PREFACE

Xylanses are the important group of carbohydrate active enzymes which have wide range of industrial applications due to its capability to depolymerize xylan, the second most abundant polysaccharide on earth. The enzyme is used for production of fermentable sugars, deinking and recycling of waste paper, biobleaching of paper pulps, treatment of livestock feeds, as an ingredient in detergent for stain removal and many more. In nature xylanases are produced by wide variety of bacteria and filamentous fungi. This industrially important enzyme can be produced in a cost effective manner by using inexpensive carbon sources to support the growth and metabolic activities of xylanase producing microbial strains. Agro residues are low cost xylan rich raw materials that can be used to achieve this goal. Agro residues generated from farming are recycled either by using them as feed for livestock or applying them back in the same field as organic manure. However, due to technological advances the farming has become highly mechanized and depends mainly on commercial fertilizers and thus agriculturally generated crop residues now largely being accumulated as wastes and creates environmental pollution. Lignocellulose present in these agro residues are potential source of fermentable sugar for production of several value added products. Xylitol, a five carbon sugar alcohol, is used as dietary sugar substitute or artificial sweetener. It is widely used in food and pharmaceutical industries due to low calorie content, anti cariogenicity, tooth rehardening, preventive against otitis, ear and upper respiratory infection etc. Due to its health promoting effect the demand of xylitol in the global market is increasing rapidly. Industrial production of xylitol is based on catalytic hydrogenation of pure xylose under high temperature and pressure, which is highly expensive. Therefore, biotechnological intervention for xylitol production is most warranted. Lignocellulosic xylan polymers can be depolymerized by microbial xylanases to xylose that can act as substrate for enzymatic conversion to xylitol. Therefore, the research work presented herein aimed to isolate microorganisms from various environmental samples with the capability to produce xylanase and to convert xylose to xylitol. The production process of microbial xylanase was optimized through conventional one factor at a time as well as by statistical approaches using wheat bran as low cost substrate in submerged fermentation. The xylanases produced were characterized and employed for saccharification of wheat bran for reducing sugar released. The released sugars were further fermented to xylitol in sequential and simultaneous saccharification and fermentation experiments.