

## Biobutanol extraction from aqueous solution by using ionic liquids and supercritical carbon dioxide

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Biobutanol, which produced from biomass through Acetone-Butanol-Ethanol (ABE) fermentation process, is currently considered as a potential biofuel. It contains more energy for a given volume than ethanol and almost as much as gasoline. In addition, its easy transportation properties make it a good replacement for bioethanol as well as diesel fuel. However, the key problem associated with the bioproduction of butanol is butanol toxicity/inhibition of the fermenting microorganisms, resulting in a low biobutanol titer in the fermentation broth. Many methods have been investigated for reducing or eliminating butanol toxicity to the culture. Among these methods, integrated fermentation and in situ product removal processes using liquids-liquid extraction have resulted in a dramatic reduction of process streams, reduced butanol toxicity to the fermenting microorganisms, improved substrate utilization, and overall improved bioreactor performance. Ionic liquids (ILs) are a fascinating class of novel solvents, attracting attention as a possible 'green' alternative to volatile molecular organic solvents. In this study, ILs have been used as extractant for recovery butanol from aqueous solution. Beside that supercritical carbon dioxide was used in combination with ILs for recovering of biobutanol.