SHORT COMMUNICATION

APPLICATION OF HYDROLYTIC ENZYME FROM THERMOPILE FUNGUS IN HYDROLYSIS OF LINGO CELLULOSE

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Abstracts: Lignocelluloses biomass refers to plant biomass that is composed of cellulose, hemicelluloses, and lignin. The carbohydrate polymers (celluloses and hemicelluloses) are tightly bound to the lignin. Lignocelluloses biomass can be grouped into four main categories: agricultural residues (including, corn stopper and sugarcane biogases), dedicated energy crops, wood residues (including saw mills and paper mill discards) and municipal paper waste.

Keywords: Enzyme, Fungus, Cellulose

INTRODUCTION

Lignocelluloses are the most abundant biomass available on earth. It has attracted considerable attention as an alternate feed stock and energy resource because of the large quantities available and its renewable nature. Lignocelluloses biomass in the form of wood fuel has a long history as a source of energy. Hydrolytic enzyme enhances the decomposition of lingo-cellulose and hemicelluloses to smaller molecules (Hendricks and Zeeman, 2009). It can be supposed that this enhanced fluidity of material for anaerobic digestion treated with enzymes. Hemicelluloses are not digestible; they can be selectively fermented by bacteria, yeast and fungi. The polysaccharides yielding pentose's on hydrolysis are caused pentoses. Xylem is an example of a pentose. Cellulose, Hemicelluloses shows variability in both structure and composition. Hemicelluloses are that they are composed mainly of the three Hexodes

MATERIAL AND METHOD

Present investigation at Hari Singh Guar University Sagar (M.P.) By using two substrate (wheat bran and saw dust), firstly 4ml of culture filtrate was taken and 0.1g of substrate (wheat bran, saw dust) are added in different tubes as labeled as reaction and also set a control tubes, after that it can be incubated at 50ºC in water bath at different interval of time (1hrs, 2hrs, 3hrs, 4hrs, 6hrs, 18hrs). After the incubation of 1hrs 0.5ml of solution were taken from reaction tube in another tube and added 0.5ml of distilled water and 3ml of DNS reagent for stopping for stopping the activity. Same processes are done for different interval of time (2hrs, 3hrs, 4hrs, 6hrs, and 18hrs). All the tubes were boiled, boiling water for 5min after that 5ml of distilled water were added in each tubes. Vortex the each tubes and absorbance was taken at 540 nm. The amount of reducing sugar liberated was calculated with the standard curve of glucose.

RESULT

In the study, the three fungi were used for xylanase production in solid state cultures at 45ºC (*Thermomyces lanuginosus, Aspergillus terreus, Malbranchea* Pulechella *var. Sulfurea*).For 7 days on wheat bran moistened with Czapeks mineral medium. The results are presented in table no.4.1 shows the profile of reducing sugar the fungi *Malbranchea* Pulechella var. Sulfurea using the wheat bran as substrate in different interval of time (1hrs, 2hrs, 3hrs, 4hrs, 6hrs, 18hrs).it releases the highest amount of reducing sugar in 18hrs 239.389µg/ml at O.D 0.817 and lowest amount of reducing sugar in 1hrs 727.71µg/ml at O.D 0.277 the amount of releases reducing sugar were increased with respect of increasing of time from 1hrs to 18hrs.in table no. 4.2 shows the profile of reducing sugar by the fungi *Aspergillus terreus* using the wheat bran as substrate in different interval of time(1hrs, 2hrs, 3hrs, 4hrs, 6hrs, 18hrs).it releases the highest amount of reducing sugar in 18hrs(1944.321µg/ml) at O.D (0.67).the lowest amount of reducing sugar in 1hrs (774.1456 µg /ml) at O.D (0.292).

By using the sawdust as a substrate its releases negligible amount of reducing sugar with all the three fungi (*Aspergillus terreus*, *Thermomyces lanuginosus*, *Malbranchea pulechella var. sulfurea.)*. In this work, from all the three species (*Thermomyces lanuginosus, Aspergillus terreus,Malbranchea pulechella var. sulfurea), Malbranchea pulechella var. sulfurea* releases high amount of reducing sugar with WB and *Malbranchea pulechella* var. *sulfurea* releases negligible amount of reducing sugar with saw dust.

