

## Levulinic Acid Production from Macroalgae: Production and Promising Potential in Industry

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<b>Abstract</b>	<p>The development of macroalgal biorefinery products as an alternative source of renewable fuels is an opportunity to solve the dependence on fossil fuels. Macroalgae is a potential biomass that can be developed as a raw material for producing platform chemicals such as levulinic acid (LA). In the industrial sector, LA is among the top 12 biomass-derived feedstocks designated by the U.S. Department of Energy as a high-value chemical. Several studies have been conducted on the production of LA from terrestrial-based biomass, however, there is still limited information on its production from macroalgae. The advantages of macroalgae over terrestrial and other biomasses include high carbohydrate and biomass production, less cultivation cost, and low lignin content. Therefore, this study aims to investigate the potential and challenge of producing LA from macroalgae in the industrial sector and determine its advantages and disadvantages compared with terrestrial biomass in LA production. In this study, various literature sources were examined using the preferred reporting items for systematic reviews and meta-analyses (PRISMA) method to identify, screen, and analyze the data of the published paper. Despite its advantages, there are some challenges in making the production of levulinic acid from macroalgae feasible for development at the industrial scale. Some challenges such as sustainability of macroalgae, the efficiency of pretreatment, and hydrolysis technology are often encountered during the production of levulinic acid from macroalgae on an industrial scale.</p>
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