INTRODUCTION

Lignocellulose, the most abundant natural biopolymer on earth, is an important source for the production of various industrially useful enzymes (Singh *et al.,* 2015). The huge amount of residual plant biomass considered as "waste" can potentially be used to produce various value added products like biofuels, animal feeds, chemicals, enzymes, etc., The demand for industrial enzymes, particularly of microbial origin is ever increasing owing to their applications in a wide variety of processes (Chapla *et al.,* 2010).

Globally, large amount of agricultural residues is produced, most of which are burnt as waste disposal and a small amount is used for mulching for fuel or as fodder. Three types of energy can be produced from lignocellulosic residues by thermo-chemical or bio-chemical processing, liquid fuel such as ethanol or pyrolysis oil, gaseous fuels such as bio gas (methane) and electricity (Chum *et al.,* 2011).

Plant cell walls, the major reservoir of fixed carbon in nature, contain three major polymers: cellulose, hemcelluloses including xylans,mannans,glucans and lignin. The hemicellulose system involves, among other endo 1-4-β –D xylanase [E.C.3.2.1.8] which cleaves internal bonds in xylan chain, β-xylosidases [E.C.3.2.1.37] which cleaves xylooligosaccharides to produce xylose (Beg *et al.,* 2001).

Xylans are found mostly in the secondary walls of plants and can represent upto 35% of the total dry weight in certain plants. Due to its complex structure the biodegrdation of xylan requires the synergistic action of several hydrolytic enzymes for efficient and complete breakdown (Biely,1985).

The use of enzymes dates from much longer than their ability to catalyze reactions was recognized and their chemical nature was known. The first complete enzymatic industrial process was developed in the year 1960. Starch processing, which is undertaken in two steps, involves liquefaction of the polysaccharide using bacterial alpha amylase followed by saccharification catalyzed by fungal glucoamylase. After the second world war, enzyme applications rose due to advances in industrial microbiology and biochemical engineering (Illanes,2008)

Nowadays enzymes are employed in many different areas such as food, feed detergent, textiles, laundry, tanning, as well as pharmaceuticals, cosmetics and fine chemical industries. Industrial applications account for over 80% of the global market of enzymes (Van Oort, 2010).

Hemicellulolytic microorganisms play a significant role in nature by recycling hemicelluloses, which are considered to be the main components of plant polysaccharides. Xylanases catalyze the hydrolysis of xylan, the major constituent of hemicelluloses. The use of these enzymes could greatly improve the overall economy of processing lignocellulosic materials for the generation of liquid fuels and chemicals. Recently cellulose free xylanase have received a great attention in the development of eco-friendly technologies in the paper and pulp industry (Kulkarni*et al.,* 1999).

Xylano pectino cellulolytic enzymes are the industrially important enzymes which specifically degrade the cellulose, xylan and pectin. Xylanase enzyme finds a prime range of applications in the paper and pulp industry, which had become an alternative bleaching technology there by reducing chlorogenic compounds. Apart from the paper industry, it also finds a wide range of applications in the extraction of vegetable oil, animal feed, fruit juice clarification, textile industry and bio ethanol production (Beg *et al.,* 2000; Polizeli *et al.,* 2005).

In order to reduce the environmental pollution, the lignocellulosic biomasses are used for the xylanase prodction in a biotechnological manner and to satisfy the industrial need,it is necessary to explore the lignocellulosic biomasses. The present study was carried out in the following aspects in order to find out a suitable alternative technology for enzyme production and to utilize the same for industrial applications.

- Conversion of lignocellulosic biomass
- Screening of xylanolytic bacteria from soil samples

- Selection of the best isolates and its gene sequencing
- Optimizing the cultural conditions of *Bacillus subtilis* for the xylanase production
- Purification and characterization of xylanase from *Bacillus subtilis*
- Applications of the crude and purified xylanases in varied industries.