less losses of quality when blanching 1min. water. Whole carrots recommended blanched in water 1min., cut into smaller losses blanched with vapour 3min. Blanching of Brussels sprouts the best way to choose between the blanching water for 1min. and blanching with vapour 3min. Blanching water for 1min. less minerals and protein loss (10% and 5%) but higher in vitamin C losses of 31%, while blanched with vapour 3min. larger losses are minerals and proteins (17%, 11%), but lower vitamin C losses to 11%.

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