

ANTAGONISTIC ACTIVITY OF BACTERIOCIN-PRODUCING STRAIN *STREPTOCOCCUS SALIVARIUS* K12

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Introduction

One of the urgent problems of the modern healthcare is increasing resistance of pathogenic microorganisms to antibiotics and a further trend toward an increasing number of antibiotic-resistant strains. Therefore, it is necessary to introduce new ways to combat resistant microorganisms. In this regard, the use of probiotics in clinical practice becomes the most promising direction in the prevention of new cases of bacterial infections caused by resistant microbes. Probiotics are live microorganisms that when administered in adequate amounts confer a health benefit on the host by changing the properties of the normal microbiota. One of the most promising probiotic strains is *Streptococcus salivarius*. *Streptococcus salivarius* is a gram-positive streptococcus, which is one of the first colonizers of human oral and nasopharynx mucosa. Among *S. salivarius* there are two main well-studied strains: *S. salivarius* K12 (SsK12) and *S. salivarius* M18 (SsM18) which are currently used as oral probiotics.

Aim

To evaluate the antagonistic activity of SsK12 against ENT and oral cavity infections pathogens (*S. pneumoniae*, *S. pyogenes*, *S. aureus*), gram-negative bacteria (*E. coli*, *P. aeruginosa*) and *C. albicans*.

Materials and methods

The probiotic strain SsK12 was isolated from dietary supplement, containing at least 1×10^9 CFU per tablet. The tablet was dissolved in the enrichment broth. The resulting suspension was seeded on 5% blood agar and incubated at 35°C in 4-6% CO₂ for 48 hours. The raised culture was identified as *Streptococcus salivarius* with MALDI-TOF mass spectrometry method. The evaluation of SsK12 antagonistic activity was carried out using a perpendicular streak technique. The daily SsK12 culture was inoculated as heavy streaks with a loop at one side of Petri dish with the Muller-Hinton agar (MHA) and incubated for 24 hours at 35°C in anaerobic conditions. It was supposed that bacteriocins would diffuse over the whole area of the agar media. On the next day *S. pneumoniae*, *S. pyogenes*, *S. aureus*, *E. coli*, *P. aeruginosa* and *C. albicans* clinical isolates were streaked at the clear side of MHA Petri dish. MHA Petri dish inoculated with SsK12 (one part) and with the respective clinical isolates (another part) streaked perpendicularly on the same day was used as the control.

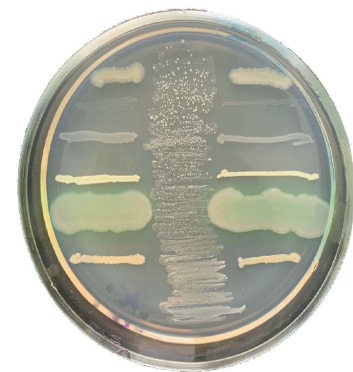
Results

There was no growth of *S. pyogenes* on the Petri dish with SsK12 daily culture; the growth of a few colonies of *S. pneumoniae* was noted. The growth of *S. aureus*, *E. coli*, *P. aeruginosa* and *C. albicans* was noted along the inoculated streak (Pic. 1).

On the control Petri dish with simultaneous inoculating of the SsK12 strain and the test cultures, the growth of all the test isolates was noted (Pic. 2).



Picture 1. Experimental Petri dish



Picture 2. Control Petri dish

Conclusions:

1. SsK12 possesses perfect antagonistic activity against *S. pyogenes* and good activity against *S. pneumoniae*.
2. There was no antagonistic activity of SsK12 against *S. aureus*, *E. coli*, *P. aeruginosa* and *C. albicans*.
3. SsK12 antagonistic properties make it possible to use this probiotic strain for prophylaxis of recurrent ENT infections.

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