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Potato Storage Methods and Conditions

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ABSTRACT

This article describes the importance of potato in agriculture, its chemical composition, its role in human life, the physiological processes that occur during its storage, the temperature and duration of its storage, and the diseases that occur during storage.

Potato is the second most important crop after wheat, rice, and corn in terms of area. Therefore, it is called "second bread". Tuganak biochemical composition consists of 75% water and 25% dry matter. 70-80% of the dry matter is starch, its content in the pulp is 13-20%, protein - 2-3%, fiber - 1%, oil - 0.2-0.3%, sugar - 1%, ash - 0.8 is 1.0%.

In addition, it is a source of vitamins (S, V1-V3, RR, K and carotenoids), as well as mineral salts and elements. Especially young unripe tubers store up to 40 mg of vitamin C or ascorbic acid. The amount of vitamin C decreases during ripening and storage.

Mineral elements (such as calcium, iron, iodine, sulfur, phosphorus, potassium) play an important role in the strengthening and strength of the bones and muscles of a young growing human body. Potato protein contains a lot of non-exchangeable amino acids (lysine, leucine, valine, tyrosine, isoleucine, methionine, tryptophan) and is higher than other plant proteins in terms of its biological value.

If the human body absorbs 100% of egg protein, 64% of wheat grain protein and 85% of potato tuber protein. Potato tubers have been found to contain 26 elements from Mendeleev's periodic table. That's why medical scientists say that potato fried in vegetable oil increases the resistance of the human body to heat. More than 500 different delicious dishes are prepared from potatoes. Nowadays, it is the food that our people love to eat all year round. A poisonous glucoalkaloid-solanine is produced in the bark, fruit, and green buds of the plant. Its amount is 0.02 milligrams per cent or more than 20 milligrams per 100 grams of root, it is toxic for humans and animals. It is useful to produce solanine in tubers intended for seed. Because they cannot be damaged by diseases and pests until they are planted. The agrotechnical and agro-economic importance of the potato crop is also great. Because it is a demanding crop, the field soil where it is grown is soft

and cleared of weeds, and it is considered a good predecessor for many grain and leguminous crops. It is grown as a cover crop in most countries. Potatoes have been grown in Uzbekistan for 160 years, mainly for food purposes. Only unprofitable small, low-quality tubers are given to cattle. At a time when millions of people in the world are suffering from hunger and poverty, due to malnutrition, potato products are at the forefront of products that help to solve this problem.

In order to drastically reduce the mortality of the cultivated potato crop, it is necessary to prepare the fields for harvesting, avoid mechanical damage, and strictly observe the storage regime. In particular, it is necessary to pay great attention to the storage of potatoes and seed potatoes. Losses occurring during potato storage:

- ✓ due to water evaporation;
- ✓ related to the breathing of the kidneys;
- ✓ due to the bruising of the buds;
- ✓ due to disease-pest damage;
- ✓ is associated with a change in the biochemical composition of the tumor.

During potato storage, various biochemical processes take place in its nodules: conversion of starch to sugar and conversion of sugar to starch, respiration, water evaporation, etc. Respiration of stored potatoes slows down during the winter and increases again in the spring, when the buds begin to bloom. In winter and especially in spring, the ability to form pods in the damaged part of the bud decreases.

Temperature and air humidity have a great influence on the breathing of the tuganak, evaporation of water and other biological processes that take place in it. With the increase in temperature, the process of respiration and evaporation of water increases, and the weight of the pod is lost in large quantities. The process of formation of fibrous tissue in damaged nodes is especially accelerated in conditions where the temperature is high (around 20^0C), air easily enters between the injured tissues, and the relative humidity of the air is high - 90-95%. Therefore, dug potatoes should be kept at high temperature and humidity for the first 10-15 days. This is called the "treatment period". After this period, the temperature is gradually reduced to 2-3 ^{0}C.

For long-term storage, potatoes and seed potatoes should be dry, healthy, clean and free from mechanical damage. Damaged (cut and crushed) tubers during harvesting lose a lot of dry matter due to the activation of respiration and wilting processes, and rotting microorganisms enter and kill them.

Therefore, during harvesting, the main attention should be paid to protecting potatoes from mechanical damage as much as possible by means of digging mechanisms. For this, in the conditions of each farm, first of all, the harvest should be harvested from ripe varieties, starting from the fields, in which the soil moisture should be 14-16%. One of the main agrotechnological processes carried out before the harvest of potatoes is the removal or desiccation. As a result, tillering and soiling are accelerated, healthy seeds are obtained, and the productivity and quality of potato digging aggregates increases, and the crop is less damaged. In the batch of potatoes intended for sorting and packing, soil, stone, gravel and plant residues must not exceed 1% for large and medium-weight tubers, 5% for small-weight tubers, and the total weight of mechanically damaged tubers must not exceed 5%.

