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PHYSIOLOGICAL CHANGES DURING STORAGE OF POTATO PRODUCTS

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ANNOTATION
This article describes the physiological changes that occur during the storage of potato products, the effect of different containers on the chemical and quantitative composition of the product and the losses caused by them, the processes that take place in the tubers, and their analysis.

Keywords: storage, container, cold storage, fatty acid, dissimilation, average temperature, chemical composition, glucose, hexose, energy.

INTRODUCTION

If harvesting, transportation and storage of potato, vegetable, potato and fruit products is carried out based on scientific and technical achievements and advanced technologies, it is inevitable that wastage will be greatly reduced. According to the information of the International Agricultural Organization (FAO), the waste of products does not exceed 10 percent of the world. In our country, this figure is 30-40 percent.

In order to preserve potatoes and vegetables well for a long time, scientific achievements in chemistry, physics, biochemistry, and microbiology are used. In the following years, large containers are used for storage and transportation of fruits and vegetables. This method protects vegetables and fruits from corrosion and spoilage. For example, after the potatoes are dug up, they try 20 times until they are eaten.

MAIN PART

During the storage period of the potato product, as a result of the metabolic processes of the tubers themselves and the various living components contained in them, microorganisms and pests are fed and multiply. The passage of such active processes affects not only the reduction of the amount of dry matter in the tuber, but also affects all its quality indicators.

During the storage period, the respiration of tuber is one of the important processes of its living activity, it helps cells and tissues to use oxygen for the oxidation of organic substances and the release of energy necessary for life.

The reserve in the potato product is kept alive as a result of the absorption of energy by dissimilation of organic matter. This process is mainly carried out as a result of the dissimilation of carbohydrates in the tuber. The place of consumed carbohydrates is filled due to oxidation or hydrolysis of complex organic compounds. In the tuber saturated with starch, it is broken down into sugar under the influence of enzymes at the expense of respiration.

During the oil saturation period, oils (fatty acids) are oxidized to sugar.

The chemical composition of the potato product stored in different containers gives different results.

It should be noted that there are still many opportunities to reduce wastage in storage and processing of vegetable products. For this, first of all, it is necessary to build new storage warehouses, restore old warehouses and canning plants. It is also necessary to accelerate scientific research on the development of low-cost, economically effective technologies.

Table 1 Effect of storage containers on the chemical composition of potato products, percentage

Storage containers	Water	Starch	Sugar	Oil	Ash	clechat
1. Pour on the ground	71,0	13,0	2,5	0,6	2,0	1,5
2. In the cell	75,0	16,0	1,5	0,8	1,0	0,8
3. In a polyethylene bag	66	11,0	3,5	0,4	2,5	1,9
4. The ticket is in the bag	68	10,3	3,9	0,4	2,6	2,4

It can be seen from the table that there were drastic changes in the storage process of potato products in storage containers for a total of 5 months. It was determined that the stored potato product in the second option was kept in good condition. This is due to the fact that the dissimilation of carbohydrates during the respiratory processes of the pods took place under aerobic conditions, that is, there was a sufficient amount of oxygen entering the pods.

Due to the sufficient amount of oxygen in the tank, the product's storage quality is effective, which can be proved by the following chemical equation.

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$C_6H_{12}O_6 + 6O_2 = 6CO_2 + 6H_2O$ +energy
Glucose oxygen carbonate anhydride water

It is known that 287 kJ of energy is released from 1 molecule of glucose.

In this case, aerobic respiration will have the following equation:

$C_6H_{12}O_6 \rightarrow 2CH_3CH_2OH + 6CO_2$ + energy
Hexose ethyl alcohol

And in alcohol fermentation:
$C_6H_{12}O_6 \rightarrow 2CH_3CH(OH)COOH + 6CO_2$ + energy
Hexose lactic acid

Tuber must break down a lot of hexose to provide energy for its storage activities. If the agricultural product is stored in favorable conditions, it can easily provide itself with breathing and heat, and it becomes a high-quality product for a long time without reducing its chemical composition. However, it should be noted that the product must be supplied with oxygen during storage.
In order to properly organize the storage of potato products, it is necessary to create the necessary conditions for the products stored in each container.
It is impossible to correctly organize the storage of the product without knowing what physiological changes will occur during the storage period of the product.
Especially in the Republic of Uzbekistan, which has a rapidly changing climate, storage of potato products causes many difficulties.

Table 2 Effect on the quantity of the product when potato products are stored in different containers

Storage containers	Storage period, days	Saved product, %		After storage , %		
		Pure product	Damaged	Pure	Rotten	Outputs
1. Pour on the ground	150	100	–	91,1	7,0	1,0
2. In the cell	150	100	–	98	2,0	–
3. In a polyethylene bag	150	100	–	94	5,0	1,0
4. The ticket is in the bag	150	100	–	96	4	0,0

Storing potatoes in the warehouse Fergana Valley is considered an unfavorable region for storage due to its climate. In our republic, it is recommended to store products grown mainly from summer varieties of potatoes, because it is stored for a long time. Basically, potatoes can be stored from October, November, December to July. But especially in May, June, July, storing potatoes is very ineffective.

In Uzbekistan, the cold reaches 15-20°C in January and February, and the ground freezes thickly because it snows. In this case, it is necessary to monitor and control the potato products stored in the warehouse. But the temperature starts to rise from March.

Table 3 The average temperature of the warehouse where potatoes are stored before storage

Temperature	Months					
	XI	XII	I	II	III	IV
Average temperature	8,7	6,7	5,1	6,3	7,2	12,5

Low air humidity also has a bad effect on potato storage. A sharp change in temperature causes a natural reduction of the stored product.

When storing potato products in specially built warehouses, they must meet a number of technical and technological requirements, taking into account the physical characteristics of the products. The average monthly temperature for potatoes stored in the warehouse below the experiment is given in the table below.

Table 4 Dynamics of the average monthly temperature in the warehouse during storage

Control time	Months				
	November	December	January	February	March
Morning	11,9°	8,9°	7,1°	4,5°	5,3°
Night	12,6°	10,9°	8,0°	5,0°	5,7°

When the temperature was measured twice a day during potato storage, it was found that the average temperature in the warehouse decreased in the morning and slightly increased in the evening.

CONCLUSION

Potatoes are the most important food product, and the demand for them is increasing day by day. In the technology of growing potatoes, it is desirable to gain long-term selectability by using agrotechnics suitable for selection. Waste of the crops grown in our country, and if we say 100 percent of the crops grown, 30-40 percent of them are wasted without selection. The problems of feeding and distribution of potato picking warehouses in accordance with the current standards should be solved.

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