

## Heterotrophic cultivation of microalgae for production of biodiesel

### ABSTRACT

High cell density cultivation of microalgae via heterotrophic growth mechanism could effectively address the issues of low productivity and operational constraints presently affecting the solar driven biodiesel production. This paper reviews the progress made so far in the development of commercial-scale heterotrophic microalgae cultivation processes. The review also discusses on patentable concepts and innovations disclosed in the past four years with regards to new approaches to microalgal cultivation technique, improvisation on the process flow design to economically produced biodiesel and genetic manipulation to confer desirable traits leading to high valued lipid-bearing microalgae strains.

**Keyword:** High cell density; Heterotrophic microalgae; Axenic mono-culture; Co-cultivation; Genetic engineering; Algal lipid; Biodiesel; Cellulosic bioethanol; Lignocellulosic waste materials; Photoautotrophic; Mixotrophic; Photoheterotrophic metabolisms; Polyunsaturated fatty acids; Eicosapentaenoic acid; Docosahexaenoic acid