

Production and Screening of Bacteriocin with a Broad Antimicrobials Spectrum of *Lactobacillus*

C.S. SIVA PRASATH, GEO. S.M. ANISHKA AND S. PRAKASH

ABSTRACT

The main purpose of these works is to reveal antimicrobial activity of bacteriocin produced by *Lactobacillus* species. It has large spectrum of inhibition against photogenic food spoilage microorganisms etc., *Lactobacilli* are important organisms recognized for their fermentative ability as well as their health and nutritional benefits. They produce various compounds such as organic acids, diacetyl, hydrogen peroxide and bacteriocin or bactericidal protein during lactic fermentation. *Lactobacilli* was cultured in MRS broth and incubated for 24 hrs. After incubation the broth was centrifuged and supernatant was collected. The antimicrobial activity of the bacteriocin was assayed by agar spot test using gram positive and gram negative bacteria. The thermo stability of the antibacterial activity was determined and assayed for bacteriocin. The antimicrobial substance produced by the strain was thermo resistant for 30min at 100°C. Maximum activity in composed medium was achieved at initial pH of 5.5 and incubation period of 48hrs at 30 – 37°C. The supernatant was subjected to UV treatment by exposing the supernatant to UV light. Plasmid was isolated using STE buffer and no plasmids were suggesting that the genes encoding bacteriocin production were located on the genome.

See end of the article for authors' affiliation

C.S. SIVA PRASATH
Department of
Biotechnology, Udaya
School of Engineering,
Ammandivilai,
KANYAKUMARI
(T.N.) INDIA

Bacteriocins are proteinaceous with inhibitory activity against more or less related genera (Nes *et al.*, 1996). Bacteriocins producing bacteria have been isolated from variety of inhibits. Bacteriocins have been characterized from many different bacterial genera, especially from lactic acid bacteria (Jack *et al.*, 1995). Bacteriocins are the protein and peptide antibiotics that may exert bioactivity against the closely related strains. Bacteriocin has been described in several genera of both gram positive and gram negative bacteria. Their widespread occurrence may be related to an ecological role. As general rule, they act through specific receptors on the target cells and therefore, have a restricted activity spectrum, usually on strains taxonomically related to the producers (Crupper and Iandolo, 1996).

Bacteriocins are generally defined as the heat stable, higher molecular weight proteins produced by bacteria that kill other micro organism. There is no criteria specified in 1976 to classify substances as bacteriocin (Tagg *et al.*, 1976). Bacteriocins are a heterogeneous group of antibacterial peptides and protein characterizes by their ability to inhibit closely related, and sometimes more distantly related strains of bacteria (Jack *et al.*, 1995). It has been proposed that bacteriocins may play a key role in bacterial population dynamics (Riley,

1998). In particular, the bacteriocins may give the producing strain a competitive advantages by killing bacteria in the same environment competing for the same resources (Odenyo *et al.*, 1994). The production of bacteriocins by lactic acid bacteria has been known for many years. According to the original definition, the term bacteriocin refers to proteins of the colicin type, characterized by lethal biosynthesis, intra specific activity and adsorption to specific receptor. Those produced by gram positive bacteria fit closely to the classical colicin model (Tagg *et al.*, 1976).

Bacteriocins are ribosomally synthesized possessing bactericidal activity that are rapidly digested by proteases in the human digestive track. The genes encoding bacteriocin production and immunity are usually organized in operon cluster (Nes *et al.*, 1996). Lactic acid bacteria are widely used as starter culture and play an important role in food preservation, microbiological stability and production of aroma compounds. Bacteriocins have application in genetic markers and for maintenance of plasmid bearing bacterial cells propagated in continuous cultures. The genetic information for the production of bacteriocins is often encoded by the plasmid genes. In such cases, treatment of the producer strains with plasmid curing (elimination) agents such as acridine orange

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