

ENRICHMENT OF MILLET FOODS FOR DIETARY BIOACTIVE MOLECULES THROUGH FERMENTATION

ABSTRACT

Ferulic acid known for its antioxidant, antidiabetic, anticancer and antihypertensive properties is a hydroxycinnamic acid derivative ubiquitously present in the plant kingdom. Due to its health beneficial effects, food industries are improving their processed products for enrichment of ferulic acid. In this regard, importance of the enzyme feruloyl esterases has attracted the attention of food processing industries owing to its ability to release bound ferulic acid making it available in free form. The therapeutic properties of ferulic acid have also instigated research towards exploration of unique feruloyl esterases for use in the development, and preparation of functional foods.

The thesis describes isolation and characterization of Feruloyl esterase producing probiotic lactic acid bacteria, *Lactobacillus fermentum* CFR5, from pearl millet porridge (kambu koozh). The zymogram assays were useful for rapid screening for the enzyme producing bacteria. The properties of the enzyme and its ability to release bound ferulic acid, specifically the activity retention in presence of metal ions, were suited for applications in millet processing. The enzyme activity increased free phenols in Indian traditional millet fermented food and thereby its antioxidant properties. Further, the fermented food retained aminoacid content and significantly reduced anti-nutritional phytic acid, trypsin inhibitors and tannins. Feeding the formulated millet porridge to diabetic rats reduced free radical formation with concomitant increase in antioxidant enzymes, superoxide dismutase, catalase and glutathione peroxidases. Thus the results apart from establishing the scientific basis of nutritional benefits in the traditionally fermented millet food, describes a cleaner technology for its preparation.