

## CHARACTERISATION OF *LACTOBACILLUS PLANTARUM* STRAINS ISOLATED FROM FOOD SOURCES

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**Keywords:** *Lactobacillus plantarum*, antimicrobial activity, RAPD-PCR, tempeh, chillibo.

### Introduction

Lactic acid bacteria (LAB) predominate the microbial flora of many oriental and western-style food products, thereby extending the shelf life by inhibition of microbial pathogens and spoilage organisms. The biopreservative effect can be attributed to antimicrobial peptides (bacteriocins) which exhibits the desired antimicrobial activity but no unwanted metabolic properties. This approach will be easier to control then relying on the growth of the natural flora of LAB that might be present in the product (Anderson, 1986; Klaenhammer, 1988; Daeschel, 1989). Although much effort is now being devoted to the applications of biopreservation to various non-fermented western-styled foods, the applications to Asian foods are not well examined. The objectives of this study were to isolate, identify and screen the LAB strains for antimicrobial activity against selected indicator organisms. In addition, the LAB strains were characterised by randomly amplified polymorphic DNA (RAPD) analysis.

### Materials and Methods

Lactic acid bacteria were isolated from tempeh and chillibo. The species designation of the strains were determined by traditional bacteriological and biochemical techniques for phenotypic identification, in addition to use of the commercial API50E enzymatic kit, and the species specific primers (Lbp1: 5'-AATTGAGGCAGCTGGCCA-3' and Lbp2: 5'-GATTACGGGAGTCCAAGC-3') in PCR reactions. The isolated LAB strains were screened for antimicrobial activity towards selected indicator organisms by used of deferred and spot-on-lawn assays (Ahn and Stiles, 1990). The RAPD analysis of the LAB strains were as described previously (Senthil et al. 1998).

### Results and Discussion

A total of 169 and 93 single colonies of LAB on PCA or MRS-S agar plates were selected randomly from the tempeh and chillibo samples, respectively. However, only 23 strains were identified as *Lactobacillus plantarum* based on the biochemical and phenotypic tests as well the results of the species specific primers (Lbp1 and Lbp2) which generated a 300 base pairs DNA band for all the 23 strains. Based on the results of the deferred and spot-on-lawn tests using several indicator organisms, only two strains isolated from tempeh (HA1 and HB1) were found to exhibit antimicrobial activities. Three primers, GEN15001 (5'-GTGCAATGAG-3'), GEN15009 (5'-AGAAGCGCTC-3') and GEN25014 (5'-CATAGCCCTT-3') were used to analyse the whole set of 23 *Lb. plantarum* strains. Four, six and five RAPD types were apparent among the *Lb. plantarum* strains from the three primers, respectively. When the results of the three primers were combined, the 23 strains of *Lb. plantarum* could be classified into twenty RAPD types, with the two strains showing good antimicrobial activity separated into different RAPD type.

### Conclusions

This study based on traditional biochemical phenotypic tests in combination with PCR-based methods has been successfully used to isolate and identify *Lb. plantarum* from tempeh and chillibo. Two strains were observed to exhibit good antimicrobial activities. The RAPD analysis showed that the *Lb. plantarum* population genotype is highly diverse.

### References

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