Abstract

Bioenergy has the potential to provide future energy security. Biofuels are the energy sources derived from living organisms or the waste generated by them. Biodiesel is alkyl esters derivatives of long-chain fatty acids using bio-based oils. In this study, oleaginous yeast (*Cystobasidium oligophagum*) was isolated from soil rich in cellulosic waste. The yeast was isolated based on its ability to accumulate intracellular lipid, grow on carboxymethylcellulose (CMC), and produce lipase. It could accumulate up to 39.4445 ± 1.1995 % lipids in a glucose medium (12.4533 ± 00.9743 g/L cell dry weight). It was able to grow and accumulate lipids (36.4615 ± 1.4997 %) in the medium containing CMC as the sole substrate. It could also grow and produce lipids on several other industrial wastes such as glycerol, starch, xylose, and lactose. The lipid profile of the organism was suitable for obtaining biodiesel with desirable fuel properties. The isolate could grow on dairy cheese whey as a substrate. It was used either untreated (UCW) or deproteinized (DCW). Cheese whey supported suitable biomass and lipid productivities with a value of 0.0760 ± 0.0004 g/L. h (biomass) and 0.0335 ± 0.0004 g/L. h (lipid) on 100 % DCW. The soluble chemical oxygen demand (sCOD) removal rate was 8.0490 ± 0.1980 and 10.6103 ± 0.1656 g/L. d. The yeast could also grow on lignocellulosic hydrolysates. It also exhibited moderate resistance to furfural, 5-(hydroxymethyl) furfural, and acetic acid found in the lignocellulosic biomass hydrolysates. In summary, the thesis discusses promising oleaginous yeast for biodiesel production.

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