Antimicrobial potential of probiotic bacteria

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The discovery of antibiotics began a new era in the treatment of pathogens. But the copious and sometimes uncontrolled use of antibiotics resulted in a lot of problems associated with them. There are still many infections not cured by treatment, new pathogens have emerged, antibiotic-resistant bacteria came out, resistance to therapy has increased. According to the estimation of the Centers for Disease Control and Prevention, drug-resistant bacteria cause annually two million illnesses and 23,000 deaths in the United States [1]. All these problems stimulate the researchers to find new approaches for pathogens treatment. Probiotic bacteria with high antagonistic activity against pathogens could be a valuable alternative to antibiotics. Different bacteria with various spectrums of antibacterial activity are used as probiotics now. Bacillus bacteria are known as highly active antagonists because of their ability to produce antibiotics. Thus, B. subtilis, as the most productive species, devotes 4-5% of the genome to synthesis of antibiotics. Bacilli produce antibiotics differ in the structure and spectrum of activity.

We isolated and studied Bacillus probiotic strains with a wide spectrum of antagonistic activity against pathogens, but not against the microorganisms of the normal flora. These probiotic strains were highly effective in vitro against a variety of pathogenic microorganisms. Comparative study of antagonistic activity of these strains with other commercial Bacillus probiotic strains showed their advantage, espacially against Campylobacter, Yersinia, Candida (including strains multiresistant to antibiotics). Bacillus bacteria were highly effective against multiresistant S. aureus clinical strains (including MRSA) in vitro studies. Our data demonstrated efficacy of Bacillus probiotics in the treatment of acute diarrhea and prevention of antibiotic-associated diarrhea in randomized double-blind controlled clinical trials [2, 3]. We postulate that Bacillus bacteria with high antagonistic activity can be a valuable alternative strategy to combat pathogens.

Keywords: Bacillus bacteria; probiotics; antimicrobial activity

References