

**COMPARATIVE ANALYSIS OF THE MAIN CHEMICAL
COMPOSITION OF ORGANIC POWDER OBTAINED FROM CARROT
ROOTS GROWN IN EARLY AND LATE PERIODS**

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ABSTRACT

*The article describes the beneficial properties of carrot (*Daucus carota*) root for the human's health, the amount of macro and microelements, carbohydrates, total acids, methods and technology of their determination and the chemical composition of carrot varieties grown in different periods. In order to analyze the chemical composition of carrot roots, samples were taken from 4 different varieties grown in 2 periods, early and late periods, and compared. Physical properties of organic powder obtained from 4 different samples: transparency, degree of color, solubility in water were also compared. According to the results of the laboratory analysis, it was found that the amount of total acid and carbohydrates (6:9 in order) in the composition of the local variety of Red Mirzoi grown in the late period is more than other samples, and the amount of organic powder (98.5%) obtained is also more than other samples.*

KEYWORDS: *Carbohydrates, Total Acids, Bullet Blender, Transparency, Degree Of Color, Early And Late Periods, K13 Ph Meter.*

INTRODUCTION

In recent years, consistent reforms have been implemented in the field of agricultural development, introduction of modern market mechanisms, development of a modern management system, and increase of export potential. In this regard, in the development strategy of the Republic of Uzbekistan for the development of agriculture for 2020-2030, a number of activities are planned in order to fundamentally reform the activities of scientific and research

institutions in agriculture, improve their material and technical base, and support the development of knowledge, innovations and agro-services relations in the field based on world experience priority tasks are defined. As a result, in order to increase the volume of fruit and vegetable production in the Republic, based on the soil and climate conditions of the regions, in 2019, 55 districts were fully specialized in fruit and vegetable cultivation. In 2022, a total of 422.3 thousand hectares, of which 49.9 thousand hectares were specialized for vegetable growing. As a result of reforms, in 2021-2022, the volume of vegetable products grown in agriculture was ensured to increase by 103%. [1].

A number of scientific research works on introduction of innovative technologies, including production and processing of products, are being carried out at the Namangan Institute of Engineering and Technology based on the tasks defined in this Decision and decrees. In particular, thanks to the technology of obtaining organic powder from root vegetables, carrots and beetroots and its application to the food industry, it is possible to increase the company's annual income by 2.5-3 times. Vegetable products and organic powder contain vitamins (A, B, C, PP), organic acids (folic acid, pantothenic acid, ascorbic acid), minerals, macro and microelements, including: Fe, Ca, K, Mg. important in increasing resistance to various diseases. [2;3].

In published and historical sources, it is acknowledged that carrot root is used in medicine for liver, kidney, gastrointestinal and anemia diseases, and in the pharmaceutical industry, the drug daukarin is obtained from its seeds, and it is used in the treatment of heart disease. [5].

Materials and methods

Today, one of the most urgent issues in the field is the preparation of organic powder from carrot root in the form of BAC in the food and confectionery industry, as well as in the processing and farm industry. For this purpose, in 2021-2022, Nam.I.T.I. scientific-research works were carried out. For preparation of organic powder in the form of biologically active substances from root vegetables, four different varieties of carrots grown in two different periods: early and late periods were used.

Among the main substances in natural products grown in the early and late periods, total carbohydrate and acid amounts were determined using a K13 Ph meter and a sugarmeter. According to the laboratory analysis, it was found that the total carbohydrate is 7.5%, the total acid is 6.2-6.5%, β -carotene is 15-30 mg% in the early varieties, and this indicator is 9%, 5.6% and 40-60 mg% (in order) in the late varieties. (Table 1, Fig. 1.) [6].

TABLE 1 CARROT VARIETIES GROWN IN DIFFERENT PERIODS CHEMICAL COMPOSITION

Carrot Varieties	total carbohydrate in the natural product	The difference from the standard ±	Including		total acid in the natural product	The difference from the standard ±	Including	
			sucrose	Fructose			B carotene mg%	Ascorbic acid mg%
Varieties grown in early periods								
shantane-2461 (standard)	7.5		5.0	2.5	6.2		12.5	5
Mushak - 195	8.0	+0.5	5.5	2.5	6.5	+0.3	14.2	5.6
Red mirzoyi	8.0	+0.5	5.0	3.0	6.3	+0.1	30.6	7
Yellow mirzoyi	7.75	+0.75	4.75	3.0	6.3	+0.1	25.3	7
Varieties grown in late periods								
shantane-2461 (standard)	8.2		6	2.2	5.6		15	3.7
Mushak - 195	9	+0.8	6	3	6.0	+0.4	25	4.5
Red mirzoyi	9	+0.8	6	3	5.91	+0.3	60	6
Yellow mirzoyi	8.75	+0.6	5.5	3.25	5.96	+0.3	40	6

Figure 1 Product view obtained for the cultivation of carrot root and preparation of organic powder



A



B



C

A- early season carrot crop B- type of Shantane

C- an organic powder sample from carrot roots

Results and discussions

To dry the product, 10 kg of product from each variant grown in early periods was taken and dried in a drying cabinet at a temperature of 70-75 °C for 4 hours, and a product dried to 11% was obtained. The dried product was grinded in a "Bullet blender" grinder to obtain 90% powder. According to the physical characteristics of the obtained powder, it was found that the color is light yellow and has a unique smell, it dissolves well in water, the level of clarity is 65-70%, and the color is 22%. It was found that this indicator is 13% dry compared to the varieties grown in the late period, and the degree of powder formation is 98.5%, which is 8.5% higher than the powder obtained from the early period. It was observed that the color of the obtained powder is pink, it has a specific smell, it dissolves well in water, the transparency of its solution in water is 75-78%, and its color is 27%. According to chemical analysis, the total acid content of 5.5-6% and 9% of carbohydrates was determined in carrot varieties grown in late periods. The main reason for this is explained by the slowness of the photosynthesis process in the carrot plant grown in early spring, relatively low soil and temperature. (Table 2.) [7;8;9.]

TABLE 2 ORGANIC POWDER MADE FROM ROOT VEGETABLES CHEMICAL COMPOSITION

Carrot Varieties	total carbohydrate in the organic powder	The difference from the standard ±	Including		total acid in the organic powder	The difference from the standard ±
			Sucrose	Fructose		
Varieties grown in early periods						
shantane-2461 (standard)	12.0		9.0	3.0	5.7	
Mushak -195	13.5	+1.5	10.5	3.0	6.5	+1.2
Red mirzoyi	13.5	+1.5	11.0	2.5	6.0	+0.3
Yellow mirzoyi	13.1	+1.1	9.0	3.1	5.8	+0.1
Varieties grown in late periods						
shantane-2461 (standard)	14.0		10.0	4.0	6.0	
Mushak -195	14.2	+0.2	10.0	4.2	6.0	0
Red mirzoyi	15.4	+1.4	11.4	4.0	5.5	-0.5
Yellow mirzoyi	15.1	+1.1	11.1	4.0	5.5	-0.5

CONCLUSIONS AND RECOMMENDATIONS

Based on the preliminary results of the conducted research, the following conclusions were drawn:

It was found that the chemical composition of carrot varieties grown in late periods is 1.5-2% higher than those grown in early periods. It was determined that the amount of organic powder obtained, its chemical composition is 8.5% more than the powder of the previously grown product. It is recommended to use Red Mirzoi and Yellow Mirzoi varieties to prepare organic powder from carrot root.

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