

Maximization of the bioethanol concentration produced from office paper waste using amicon- integrated SPVC-PAMPS polymeric membrane

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This work aims to valorize the using of the municipal solid waste as a raw material for the production of bioethanol. The office paper waste with optimum concentration of 6% was pretreated with 15% HCl and autoclaving followed by enzymatic degradation in order to increase the liberated glucose units to its maximum of 15.7 mg/ml. The liberated glucose units were subsequently fermented by *Hanseniaspora uvarum* (accession number OP800106) into bioethanol. One Variable At Time (OVAT) optimization process was performed in order to reach the maximum bioethanol production. The optimum conditions revealed that the inoculation of 5% (v/v) of the yeast pre-culture into the waste hydrolysate at pH 5 and temperature 30oC under anaerobic conditions would result in the production of 5.3 mg/ml bioethanol. The concentration of the produced bioethanol was increased from 31 to 79% using amicon cell-integrated polymeric membrane. The membrane which is a blend of Sulphonated polyvinyl chloride and 2-acrylamido-2-methyl-1-propanesulfonic acid (SPVC-PAMPS) was characterized using FTIR, Raman spectroscopy and XRD. While it's morphological appearance and thermal stability were investigated using SEM and TGA, respectively. After bioethanol purification, the total flux of the permeate was measured as 2530,659 mg/m².h, which indicating that the used polymeric membrane can be effectively used for increasing the bioethanol concentration compared with other applied techniques [Figure 1].

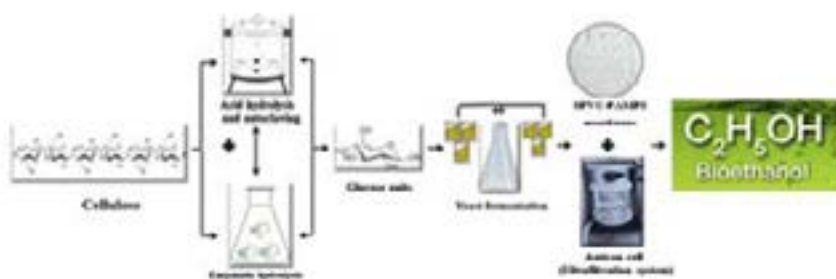


Figure 1. Schematic representation of performed experiment.

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Biography

Tarek Hosny Taha is an associate professor at Environmental Biotechnology Department, Genetic Engineering and Biotechnology Research Institute (GEBRI), City of Scientific Research and Technological Applications (SRTA-CITY), Alexandria, Egypt. He is currently a visiting researcher at Newcastle University, UK. He has his expertise in the field of environmental biotechnology. His research interest is concerned by the bio-monitoring and bioremediation of environmental contaminants. He is also interested in the biosynthesis of nanoparticles and their applications in biosensors and other environmental fields and has a great passion with Bioinformatics, molecular techniques and genetic engineering. In addition, he is interested in the production of biofuel from environmental wastes and finally, the bioconversion of environmental wastes into industrial and pharmaceutical products.

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