

Influence of pH on the hydrothermal conversion of macroalgae-derived sodium alginate into organic acids under subcritical water conditions

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The hydrothermal treatment of sodium alginate was conducted in subcritical water as a function of pH in order to investigate the effects of catalysts on alginate depolymerisation and organic acid production. At pH 1, the acid-catalysed hydrothermal decomposition of alginate promoted the production of monomers (mannuronic acid and guluronic acid) and glycolic acid. On the other hand, at pH 13, the lactic acid and dicarboxylic acids (malic acid and fumaric acid) were predominantly produced by the base-catalysed reaction. Regardless of the presence of catalysts, increasing the reaction temperature enhanced both the acid- and base-catalysed reactions via changes in properties of subcritical water. Our study demonstrates that optimizing the reaction conditions (temperature, time and pH) is important for the efficient conversion of seaweed-derived biomass into value-added organic acids.