Hydrothermal Conversion of Sodium Alginates into Organic acids in Sub-critical conditions

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Alginate from sea algae, especially brown sea weeds, is a bio-polymer material mainly composed of two hexuronic acids; mannuronic acid and guluronic acid. Hydrothermal depolymerization under various sub-critical water conditions leads to convert sodium alginate into biofuels and valuable organic compounds. The hydrothermal treatment induces the sodium alginate polymer to degrade to mannuronic acid or guluronic acid monomers by selective cleavage of 1,4-glycosidic bonds. In addition, the monomers convert into organic compounds, such as carboxylic acids and dicarboxylic acids, by decomposition of hexuronic acids' ring structure. Our purpose in this research was to investigate the effects of various experimental parameters, such as temperature, time, alginate concentration and initial pH of reactant, on the degree of depolymerization of sodium alginate and distribution of products. The degree of depolymerization was obtained by applying pH measurement, GPC and MALDI-TOF-MS techniques. Qualitative and quantitative analysis of products was performed by using GC/MS, LC/MS and HPLC (or IC) instruments.