STONE FRUITS AS VALUABLE SOURCES OF PECTIN

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Abstract. The article contains the results of the studies on the content of pectic substances in three pomological varieties of apricot fruits, in three pomological varieties of peach and three pomological varieties of plum fruits grown in the climatic conditions of the Republic of Uzbekistan. The studies have shown that stone fruits as apricots, peaches and plums grown in Uzbekistan are characterized by a high content of pectin. According to our research, the variety Yubileyniy (anniversary) Navoi turned out to be the richest in pectic content from the studied fruit varieties, where the average content is 1.32%; in the Raspberry variety of peaches it is 1.12%; in the Violet Hungarian variety of plums, the average content is 1.32%. In all other studied varieties of apricot, peach and plum fruits, the content of pectic substances is more than one percent, with the exception of the fruits of the Yaichnaya (eggy) yellow plum variety where the average content of pectic substances is 0.93%. Due to the high content of pectic substances with good gelling properties, the studied pomological varieties of stone fruits can be successfully used to obtain a number of confectionery products with a jelly-like consistency.

Key words: stone fruit, apricot, peach, plum confectionery, protopectin, pectin, pectic substances.

Introduction. For the recent years, new reforms have been carried out in the Republic of Uzbekistan in the agriculture in order to develop the fruit and vegetable sector. This is evidenced by the Decree of the President of the Republic of Uzbekistan “On the measures to develop agricultural cooperation in the fruit and vegetable industry” adopted on the 14th of March, 2019 and numbered as PP-4329, which indicates comprehensive measures aimed at improving the fruit and vegetable industry, including a significant increase in sown areas, capacities for preservation and processing of fruits and vegetables by actively involving the funds from international financial institutions for the development of this industry (1).

Horticulture is thought to be the most important branch of the agriculture of Uzbekistan. For the recent years, considerable attention has been paid to the cultivation of stone fruits in the horticulture of Uzbekistan. Today, a science-based

scheme for the placement of agricultural crops is being introduced which put an end to the cotton monopoly in the Republic.

It should be noted that for the recent years, the scientists from the Uzbek Research Institute of Horticulture, Viticulture and Winemaking named after academician M. Mirzaev and its branches, experimental stations in the field, as well as experienced gardeners have done significant work on the study of the biology of stone fruits. However, until now, the biological value of stone fruits still remains poorly studied.

In this regard, we have set the task to research the content of pectic substances, which are one of the determining indicators of the biological value of stone fruits.

The object and methods of the study. For the study, perspective pomological varieties of apricot, peach and plum have been taken.

From the apricots, zoned varieties have been researched such as Arzami, Yubileyniy Navoi, Kursadik grown in the gardens of the Samarkand branch of the Uzbek Research Institute of Horticulture, Viticulture and Winemaking named after academician M. Mirzaev, located in the branch of Samarkand.

Of the peaches, the zoned peach varieties Start, Raspberry, Abundant, collected in the gardens of the Charkhinsky fruit nursery of the Samarkand branch of the Uzbek Research Institute of Horticulture, Viticulture and Winemaking named after Academician M. Mirzaev, served as the object of our research.

The stone fruit varieties selected for the study meet the requirements for promising varieties: wide distribution, high yield, sugar content, good taste, transportability and keeping quality.

The content of pectic substances in fruits have been determined by the calcium pectate method (2). For the analysis, the average sample of fruits, crushed together with the peel, was used. The study was carried out immediately after the removal of the fruit.

The results of the research and their discussion.

It should be noted that pectic substances are thought to be a group of colloidal polysaccharides. In fruits and berries, pectic substances are most often found in the form of soluble pectin, protopectin and pectin acid. Pectins are organic compounds that are esters of methyl alcohol and polygalacturonic acid. In plants, pectins consist of D-galacturonic acid residues, which account for 83 to 90% (3-4).

Pectins have a positive effect on the human body. The ability of pectic substances to inhibit the growth and reproduction of microorganisms allows them to be used to treat certain infectious diseases. They prevent absorption of toxic substances in the body, including heavy metals and radionuclides. Pectins, getting into the digestive tract, form gels that adsorb toxic substances and remove them from the body.

A positive effect of pectin in the treatment and prevention of diabetes mellitus, coronary heart disease, and obesity has been established, which is explained by the ability of pectin to correct lipid and carbohydrate metabolism (5,6,7,8).

The results of studies on the content of pectin in peach and plum are presented in the table 1.

Table 1.

Pectic substances of stone fruits in Uzbekistan

Researched objects	The content of pectic substances, % per the raw substance			% of protopectin from the total content of pectic substances
	Pectin	Protopectin	Total content of pectic substances	
Apricots:				
Arzami	0,54	0,74	1,28	57,81
Yubileyniy Navoi	0,48	0,84	1,32	63,64
Kursadik	0,68	0,57	1,25	45,60
Peaches:				
Start	0,43	0,59	1,02	57,84
Raspberry	0,34	0,78	1,12	69,64
Obilniy (plentiful)	0,48	0,37	0,85	43,53
Plums:	0,44	0,63	1,07	58,88
Ispolinskaya				
Hungarian	0,64	0,68	1,32	57,52
Eggy yellow	0,30	0,68	0,43	73,12

The analysis of the data obtained showed that in all varieties of apricot, peach and plum, the amount of pectin substances exceeds more than 1%, with the exception of peaches of the pomological variety Obilniy and the plum Eggy Yellow. Of the studied varieties of apricot fruits, the richest in pectin content was the variety Yubileyniy Navoi, where the average content is 1.32%, the peach variety Raspberry, and the plum variety Vengerka violet are respectively 1.12; 1.32%.

As it is known, the preservation of stone and pome fruits during storage is significantly affected, in addition to the total content of pectin by their fractional composition. For insoluble pectins, there is a common name protopectin. The transformation of protopectin into soluble pectin is found during the ripening of

fruits, which leads to a decrease in the rigidity of fruits and an improvement in their taste.

Most authors indicate in their works that soluble pectin predominates in ripe apples, where the average content is 60-70% of the total amount of pectic substances (9,10,11)

We have not found such regularity in the fractional composition of pectic substances in the researched stone fruit varieties. In all studied varieties of apricot, peach and plum, insoluble protopectin prevails where the average content is more than 50%, with the exception of the apricot variety Kursadik, the peach variety Obilniy.

The conclusion. The results of our study have revealed that apricots, peaches and plums are important sources of pectin. The weather and climatic conditions of Uzbekistan are most favorable for the accumulation of pectic substances in fruits. In the studied fruits, the quantitative content of the water-insoluble fraction of pectin substances exceeds the value of the indicator of the soluble fraction of pectin. Due to the high content of pectins in apricots, peaches and plums, they can serve as an important natural detoxifying raw material in the production of marmalade, jam and a number of other types of canning products.

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