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Combained Cultivation of Endemic Strains of Lactic Acid Bacteria and Yeast with Antimicrobial Properties

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Abstract : Introduction: At present, the simbiotics based on different genera and species of lactic acid bacteria (LAB) and yeasts are used. One of the basic properties of probiotics is presence of antimicrobial activity and therefore selection of LAB and yeast strains for their co-cultivation with the aim of increasing of the activity is topical. Since probiotic yeast and bacteria have different mechanisms of action, natural synergies between species, higher viability and increasing of antimicrobial activity might be expected from mixing both types of probiotics. Endemic strains of LAB Enterococcus faecium БТК-64, Lactobaccilus plantarum БТК-66, Pediococcus pentosus БТК-28, Lactobacillus rhamnosus БТК-109 and Kluyveromyces lactis БТХ-412, Saccharomycopsis sp. БТХ- 151 strains of yeast, with probiotic properties and hight antimicrobial activity, were selected. Strains are deposited in "Microbial Depository Center" (MDC) SPC "Armbiotechnology". Methods: LAB and yeast strains were isolated from different dairy products from rural households of Armenia. The genotyping by 16S rRNA sequencing for LAB and 26S RNA sequencing for yeast were used. Combined cultivation of LAB and yeast strains was carried out in the nutrient media on the basis of milk whey, in anaerobic conditions (without shaker, in a thermostat at 37oC, 48 hours). The complex preparations were obtained by purification of cell free culture broth (CFC) broth by the combination of ion-exchange chromatography and gel filtration methods. The spot-on-lawn method was applied for determination of antimicrobial activity and expressed in arbitrary units (AU/ml). Results. The obtained data showed that at the combined growth of bacteria and yeasts, the cultivation conditions (medium composition, time of growth, genera of LAB and yeasts) affected the display of antimicrobial activity. Purification of CFC broth allowed obtaining partially purified antimicrobial complex preparation which contains metabiotics from both bacteria and yeast. The complex preparation inhibited the growth of pathogenic and conditionally pathogenic bacteria, isolated from various internal organs from diseased animals and poultry with greater efficiency than the preparations derived individually alone from yeast and LAB strains. Discussion. Thus, our data shown perspectives of creation of a new class of antimicrobial preparations on the basis of combined cultivation of endemic strains of LAB and yeast. Obtained results suggest the prospect of use of the partially purified complex preparations instead antibiotics in the agriculture and for food safety. Acknowledgments: This work was supported by the RA MES State Committee of Science and Belarus National Foundation for Basic Research in the frames of the joint Armenian - Belarusian joint research project 13РБ-064.

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