

**PURIFICATION AND CHARACTERIZATION
OF BACTERIOCINS
FROM LACTIC ACID BACTERIA**

by

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in fulfillment of the requirement of the degree of
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CERTIFICATE

This is to certify that the thesis entitled "Purification and Characterization of Bacteriocins from Lactic acid Bacteria", being submitted by Sanghamitra Mukhopadhyay to the Indian Institute of Technology, Delhi, for the award of Degree of Doctor of Philosophy, is a bonafide research work carried out by her under my supervision and guidance. The results obtained in this thesis have not been submitted to any other University or Institute for the award of any other degree or diploma.

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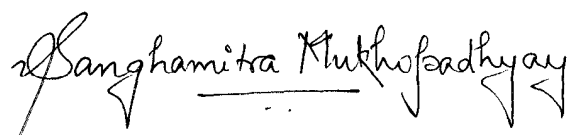
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ABSTRACT

Current consumer demand for commercially processed food and growing awareness to avoid chemical preservatives have led to an upsurge in search for safe and food-grade preservatives of biological origin. Antibacterial proteins, such as bacteriocins from lactic acid bacteria have been very popular in this regard as they are safe and have potential to control both spoilage and pathogenic bacteria.

Bacteriocins are a heterogeneous group of antibacterial proteins that vary in their spectrum of activity, mode of action, molecular weight, genetic origin and biochemical properties. There is a wide range of bacteriocins produced by many different lactic acid bacteria. Bacteriocins can be introduced into food by two methods: as a pure compound or, in case of fermented products, by the use of bacteriocin producing lactic acid bacteria as starter culture. A wide variety of such strains are routinely employed as starter culture in the manufacture of dairy, meat, vegetables and bakery products.

Bacteriocin production by *Enterococcus* species has been known for many years. It is evident from the previous studies that bacteriocins from *Enterococcus* species have promising potential as food biopreservative. However, considerable research and testing is required before these

bacteriocins can be considered useful in food system as, relatively, very few bacteriocins from the *Enterococcus* species have been fully characterized. In order to study their biochemical and antimicrobial properties and to determine their effectiveness in food systems, it is necessary to obtain these bacteriocins in pure and concentrated form.

In the present study, an attempt has been made to purify and characterize bacteriocins produced by three strains of *Enterococcus faecium* viz., AA13, G 16 and P21, isolated from Spanish meat products. In addition, the antimicrobial activity of these bacteriocins against a wide spectrum of lactic acid bacteria and food-borne pathogens was determined. Media for the growth of *Enterococcus faecium* strains and bacteriocin production was evaluated and finally the mode of action of the bacteriocins was determined.

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