As compare to *Malbranchea Aspergillus terreus* releases less amount of reducing sugar with WB also in saw dust. As compare to both of these (*Malbranchea pulechella var. sulflurea, Aspergillus terreus*) *Thermomyces lanuginosus* releases less amount of reducing sugar with bran, also in saw dust.

High amount of reducing sugar releases within the incubation periods of 18 hrs.The enzymatic degradation of plant polysaccharides is a process of fundamentals important in nature furthermore polysaccharides degrading enzymes are very important in many industrial processes. Therefore the study of enzyme is an important field of research the degradation of plant cell wall is a complex process that involves wide ranges of enzymes mainly produced by microorganism.Temperature is one of the important environment factors that play a key role in survival and growth microorganism in nature. Mostly the thermophilic moulds comparatively growing at high temperature procedures thermostable enzymes which have industrial important. They can utilize complete organic matter such as lignocelluloses for their growth by virtue of extra cellular thermos table hydrolytic enzyme they produces this hydrolytic properties is tightly used for waste managements. Thermostable enzyme offers potential benefits in the hydrolysis of lignocellulosic substrate higher specific activity decreasing the amount of enzyme enhanced stability allowing improved hydrolysis performance and increased flexibility with respect to process configuration. The processing of lignocelluloses biomass into value-added chemicals via fermentation is act at a primitative stage of development when compared with the chemical processing of petroleum and natural gas we strongly believe that give time for process improvements in this fields bioconversion of lignocellulosic will be in high demand.*Aspergillus terreus* reported as the best produce reducing sugar in solid state fermentation. To evaluate the effect of different incubation period on production of period of the medium range was varied from 1hrs to 4hrs and high range was 18hrs.

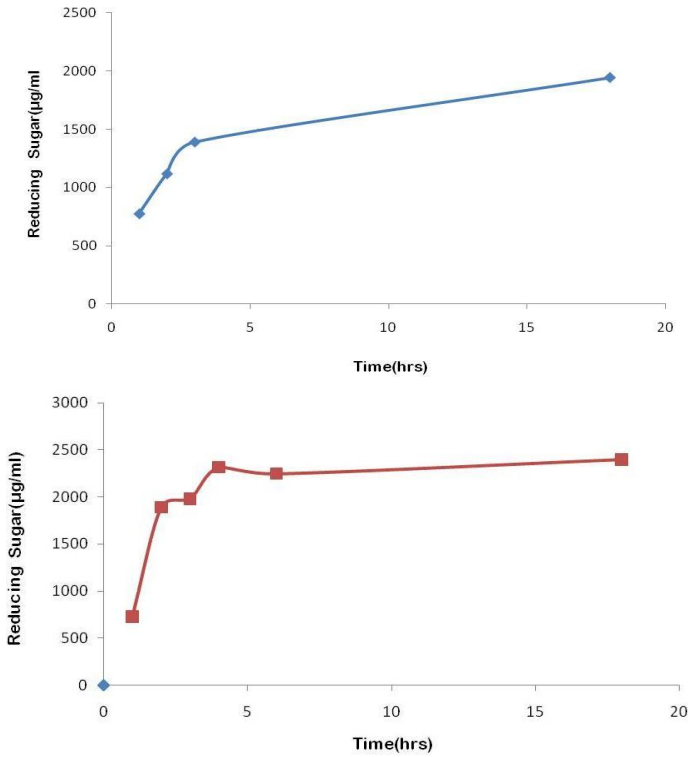

Fig – 4.1: Liberation of Reducing sugars from wheat bran by *Malbranchea pulchella var. sulfurea and Aspergillus terreus.*

Table no.4.2: Liberation of Reducing sugars from wheat bran by *Malbranchea pulchella var. sulfurea and Aspergillus terreus*

Incubation time	O.D	Reducing sugar	0.D	Reducing sugar
1hrs	0.292	774.14	0.277	727.71
2hrs	0.403	1117.76	0.652	1888.59
3hrs	0.491	1390.19	0.682	1981.46
4hrs	0.08	117.85	0.79	2315.80
6hrs	0.266	693.65	0.768	2247.7
18hrs	0.67	1944.32	0.817	2399.38

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