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A REVIEW OF CONVERTION OF CELLULOSE FROM SAW-DUST TO GLUCOSE

BY

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DECLARATION AND APPROVAL

I Wakube Julius declare that the information here is my original work unless where reference has been cited. The work has never been submitted to any other institution for any award or publication

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DEDICATION

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ABSTRACT

From the reviewed work, Wood saw dust (WSD) after lignocellulosic saccharification by different hydrolysis methods is more efficient for glucose production as, its contains cellulose and hemi-cellulose at higher levels 5.52±0.05 % (w/v) and 0.990±0.001% (w/v), respectively. Cellulose and hemicellulose account for about a quarter of whole biomass in all land plants. A pretreatment method using chemicalhydrolysis and enzymatic conversion from starch into fermentable sugars was investigated by Joung Woo Han, (2005). The WSD was hydrolyzed at1.69 g/l, using a crude culture filtrate Aspergillus fumigatus at pH 5.0 and 30ºC in acetate buffer 50 mM, while 23.3 g/l was with 1 N sulfuric acid (H_2SO_4) treatment. Aonla pomace waste was used as substitute to acid because of high acidic nature. Optimum conditions for lignocellulosic saccharification was discussed in this work.

Megersa, S., & Feleke, S. (2020). Also carried out combined pretreatments of steam and mild NaOH with white rot fungi (WRF) on sawdust samples from Eucalyptus globulus and Cupressus lusitanica were investigated. Samples of the pretreated sawdust samples were then subjected to the enzymes from the hydrolytic wood rot fungi for hydrolysis into fermentable sugars after measuring. It was observed that lignin, cellulose and hemicellulose losses of the two sawdust types increased with the increasing incubation days but lignin and hemicellulose were preferentially degraded than cellulose. Sugar yield obtained from the sawdust pretreated in the combination of NaOH with WRF and steam with WRF was significantly higher compared to the yield obtained from the NaOH and steam alone. It was also reviewed thatThree top, but with no significant differences ($P \leq 0.005$), sugar yields of 7.78 g/l, 7.54 g/l and 7.51 g/l were obtained.

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND

Cellulose is the name given to a long chain of atoms consisting of carbon, hydrogen and oxygen arranged in a particular manner it is a naturally occurring polymeric material containing thousands of glucose-like rings each of which contain three alcoholic OH groups (Bertran,M.S. and Dale,B.E,1985). Its general formula is represented as $(C6H_{10}O_5)$ n. The OH-groups present in cellulose can be esterified or etherified, the most important cellulose derivatives are the esters(Bradbury, J.H. 2006). Cellulose is found in nature in almost all forms of plant lifes, and especially in cotton and wood. A cellulose molecule is made up of large number of glucose units linked together by oxygen atom. Each glucose unit contains three (3) hydroxyl groups; the hydroxyl groups present at carbon-6 is primary, while two other hydroxyl are secondary (Cereda, M.P and Matos M.C 1998). Cellulose is the most abundant organic chemical on earth more than 50% of the carbon in plants occurs in the cellulose of stems and leave wood is largely cellulose, and cotton is more than 90% cellulose. It is a major constituent of plant cell walls that provides strength and rigidity and presents the swelling of the cell and rupture of the palms membrane that might result when osmotic conditions favor water entry into the cell(Eliasson, A.N 2004). Cellulose is fibrous, ought, water-insoluble substances, it can be seen in cell walls of plants, particularly in stalks, stems, trunks and all woody portions of the plant. Cellulose is polymorphic, that is to say there are many different crystalline forms that reflect the history of the molecule.

It is almost impossible to describe cellulose chemistry and biochemistry without referring to thosedifferent forms(J. Mendham, Denney RC,Barns JD,Thomas M/K, 2002). Cellulose is gotten from plant materials, celulose is also found in protozoa and in the gut of insects such as termites.

Very strong acids can also degrade cellulose, the human digestive system has little effect on cellulose (Yudkinj, Edelman J, and HoughL, 2000). Cellulose is a linear polymer of Danhyroglucopyranose monomers connected by β-1,4-glycosidic bonds(Zhang et al, 2012)and its degree of polymerization varies typically between 2000 to 27000glucan units, depending on the

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