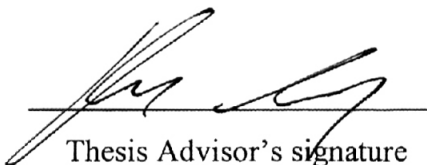


Walaiporn Timbuntam 2008: Development of Technology for Lactic Acid Production from Cassava Starch. Doctor of Philosophy (Biotechnology), Major Field: Biotechnology, Department of Biotechnology. Thesis Advisor: Associate Professor Klanarong Sriroth, Dr.Ing. 178 pages.

Lactic acid is widely used in food, cosmetic, pharmaceutical and chemical industries and has received an increasing attention for used being as feedstock in the production of biodegradable poly lactic acid (PLA). Nowadays, refined sugars and high cost nitrogen sources are used in industrial production with costly and less environmentally friendly recovery and purification process of produced acid. Lactic acid production technologies need to be further advanced and implemented to become technically and economically feasible and environmentally sound. Moreover, the desirable characteristics for industrial lactic acid bacteria (LAB), i.e. the abilities of rapidly and completely converting cheap raw materials into lactic acid with minimal nutritional requirements and providing high yields of preferred stereoisomer are of great importance. In this study, high production yields of lactic acid (> 98%) from inexpensive raw materials including cassava starch, chips and roots, together with high product concentrations ( $140 - 150 \text{ g l}^{-1}$ ) and good productivity ( $4.69 \text{ g l}^{-1}\text{h}^{-1}$ ), were feasible by a stable strain (*Lactobacillus rhamnosus* DM3: the highest stereospecificity of L-type 92.8%) isolated from Thai fermented pork, using simultaneous saccharification and fermentation process (SSF) with low-cost fish waste hydrolysates (4% w/v) and yeast extract (0.5% w/v) as a nutrient source. Furthermore, biopolar electrodialysis (BED) was applied to effectively recover and purify lactic acid from the fermentation broth. By two-stage electrodialysis, i.e. monopolar and BED anion process, free lactic acids could be recovered from ammonium lactate salts in fermentation broth of which the final lactic acid concentration increased by 32 %.

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Student's signature



Thesis Advisor's signature

11 / 4 / 08