

## THE HEAT RELEASE AND RESPIRATION RATE OF CHAMPIGNON BISPORED MUSHROOMS

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In recent time there has been a rapid increase in production and consumption of cultivated edible mushrooms in fresh and processed form as a result lack of protein and its imbalance in the diet of people [1, 2]. Scientists project that in the future, much of the necessary human proteins will be satisfied from the industrial production of edible mushrooms. Today in Europe and the CIS countries is one of the leading places among the cultivated mushrooms of champignon bispored [3-4].

After start storage in mushrooms continuing physiological processes, that affect on the intensity change of merchantability and loss in weight. The main among these processes are respiration rate and heat release.

Therefore, the aim of our study was to determine the effect of different temperatures, duration of storage and wave fruiting on the intensity of physiological processes in mushrooms *champignon bispored*.

*Champignons bispored* strain IBK-25 used in the studies. Mushrooms stored during 6 days at a temperature 1, 3 and 5 °C and relative humidity –  $90 \pm 1\%$ . Repeatability is four. Control was production, that kept the temperature 1°C. Mushrooms kept in cold rooms with a working volume of 6 m<sup>3</sup>.

The experiments were made with mushrooms first and second waves of fruiting.

Respiration rate mushrooms were determined experimentally in a desiccators, every day during storage, the technique based on the absorption of carbon dioxide alkalis (Ba(OH)<sub>2</sub>) with known concentration with further determination amount of alkali that the titration unreached acid (HCl). Simultaneously conducted titration with alkali products desiccators without (control).

The amount of heat released by mushrooms was determined by the amount of CO<sub>2</sub> released during aerobic respiration. Each gram of carbon dioxide, a dedicated breathing spent 2.553 kcal or kJ 10.69.

Thus, at a temperature of 1 ° C after one day of storage depending on the wave of fruiting respiration rate increases from 3.9-4.1 to 7.8-8.8 mgCO<sub>2</sub>/kg·h. This indicates that the normal process of opening hat of mushroom accelerated after cut of fruit body. Therefore after cutting, mushrooms continue to grow, affecting the intensity of their breathing. After stabilization of temperature and humidity in the chamber decreases evaporation from the surface of mushroom and growth processes are inhibited, respiration rate begins to decrease until the end of storage. On the sixth day the amount of carbon dioxide equal 2.3-2.9 mgCO<sub>2</sub>/kg·h.

On the amount of carbon dioxide released during respiration fruiting bodies of mushrooms after harvesting affects temperature storage. On the second day, at a

temperature of 1 °C, the intensity of respiration is 10,4-10,8 mgCO<sub>2</sub>/kg·h depending on the wave of fruiting at 3 °C – 11.5-12.3 and 5°C – increases to 13.8-14.4 mgCO<sub>2</sub>/kg·h. For storage temperature 5 °C from fifth to sixth day of storage, an increase in the intensity of respiration from 4.7-4.8 to 6.8-7.0 mgCO<sub>2</sub>/kg·h, indicating the beginning of aging fruit body and preparing it for opening hat mushrooms and release of spores.

Based on data from breathing intensity calculations of heat release of mushrooms. Heat release mushrooms varies similarly respiration intensity.

The highest heat release (3.6-3.7 kJ/kg·day) observed at a temperature of 5 °C storage. Lowering the temperature of storage provided to reduce heat release to 2.9-3.1 at 3 °C and 2.6-2.7 kJ/kg· for 1 day at 1 °C.

Using the results of heat mushrooms defined productivity ventilation during storage. For quick cooling of 1 ton of mushrooms from 17 to 5 °C cooled air supply should be at least 4456 m<sup>3</sup>/h. Upon reaching optimum storage temperature, ventilation activity can be maintained at approximately 645 m<sup>3</sup>/h.

Keeping quality mushrooms fruiting second wave is slightly lower than the keeping quality fruit bodies and immediately fruiting. This dependence obviously associated with reduced activity of compost, loss of nutrients, as well as the appearance of bacterial, viral and fungal infections. But, at the same time, a significant difference between the two options is most insignificant in appearance and almost invisible.

Question of influence temperature, duration of storage and waves of fruiting mushrooms of *champignons bisporod* on the intensity of the flow of basic physiological processes were considered. As a result, it was found that after starting of mushrooms storage their breathing intensity increases, which associated with the end of ripening process, and then decreases. On the second day of storage this indicator is from 10.5 to 14.2 mgCO<sub>2</sub>/kg·h, depending on the temperature and wave fruiting. Further respiration rate decreases to 2.5-3.0 mgCO<sub>2</sub>/kg·h.

Dynamics of heat release associated with respiration rate, has the same trend varies from 0.5 kJ/kg·day at the end of storage to 3.7 kJ/kg·day on the second day. Temperature, time of storage and wave fruiting mushrooms of *champignons bisporod* were main factors influence the intensity of physiological processes there.

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