

The growth of energy demand, particularly, in developing countries has led to the huge requirement of fossil fuels. The algal strain selected was *Chlorella vulgaris* which has a growth rate of 15 g/m<sup>2</sup> per day having productivity of 25%. Peer-review under responsibility of the scientific committee of the 25th CIRP Life Cycle Engineering (LCE) Conference Smita Raghuvanshi et al. / Procedia CIRP 69 ( 2018 ) 568 – 572 569 (GWP) from *Chlorella Vulgaris* grown in raceways are nearly 85% and 78% which are lower than the fossil derived diesel. The system boundary includes cultivation, harvesting, lipid extraction, conversion, and disposal and excludes labor, transport infrastructure, capital machinery, or combustion of biodiesel. Ferreira et al [6] have carried out the detailed life cycle analysis for energy consumption and CO<sub>2</sub> emission from *Nannochloropsis* species using a bio refinery method and cradle to grave approach. Handler et al [7] have studied the life cycle assessment of algal based bio fuels and chose 1 MJ of fuel produced as a functional unit. This assessment has covered cultivation, harvesting, dewatering, milling, lipid and pigment extraction and also has shown leftover biomass to H<sub>2</sub> production. This work discusses the life cycle assessment studies for biodiesel production using algae grown in fresh water and wastewater in order to show the sustainability of scaled up processes. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>). The results indicate that GHG emissions are higher for fossil fuels and gave insights for other wastewater sources to be used for algae growth. Algae are autotrophs that utilize CO<sub>2</sub> and sunlight through photosynthesis to produce biodiesel and other bio fuels [1]. The biodiesel production follows the following steps: cultivation of microalgae, flocculation, centrifugation, extraction, and transesterification [2]. Clarens et al [3] have carried out the life cycle comparative studies of bio-energy feed stocks from algae. Stephenson et al [4] carried out the life cycle assessment of algal biodiesel production using *Chlorella Vulgaris*. Most of the literature for the production of biodiesel from algae has used pure algal strain and pure CO<sub>2</sub> for the cultivation of algae and LCA boundaries. The results show cumulative energy demand, greenhouse gas (GHG) emissions, water use, eutrophication, direct land requirements, etc.2.