ANTAGONISTIC ACTIVITY OF LACTIC ACID BACTERIA AGAINST YEAST ISOLATED FROM FLOUR

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Baking is a significant part of the food industry. The quality of produced food products depends strongly on the leavening agents added to the dough, as well as on the microorganisms of the flour itself. The microbiota of flour is mainly represented by lactic acid bacteria (LAB), which provide organoleptic properties, and yeast, which give structure to bread. Modern trends towards a healthy lifestyle have led to a demand for bread made using sourdough starters comprising LAB. The interaction of bread sourdough cultures and wild microbiota of flour determines the degree of control over the technological process.

The aim of the work was to investigate the interaction between strains of lactic acid bacteria - candidates for sourdough production, and strains of wild yeast isolated from rye flour.

Materials and methods. In this work, we used 56 strains of LAB of the genera *Leuconostoc* (19 strains), *Lactobacillus* (36 strains), and *Enterococcus* (1 strain). The antagonistic activity of LAB was investigated using well method; growth inhibition zones were measured after 24 hours of cultivation at 30°C. Test cultures were represented by two strains of wild yeast that were previously isolated from rye flour. The role of organic acids was evaluated by neutralizing culture fluid. The chemical nature of substances with antagonistic action was investigated by treating the culture fluid with catalase, lipase, α-amylase, and proteolytic enzymes. The protein fraction of the culture liquid was obtained by salting out with ammonium sulfate (60% saturation).

Results. As a result of the screening, 17 strains of LAB were selected, which are producers of metabolites with antagonistic action against two strains of wild yeast isolated from rye flour. The antagonistic activity was preserved in the neutralized culture liquid, therefore, it is not caused by the action of organic acids. Enzymatic processing revealed the protein nature of the antagonistically active metabolites of the culture liquid of LAB strains. This was confirmed by the study of the antagonistic activity of the protein fractions of the culture liquid The mean growth inhibition zone on the yeast test cultures was 14.1 ± 1.6 mm. The protein fraction of the *L. fermentum* c215 strain had the smallest zone of growth inhibition (11 mm), *Leuconostoc mesenteroides* 23ap strain had the largest (16.5 mm).

Conclusions. We have been identified LAB strains producing protein metabolites, possibly bacteriocins or bacteriocin-like substances that inhibit the growth of wild yeast strains. The use of selected cultures of the LAB has a positive effect on the controllability of the bread-making process by suppressing the development of unwanted wild flour microbiota.