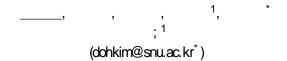
## Hydrothermal depolymerization of alginate into organic acids under subcritical conditions



Alginate, one of the main constituents of algae, is a biopolymer comprised of mannuronic acids and guluronic acids via 1.4-glycosidic bonding. Under subscritical conditions using water as a reaction medium, the bond between two uronic acids can be selectively cleaved into smaller molecules, viz, monomers. Further decomposition results in mono- and di-carboxylic acids, such as lactic acid, succinic acid, and malic acid. This research focuses on the effects of different reaction conditions on the depolymerization of alginate. The reaction parameters controlled are temperature, reaction time, reactant concentration, and, more importantly, initial pH of the reaction medium. After hydrothermal reactions, the liquid phase was analyzed by gas chromatography-mass spectrometry (GC-MS) and liquid chromatography-mass spectrometry (LC-MS) for qualification. Quantification of the organic acids was carried out by high performance liquid chromatography (HPLC). Gel permeation chromatography (GPC) and LC-MS were both employed to verify molecular distribution of the biopolymer.