

The potential of using pulsed electric field (pef) technology as the cell disruption method to extract lipid from microalgae for biodiesel production

Abstract

For the past few years, there has been an explosive growth of interest in biodiesel production from algae based crops. Feedstock from microalgae is a highly promising resource and can be used as an alternative for sustainable and renewable energy since; lipid from microalgae can be converted to biodiesel. The study brief reviews of the processes related to microalgae for biodiesel production. This includes the process of microalgae cultivation, microalgae harvesting, extracting microalgae lipid and conversion of biodiesel from microalgae. Biodiesel yield is dependable on the amount of lipid extracted which is affected by the technology and method of extraction. The microalgae lipid extraction using traditional methods is primarily discussed and followed by the latest technology of microalgae cell disruption based on electroporation concept. Pulsed electric fields (PEF) Technology as the potential method to extract microalgae lipid is proposed in this work. Treatment of PEF associated with conventional extraction, such as solvent extraction is demonstrated to improve the extraction efficiency of lipid and other valuable intracellular components from microalgae. The paper also described the electroporation mechanism occurred in a cell membrane and the factors that affect the mechanism. Several of PEF chamber designs were discussed which adapted from food industries, biotechnology and engineering perspective view. The benefits and limitation of PEF in the microalgae lipid extraction are also mentioned in this work for the purpose of the future improvement of the PEF extraction system.