IDENTIFICATION OF NEW ANTIMICROBIAL PEPTIDES FROM THERMOPHILIC BACTERIA

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Bacteriocins comprise a huge family of ribosomally synthesized peptides. They are heat-stable, produced by various bacteria and have antibacterial activity towards closely related strains, although there are an increasing number of bacteriocins reported to have broad range antimicrobial activity. Interest in bacteriocin research has gained great momentum due to its potential as both a natural food preservative and as next-generation antibiotics targeting the multiple-drug resistant pathogens. They are especially attractive for various applications.

Thermophilic bacilli are a potential contaminant in various industries that maintain higher temperatures (40-65°C) in the manufacturing process as food industry. Bacteriocins acting against thermophilic bacteria could be a solution to this problem. Thermophilic bacteria proteins are usually thermostable, therefore bacteriocins derived from these bacteria could be also thermostable, even with a higher thermostability than those encoded in mesophilic bacteria.

This study aimed to synthesize and characterize new antibacterial peptides. We analyzed genomes of thermophilic bacteria species and identified gene clusters encoding potential bacteriocins. One novel bacteriocin (circularin-like) was encoded in *Geobacillus thermoleovorans* strain. It is post-translationally modified head-to-tail cyclized peptide, whose N- and C-termini are linked by a peptide bond. Another one (lacticin-like) was found in genome of *Parageobacillus thermoglucosidasius*. It is leaderless bacteriocin and do not contain unusual post-translational modifications. We have cloned the bacteriocin biosynthesis genes into expression vectors and performed their heterologous biosynthesis in *Escherichia coli* to obtain active antibacterial peptides. The synthesized bacteriocins will be purified, characterized and evaluated for their antibacterial activity against various bacteria strains including pathogens.