



2nd International Conference on Biotechnology

April 15-16, 2019 Valencia, Spain

Tert-Butanol as Greener Alternative for Hexane Based Oil Extraction Process Studied for Custard Apple Seed Oil Extraction: An Inventory Analysis

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Chemical oil extraction processes are very economical and widely accepted where hexane is most commonly used as a solvent. Although there are many more solvents studied by the researchers as an alternative solvent for hexane, they are not persuading enough in terms of both environmental sustainability and economic benefits. In the present study extraction of the custard apple seed oil was executed by a conventional method using hexane and t-butanol. Comparative study of both the solvents in terms of process efficiency, solvent requirement, energy requirement, evaporation losses elucidated higher efficacy of t-butanol over conventionally used hexane. Application of t-butanol was observed to deliver 0.293 g/g oil extraction with 95.22% solvent recovery whereas an hexane assisted extraction gave 0.287 g/g oil extraction with 94.05% solvent recovery. The extraction was carried out in a baffled stirred tank glass reactor provided with an overhead stirrer. Although evaporation point of t-butanol is higher than hexane, overall energy consumption by t-butanol was observed to be lower than that of the hexane. Extracted oil was witnessed to have better quality in terms of acid value and peroxidise value. An inventory analysis of the extraction processes for 1kg oil production elucidated t-butanol as a more competent solvent than hexane.

Keywords: Custard apple seed oil, hexane, t-butanol, inventory analysis.

Biography:

Ms. Dhanashree Panadare is a final year Ph.D. Student working in the area of organic waste utilization and life cycle assessment from Institute of Chemical Technology, Mumbai. She has published 3 research paper and 3 review articles in reputed journals.