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MUSHROOM POLYSACCHARIDE FOR FORTIFICATION OF DAIRY PRODUCT

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Abstract: *In our study we use as functional additives, obtained from submerged cultivated *Pleurotus ostreatus* biomass. Biomass was treated with the 80% ethanol twice. Etanol extraction remove from biomass lipids and low-molecular compounds and improve permeability of mushrooms cell wall. As preparation was taken the solid residue remaining after ethanol extractions, which contained polysaccharides. Preparation was added to milk in different concentration before the introduction of lactic acid cultures. The titrated acidity was analyzed by acid-base titration with sodium hydroxide. The water holding capacity was defined as the ratio of the weight of the fermented bunch to the weight of the total fermented milk product after storage for 24 hours from the time of preparation.*

Keywords: *polysaccharides, *Pleurotus ostreatus*, functional food, dairy product.*

INTRODUCTION

Currently, many studies of medicinal properties of biological active substances produced from mushrooms are being conducted. Some scientific research works of fungi of the family *Basidiomycetes* have shown different medicinal properties. In fact, some of the developed medicinal treatments have already appeared on the market as independent antitumor, immunostimulating or hypoglycemic preparations (Gargano, M. L., 2017).

The fact that polysaccharides are produced by edible mushrooms makes them suitable candidates for research and development of new food products and nutraceuticals. *Pleurotus ostreatus* has a wide range of medical properties. One of the most active compounds of this mushroom are polysaccharides (in particular, β -glucans), which participate in organization the cell walls. Systematic human consumption of these polysaccharides has an effect on physiological systems (immune, humoral, nervous, circulatory and digestive) and psychosocial behavior. It is

believed that products enriched with polysaccharides *P. ostreatus* maintains physical health and reduces the risk of various diseases (Giavasis, I., 2001).

Extracts of *P. ostreatus* are commonly used for enriching products, in particular dairy products. Milk is a good source of many functional ingredients as riboflavin and calcium, as well as the base for production of bifidobacteria, mineral substances, dietary fiber, fat-soluble vitamins A, D, E.

EXPOSITION

The aim of present research is the study the effect of the β -glycans, obtained from submerged biomass of *Pleurotus ostreatus*, on milk fermentation by kefir inoculum at creation of functional product. In this research we considered influence of various concentration polysaccharides mushroom *P. ostreatus* to the level of milk fermentation by cultures: *Lactobacillus* (*Lactococcus lactis* subsp. *lactis*, *Lactococcus lactis* subsp. *cremoris*, *Lactococcus lactis* subsp. *lactis* biovar *diacetylactis*, *Leuconostoc mesenteroides* subsp. *cremoris* u *Sacharomyces cerevisiae*) production of the company «Skvaska» (St. Petersburg), on the basis of commercial milk of «Valio» (Moscow) with the fat content of 1,5%. As well some physical and chemical parameters of received milk products were evaluated.

The object of our research were polysaccharides, received from biomass *Pleurotus ostreatus*, cultivated by method of submerged biomass. Biomass was extracted by double extraction with an 80% aqueous solution of ethanol. Such processing is needed to isolate the biomass of low-molecular connections and make fungal cell walls more permeable. As preparation firm residue which remained after extraction and contained polysaccharides was taken.

The preparation was added to milk in different concentration before introduction of inoculum. For analysis five samples of kefir with various concentration of the preparation polysaccharides were prepared: 0,1%, 0,25%, 0,5%, 0,75% and 1%. As well one control sample was made without preparation addition. Experiment was taken in three frequencies. During fermentation acidity was controlled by acid-base titration, and after cooling and storage during 24 hours the water holding capacity was defined (WHC).

Analyses of titratable acidity were carried out according to the indicator method described in GOST (Russian State Standard) 3624-92 «Milk and dairy products. Titrimetric methods for determination of acidity» (GOST 3624-92, 1992). The schedules of dynamics of titratable acidity are shown on the Figure 1.

From presented on the Figure 1 it is clear that the acidity of milk fermented by mesophilic *Lactobacillus* didn't increase after use of the preparation.

The water holding capacity was defined as the ratio of the weight of the fermented bunch to the weight of the total fermented milk product after storage for 24 hours from the time of preparation (P). On the Figure 2 data of WHC received during research are presented. From this data it is possible to draw a conclusion that the introduction of preparations into the milk before fermentation increased the WHC of the clots.

