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Physical Properties of Cabbage and Their Changes During Storage

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Abstract:
In the process of storing vegetables, it is important to know their physical properties and to use these properties on a scientific basis. The physical properties of vegetables are of great importance in their harvesting, transportation and storage. The physical properties of vegetables are their evaporation and sweating. thermal properties, mechanical hardness, flowability. varieties by themselves include separation, porosity, etc. In the process of storage, products evaporate a lot of water, sweat, and as a result, wither.

Keywords. Fruits, vegetables, polys, products, storage, storage, refrigerator, permanent storage, storage capacity, cabbage, storage period.

Introduction

Introduction. The amount of evaporation depends on the product type, variety, morphological structure and its chemical composition. Withered products perish quickly and cannot be stored for a long time. Air temperature. high, low humidity, and the faster its movement in storage, the higher the rate of evaporation. Small vegetables lose water faster than large ones. Vegetables begin to sweat when they are placed in a bowl or piled up thickly and without an open space for air to pass through. The temperature between the cage or pile is usually higher than the storage temperature. Because of this, the vegetables on the upper floor or on the side sweat.

Table 1 Permissible standards of moisture loss in cabbage

Products Dish types	Dish types	Storage period, month	Moisture loss				
			During the storage period		On average, within a month		During the most inconvenient month
			kg/t	%	kg/t	%	%
White cabbage	In a heap	6	96	9,6	10,67	1,07	2,48
	In the container	6	92	9,2	10	0,9	2,1
	Container MGM	6	85	8,5	8	0,5	0,9

Methods

In this case, they quickly break down. Moisture on their surface creates favorable conditions for the development of microorganisms. Vegetables are frozen artificially in refrigerators and naturally ventilated with the help of external air for storing vegetables. the freezing temperature of vegetables depends on the amount of water they contain. The faster the products are cooled, the development of harmful microorganisms and biochemical processes slow down, as a result, the shelf life of the product increases and its shelf life decreases. In freezing, the water contained in vegetables freezes for different periods of time. Free water, i.e. water between the cells, freezes first, and then the water inside the cells. Vegetables in small containers and stored in bulk, small vegetables usually freeze

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quickly.

Table 2 Average rate of water evaporation from vegetables, g/t per day

Vegetables	Storage period		
	In Autumn	In winter	In spring
Cabbage	800	630	700

Often, as a result of hard freezing, the products die as a result of dehydration of cells, irreversible coagulation of proteins and plasma and other colloidal substances. Mechanically damaged products increase their death from cold. Thermal properties of vegetables are also important in their storage. They are characterized by poor heat and temperature transfer. For this reason and because of their large porosity, they cool down and heat up very slowly. Due to the poor heat and temperature conductivity of vegetables, a spontaneous heating process occurs in warehouses, and as a result, a part of the stored product either The temperature and humidity of the air in warehouses depends on the speed of their heat release during storage of vegetables. The characteristic of heat release of vegetables depends on the rate of respiration, which is calculated based on the amount of carbon dioxide released.

Because vegetables contain a lot of water, their heat capacity is high. Usually, when calculating the heat capacity of vegetables, the amount of water in it is taken into account. For example, if a tomato contains 86% water, its heat capacity is equal to 860 kcal/t °C. Knowing the heat capacity of vegetables and the amount of heat released from it, it is possible to calculate how much the temperature of the product in the warehouse has increased. For example, in a warehouse where potatoes are stored, heat release is equal to 570 kcal/t per day at 15°C. And the heat capacity is 850 kcal/t °C if there is 85% water in the tank.

Table 3 Amount of heat released during storage of cabbage products in different containers, kcal/t per day

Storage containers	Temperature, °C		
	0	2	5
1. In a heap	400	450	650
2. In the container	380	400	570
3. Container MGM	350	370	450

By determining the increase in temperature of vegetables, we can know when ventilation is necessary. Otherwise, the increase in temperature accelerates the process of heat release and respiration. As a result, the process of self-heating accelerates. At the same time, the development of microorganisms accelerates. When placing vegetables in warehouses, their mechanical ripeness is the main indicator. The mechanical hardness of vegetables is understood as their specific resistance affecting one cm^2 and is measured in kg/cm^2. The relative resistance of vegetables depends on a number of their properties, their structure, ripeness, hardness, weight and size. For example, the specific resistance of potatoes ranges from 17 to 25 kg/cm^2. Since they are of different shapes and sizes, their spillability is low. When storing vegetables in heaps, their natural slope is in the range of 10-15°C. When placed in warehouses, they slide down only when the slope of the angle is more than 40-50°. Usually, when moving vegetables from one place to another, the inclination angle of vehicles should be smaller than the sliding angle.

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Conclusion

When filling vegetable warehouses with the help of a mechanism, self-sorting is observed. In this case, large products are collected in the middle of the pile, and small ones are collected around the pile. Such agglomeration has a negative effect on air exchange between them. To prevent self-sorting of products, it is important to sort them according to their size and carry out calibration. In this case, it is necessary to clean the products from soil, sand and other impurities. Air exchange between the products during storage depends on their porosity. The number of holes in 1 m^3 pile of vegetables is called their porosity. Usually, the porosity is from 30 to 50 percent. The size of the holes between the products is also of great importance in air exchange between the piles. The porosity of vegetables depends on their size, for example, the porosity of beets is 50-55. that of carrot is 51-53. that of potatoes is 37-55%. The main task in product storage is to take all measures to prevent them from overheating and sweating. Artificial cooling of warehouses, active ventilation and storage of products in containers are important in this regard.

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