Mainly permanent and temporary warehouses, partially piles and bales are used for potato storage. The most convenient and effective way is to use warehouses. Because it can control temperature and humidity. Storage in containers in special refrigerated warehouses is considered to be a promising and widespread method in global potato growing.

Storage in containers prevents 12-15% damage during transportation, loading and unloading and creates conditions for good storage.

Procedure for placing potatoes in containers for storage in warehouses

Potatoes intended for long-term storage go through three periods:

First: treatment period;

Second: cooling period;

The third: forced rest period, i.e. wintering period.

The treatment period begins with the digging of potatoes, during which complex changes occur in the tuber, related to maturation and healing of damaged areas. Suberine and periderm are formed in the injured, cut and crushed areas of the tuganak, the skin thickens, the amount of starch increases, and the amount of sugar decreases. Even toxic substances (such as solanine, chaconine, caffeic acid, scopoletin) are produced against disease agents.

The treatment period lasts 10-15 days depending on the characteristics of the crop variety, during this period the temperature should be 15-20 ^{0}C, the relative air humidity should be 85-95%. During the cooling period, the physiological and biochemical processes in the bud are the most weakened, and it lasts 20-40 days. During this period, the air humidity is 90-95%, and the temperature drops from 14-18 ^{0}C every day by 1.5-2 ^{0}C.

After that, the main storage period of potatoes - wintering begins. During this period, the temperature should be 1.5-2 ^{0}C for quick-ripening varieties, 2-4 ^{0}C for medium-ripening varieties, 4-5 ^{0}C for late-ripening varieties, and air humidity should be 85-95%. The amount and composition of gas in the air also has a significant effect on the preservation of the tumor. The most favorable conditions for storing potatoes are created when the oxygen in the air is 16-18%, carbon dioxide gas is 2-3%.Active ventilation allows you to maintain the temperature and gas content between the air and the nodes at the recommended level. In addition to the method of storage, the shelf life of potatoes also depends on the growing conditions and agrotechnics. One-way fertilization at a high rate, for example, giving only nitrogen fertilizers, violating the order and regime of watering, using a large amount of desiccant, pesticides, etc., has a negative effect on the storage of potatoes. Before harvesting, potatoes should be left for 30-40 minutes on a sunny day, as a result, they will dry out and the soil will not stick. In addition, it will be possible to immediately separate those that are mechanically damaged. Sorted whole and healthy tubers can be stored in normal storage or bins. When potatoes are stored in ordinary warehouses (sheds), doors and windows should be closed tightly, if necessary, heating measures should be taken, and ways to protect them from the cold should be considered.

In the conditions of Uzbekistan, potatoes are stored in sacks in most cases. It is desirable that the place where the holes are dug has deep underground water, far from ditches, and a low slope to

one side where water does not accumulate. The width of the coils is 0.6-0.8 m, the depth is 0.7-0.9 m, and the length is 2.5-4 meters. Before placing potatoes in the bales, the inside of the container is cleaned of glass, stones, plant residues and veins. The thickness of the soil above the pile is covered up to 25-40 cm so that it does not get wet and cold, and it is made into channels for the rain water to flow. In early spring, 20-30 days before planting, potatoes are removed from the pods and prepared before planting.

First of all, stored potatoes are divided into 3 groups - small (30-50 grams), medium (50-100 grams) and large (more than 100 grams). Small and large groups of buds are cut and divided into pieces, and it is advisable to plant them in the early period. The tubers of the middle group are kept until the summer and used as seeds to obtain evening potatoes without cutting them. During storage, potatoes are often affected by fungal, bacterial and functional diseases. The most common of them are:

- Fusarium disease, dry rot:
- dry bacterial rot disease, tubers affected by this disease emit a lot of liquid and smell when applied;
- black thigh disease, in which the inner tissue of the leg dies under the influence of high temperature and lack of air exchange:
- the darkening of the flesh of the tubers occurs as a result of the oxidation of some amino acids due to damage during digging and transportation of potatoes, this darkening spoils the taste of potatoes and reduces its yield by 15-20% when planted.

When potatoes are stored in excessively humid and air-deficient conditions (in trenches), sometimes the mesh on the skin of tubers expands and small light spots appear on the surface. Care of potatoes stored in warehouses is to maintain the temperature inside the building at a normal level, to look at tubers from time to time, and to remove rotten ones. and will consist of pulling out tumors.

A comfortable temperature in the warehouses is created by artificial cooling of the room, which, in addition to reducing the death of the tubers, allows to preserve the quality of their seeds. Therefore, first of all, seed potatoes should be stored in cold rooms.

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