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ADVANTAGES OF STORAGE OF FOOD PRODUCTS IN A MODIFIED GAS ENVIRONMENT

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ABSTRACT

This article discusses the benefits of modified gas environments for long-term storage of meat, milk, and other food products. It has been shown that it is important to use films with a thickness of 15-50 microns that transmit oxygen gas.

Key words: sanitary requirements, meat, milk, sausage, product storage procedure, temperature standard, relative humidity, film storage, refrigerator.

ENTER

In order to ensure the microbiological safety of food products, the production process of products must be carried out in strict accordance with sanitary and hygienic requirements. In food industry enterprises (milk, meat, fish, bakery products, confectionery, fruits and vegetables, etc.) it is required to be stored based on the relevant sanitary rules and norms. General sanitary and hygiene requirements are listed below:

-availability of relevant technical regulations, sanitary rules and norms, other necessary regulatory documents for the food industry;

-sanitary requirements of the territory of economic and production zones; appropriate sanitation areas (cleaning, location and condition of garbage cans, their cleaning and disinfection);

-the presence of production and household buildings in accordance with the capacity of the enterprise, and the presence of a special laboratory in food enterprises and organizations that control the quality of products.

The tasks of the special laboratory are as follows:

-quality monitoring of raw materials, semi-finished products and auxiliary materials entering the enterprise, as well as materials stored in warehouses (input control);

-analysis at intermediate stages of the production process to prevent unusability of the finished product, check compliance with technological parameters (intermediate control);

-control the quality of the finished product and establish compliance with indicators and standardized requirements.

Also, general requirements include the cleanliness of the area where garbage, dust and other impurities can enter, as well as the cleanliness of auxiliary and household buildings. Sources of indoor air pollution with microorganisms, cleanliness of toilets and trash cans are special requirements.

These buildings should fulfill sanitary requirements and act as a reliable barrier to access the territory. Observance of personal hygiene rules by food production specialists and employees (cleaning shoes with disinfectant solutions, changing clothes, washing hands); regime of strict access to the territory and production buildings; ventilation in rooms additional requirements, such as the presence of fences at channels and technical entrances, also affect the quality of food products.

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ANALYSIS AND RESULTS

The temperature of the warehouses where the products are stored is one of the main factors affecting their shelf life, because the increase in temperature accelerates the activity of enzymes and chemical processes in the products, and leads to the increase of microorganisms. As a result, the acceleration of these processes leads to a deterioration of product quality and a decrease in shelf life. Therefore, the temperature of warehouses where food products are stored should be such that there are no conditions for the development of microorganisms, and there should be no changes in their physical and chemical state.

Depending on the types and characteristics of food products, they can be stored at temperatures ranging from -18 °C to +25 °C. For example, the best temperature for storing frozen meat, fish, fruits and vegetables is -18 °C and lower. Microbiological, chemical and physical changes that occur during the storage of food products at such temperatures become very difficult and help them to be preserved well.

The most convenient temperature for storing most food products is between 0 °C and +4 °C. This temperature is the best temperature for milk and dairy products, most fruits and vegetables, eggs, vegetable oils, meat and meat products, and perishable products in general. Products with a very low water content (flour, semolina, sugar, starch, tea) can be stored at a temperature of up to +20 °C.

It should also be said that when storing food products, sometimes high and sometimes low temperatures lead to the acceleration of chemical and biochemical processes in them, the increase of moisture in the product, the rapid growth of microorganisms and the rapid deterioration of product quality.

Effect of relative air humidity on food storage. In the storage of food products, the humidity of the places where they are stored is as important as the temperature. Air humidity is measured by absolute humidity and relative humidity.

The absolute air humidity is measured in grams of water vapor in 1 m3 of air amount is understood.

Recently, special attention has been paid to the storage of food and agricultural products in a modified gas environment. The method of storing food products in a variable gas environment is related to their storage in wrapped or refrigerated chambers and in a reduced concentration of oxygen and nitrogen, and an increased concentration of carbon dioxide (C02) gas. This method is economical and promising.

A modified gas environment is created by active and passive methods. Special generators are used for this. The work of generators is based on the burning of natural or liquefied gas.

Nowadays, mainly 3 types of gas environments are used in the preservation of food products by this method.

1. The sum of the concentration of oxygen (O2) and carbon dioxide (CO2) gases should be 21% (percent) as in normal air. However, the percentage of carbon dioxide (CO2) is much higher than in air, and the amount of oxygen (O2) is slightly lower. Most often, a gas environment with a carbon dioxide (CO2) content of 5-10% (percent), and an oxygen (O2) content of 16-11% (percent) is used. The amount of nitrogen (N2) gas is 75%.

2. A gas environment in which the sum of the concentration of oxygen (O2) and carbon dioxide (CO2) gases is less than 21% (percent). For example, it is recommended to use a gas environment with a carbon dioxide (CO2) content of 5% (percent) and an oxygen (O2) content of 3% (percent) for the storage of many apple varieties. This gas environment is not available for storing all food products. Gas environments with different proportions of oxygen (O2) and carbon dioxide (CO2) gases are used depending on the type of products, variety and climatic conditions.

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3. An environment with very little oxygen (O2), often 2-3% (percent), and no carbon dioxide (CO2) gas. It can be seen that in this environment, mainly nitrogen (N2) content is high.

Research related to the preservation of food products in modified gas environment in our country and abroad and the industrial use of this method in the preservation of some products show that the shelf life of products is 1.5-2 ,0 times longer, their the quality is maintained much better, and the additional costs incurred will be covered within 2-3 years, and warehouses working with gas environment will start to show economic results.

As we said above, a modified gas environment can be created using passive methods. A passively modified gas environment is created mainly due to the respiration of fruits and vegetables, as well as the properties of polymer packaging materials.

One of the simplest methods of storage in a modified gas environment is the method of storing products in hermetically sealed polyethylene bags.

It is known that polyethylene and other polymer materials have the property of selectively passing gases from the air through their surface.

Only polyethylene materials with a thickness of 30-60 μm have the ability to pass gases in the air to a certain extent. Polyethylene materials of high thickness, for example, 100-200 μm thick, do not transmit gases at all. That is why it is so thick products cannot be stored in hermetically sealed polyethylene bags, because due to lack of oxygen (O2), incompletely oxidized compounds of carbohydrates are formed in the products, which lead to a decrease in product quality. Summary. Recently, research conducted in different regions of our country has shown that it is possible to extend the shelf life of food products by widely using polymer materials in creating a modified gas environment.

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