

Evaluation of Antimicrobial Properties of Lactic Acid Bacteria of Enterococcus Genus

Authors : Kristina Karapetyan, Flora Tkhruni, Tsovinar Balabekyan, Arevik Israyelyan, Tatyana Khachatryan

Abstract : The ability of the lactic acid bacteria (LAB) to prevent and cure a variety of diseases, their protective role against infections and colonization of pathogenic microorganisms in the digestive tract, has lead to the coining of the term probiotics or pro-life. LAB inhibiting the growth of pathogenic and food spoilage microorganisms, maintaining the nutritive quality and improving the shelf life of foods. They have also been used as flavor and texture producers. Enterococcus strains have been used for treatment of diseases such as diarrhea or antibiotic associated diarrhea, inflammatory pathologies that affect colon such as irritable bowel syndrome, or immune regulation, diarrhea caused by antibiotic treatments. The obtaining and investigation of biological properties of proteinaceous antibiotics, on the basis of probiotic LAB shown, that bacteriocins, metabiotics, and peptides of LAB represent bactericides have a broad range of activity and are excellent candidates for development of new prophylactic and therapeutic substances to complement or replace conventional antibiotics. The genotyping by 16S rRNA sequencing for LAB were used. Cell free culture broth (CFC) broth was purified by the Gel filtration method on the Sephadex Superfine G 25 resin. Antimicrobial activity was determined by spot-on-lawn method and expressed in arbitrary units (AU/ml). The diversity of multidrug-resistance (MDR) of pathogenic strains to antibiotics, most widely used for treatment of human diseases in the Republics of Armenia and Nagorno Karabakh were examined. It was shown, that difference of resistance of pathogens to antibiotics depends on their isolation sources. The influences of partially purified antimicrobial preparations (AMP), obtained from the different strains of Enterococcus genus on the growth of MDR pathogenic bacteria were investigated. It was shown, that bacteriocin containing partially purified preparations, obtained from different strains of Enterococcus faecium and durans species, possess bactericidal or bacteriostatic activity against antibiotic resistant intestinal, spoilage and food-borne pathogens such as *Listeria monocytogenes*, *Staphylococcus aureus*, *E. coli*, and *Salmonella*. Endemic strains of LAB, isolated from Matsoni made from donkey, buffalo and goat milk, shown broad spectrum of activity against food spoiling microorganisms, moulds and fungi, such as *Salmonella* sp., *Escherichia coli*, *Aspergillus* and *Penicillium* species. Highest activity against MDR pathogens shown bacteria, isolated from goat milk products. High stability of the investigated strains of the genus *Enterococcus*, isolated from samples of matsun from different regions of Nagorno-Karabakh (NKR) to the antibiotics was shown. The obtained data show high stability of the investigated different strains of the genus *Enterococcus*. The high genetic diversity in *Enterococcus* group suggests adaptations for specific mutations in different environments. Thus, endemic strains of LAB are able to produce bacteriocins with high and different inhibitory activity against broad spectrum of microorganisms isolated from different sources and belong to different taxonomic group. Prospect of the use of certain antimicrobial preparations against pathogenic strains is obvious. These AMP can be applied for long term use against different etiology antibiotic resistant pathogens for prevention or treatment of infectious diseases as an alternative to antibiotics.

Keywords : antimicrobial biopreparation, endemic lactic acid bacteria, intra-species diversity, multidrug resistance of pathogens

Conference Title : ICBT 2018 : International Conference on Biotechnology and Devices

Conference Location : Prague, Czechia

Conference Dates : March 22-23, 2018