Separation of lactic acid from fermentation broth with precipitation using ethanol and reactive distillation

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Precipitation and reactive distillation were used to isolate lactic acid from fermentation broth. Lime and ethanol were added to fermentation broth in order to convert soluble lactic acid to insoluble calcium lactate form. In ideal solution of organic acids and fermentation broth, precipitation experiments were performed with varying amount of ethanol. Futhermore, the supernatant after filtration was recycled and reprecipitated adding some amounts of ethanol and lime in order to increase the amount of precipitated calcium lactate.

Precipitation process was followed by reactive distillation. Reactive distillation was performed for conversion of carboxylate salts made in previous precipitation process into their corresponding acids. Carboxylate salts were mixed with carbon dioxide, triethylamine to precipitate as calcium carbonate. The remaining liquor was distilled at 150℃ for 1hr. Triethylamine and water and other organic acids were recovered from the top of the distiller, while lactic acid was remained in feeding bottle. The yield of recovered lactic acid was 87.1% with the purity of 99.3%. The main impurities were other organic acids.