THE EFFECT OF FREEZING ON CONSUMER PROPERTIES OF QUICK-FROZEN JUICES WITH PULP

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One of the important tasks of fruit and vegetable processing branch of food industry is to increase the effectiveness of fruits and vegetables preservation by means of introduction and improvement of modern methods of food and vegetable processing, aimed at retention of consumer properties of plant raw materials at the maximum level. Disadvantages of the classical method of producing clarified juices, which occupy a considerable share in the juice market in Ukraine, are its clarification and heat treatment, resulting in a significant reduction of their consumer properties, in particular of vitamin value. Juices with pulp conservation by freezing needs a number of issues, related to the providing stability of the suspension and preserving color characteristics of the product, to be addressed.

The aim of our research is to study the effect of freezing on consumer properties of quick-frozen juice with pulp, consumable in a frozen form.

The object of the research is apple-carrot-celery and apple-beetroot juices with pulp, received from the variety of apples *Golden Delicious*, carrot *Canada*, celery *Giant* and beetroot *Bordeaux*.

Juices with pulp were obtained by direct extraction, and the apple, carrot and celery juices in ratio 60, 30 and 10%, and the apple and beetroot juices in ratio 80 and 20% respectively, were blended in order to improve organoleptic properties. We added xanthan gum to the juices in order to ensure the resistance of the suspension to settling (separation), as an antioxidant we used ascorbic acid, and as a cryoprotective agent – sugar. Content of admixtures in juices are represented in Table 1.

Table 1 – **Content of admixtures in juices**

Juice	**Content of admixtures, %**		
	xanthan gum	**white sugar due to SSTU 4623:2006**	**ascorbic acid**
Apple-carrot-celery	0,040	3,0	0,005
Apple-beetroot	0,050		

The research of consumer properties was conducted for juices before and after freezing. The research results are shown in Table 2.

Table 2 – **Consumer properties of juices with pulp**

Content / Juice	soluble solids, %	sugars, %	titrating acids, %	vitamin C, mg/100 g	polyphenol compounds, mg/100 g	β-carotene, mg/100 g
Apple-carrot-celery juice						
Before freezing	15,54	13,03	1,34	21,51	2569	2,05
After freezing and storage during, months:						
– 0	15,41	12,91	1,40	20,11	2508	2,03
– 3	15,39	12,89	1,43	19,67	2499	2,02
– 6	15,37	12,88	1,45	19,61	2491	2,01
– 9	15,37	12,88	1,45	19,61	2485	2,01
– 12	15,36	12,87	1,45	19,59	2482	2,00
Apple-beetroot juice						
Before freezing	15,98	13,31	1,41	20,40	2569	2,05
After freezing and storage during, months:						
– 0	15,88	13,18	1,47	19,07	3097	
– 3	15,85	13,16	1,50	18,93	3023	
– 6	15,85	13,15	1,50	18,80	3015	traces
– 9	15,84	13,15	1,52	18,74	3004	
– 12	15,83	13,13	1,52	18,71	2997	

The undertaken researches confirm the stability of organoleptic characteristics and indicators of chemical composition of the apple-carrot-celery and apple-beetroot juices with pulp at a high level. Sugars, acids and β-carotene are the most resistant to low-temperature effect. Vitamin C and polyphenol compounds are more labile, the main losses of these components occur during freezing (6,51 and 6,52% respectively) and trivial losses – during low temperature storage (2,49 and 1,73% respectively).