

Development of a bioreactor with an Internal fixed cylindrical adsorber for *in situ* production-recovery of lactic acid

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Lactic acid has the potential of becoming a very large volume, commodity-chemical intermediate produced from renewable carbohydrates and a feedstock for biodegradable polymers. An integrated process using a bioreactor equipped with an internal contactor was developed and optimized for the simultaneous fermentation and primary recovery of lactic acid. Lactic acid fermentation with *Lactobacillus rhamnosus* was performed. An internal contactor packed with a strong anionic exchange resin, Amberlite IRA-400, was used to recover lactic acid directly from the fermentation broth during the batch fermentation. The optimal pH for production of the lactic acid from *Lactobacillus rhamnosus* and the optimal adsorption of the lactic acid obtained pH 6. Also Amberlite IRA-400 was 0.26 lactic acid g/wet resin g at pH 6. Interactions between the ion exchange in the internal contactor and lactic acid in the feed suspension were studied. The effect of impeller type and impeller rotating speed on the adsorption performance was examined.