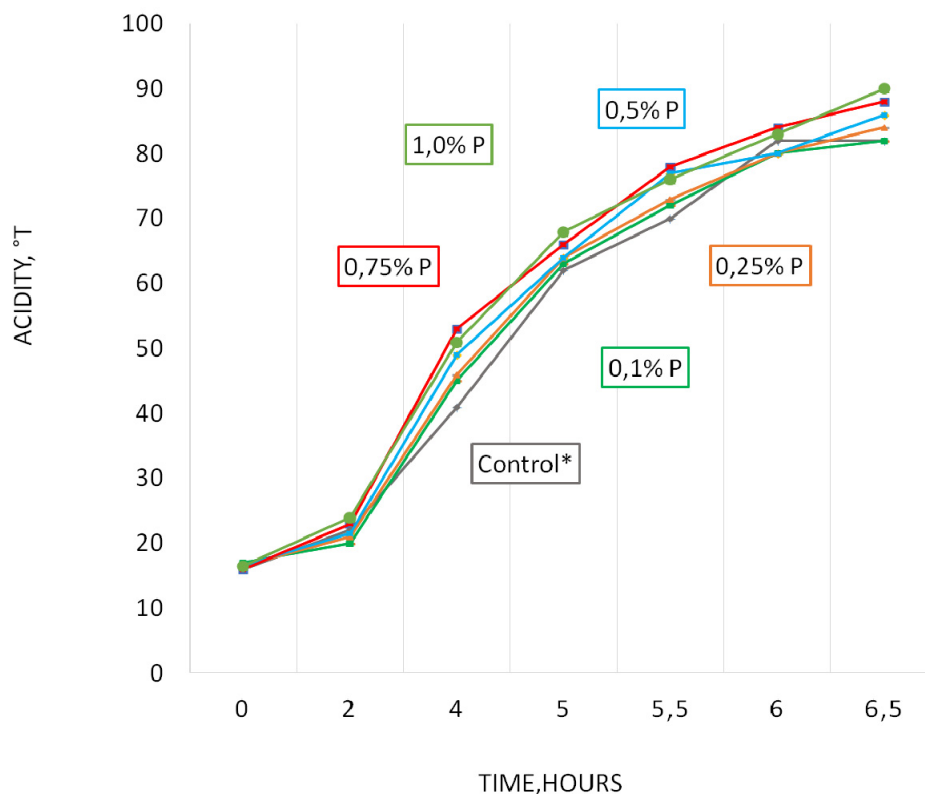


Fig. 1. Dynamics of titratable acidity during fermentation of milk by mesophilic *Lactobacillus* with the addition of preparation (P)

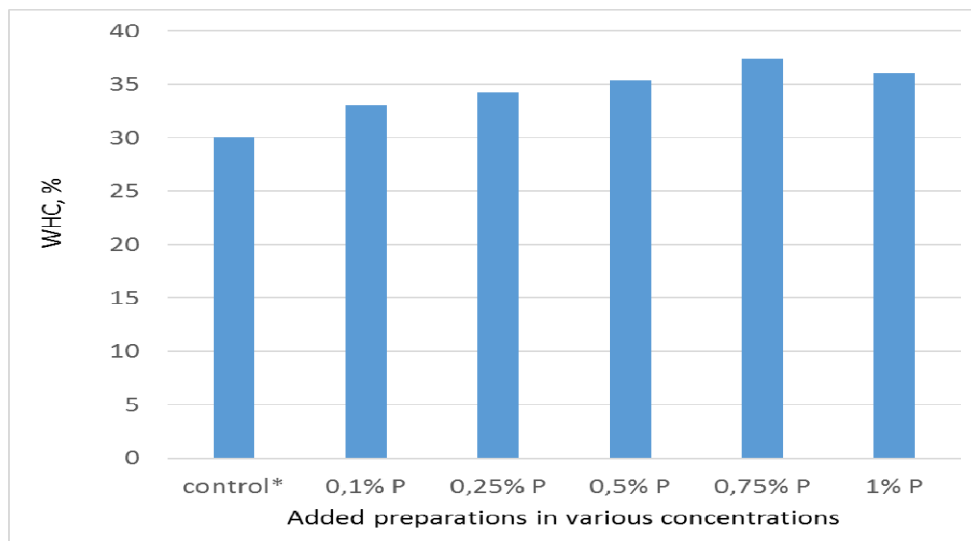


Fig. 2. Effect of preparation on the WHC of milk clots of products

CONCLUSION

1. Addition of *P. ostreatus* preparation to milk considerably does not influence on glycolytic activity of mesophilic *Lactobacillus*, used for kefir preparation, does not increase the level of titratable acidity, and consequently does not reduce the time of the milk fermentation.

2. Addition of preparation *P. ostreatus* to milk influences positively to the water holding capacity, so improves physical-chemical properties of dairy product.

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