

The production of levulinic acid and formic acid from red macroalga *Kappaphycus alvarezii* using methanesulfonic acid

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Abstract	<p>Levulinic acid (LA) and formic acid (FA) are high-value chemicals that can be generated from biomass and are widely used in diverse industries. <i>Kappaphycus alvarezii</i> is potential biomass to be developed as raw material for producing LA and FA. Biomass, catalyst, and reaction factor play important roles in LA and FA production. In this research, we investigated the conversion of macroalgae <i>K. alvarezii</i> for the production of LA and FA through the thermochemical reaction with methanesulfonic acid (MSA) as an environmental-friendly and strong acidic catalyst under the response surface statistical approach. By optimizing the reaction factors, the highest LA and FA yield of 14.69% and 5.35%, respectively were attained under the conditions of 180 o C reaction temperature, 0.6 M MSA catalyst concentration, 30 min reaction time, and 2.5% biomass load. The application of <i>K. alvarezii</i> and green catalyst MSA in LA production can be a new insight into macroalgae biorefinery.</p>
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