PACCON 2020
Pure and Applied Chemistry International Conference
Chemistry for Catalyzing Sustainability and Prosperity
February 13 - 14, 2020 || IMPACT Forum, Muangthong Thani, Bangkok, THAILAND

A Facile Way for Conversion of Sucrose into 5-HMF at Low Reaction Temperature under Deep Eutectic Solvents

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Abstract: The main purpose of this work is adding value of sugars via catalytic chemical process which will be converted into 5-hydroxymethylfurfural (5-HMF). To date, 5-HMF is utilized as a platform compound for petrochemical industries. However, several problems for 5-HMF synthesis such as complicated process, high production cost, too high reaction temperature and long reaction time as well as obtained low yield have been found in previous literatures. To solve above problems, in this work, 5-HMF was synthesized from sucrose via hydrolysis, isomerization and dehydration processes under deep eutectic solvents (DES) system in the presence of choline chloride (ChCl) and HCl catalyst. As expected, a maximum yield of 5-HMF 92.74 %yield was obtained from sucrose conversion at low reaction temperature of 100 °C for 1 h. Moreover, the presence of by-products such as levulinic acid, formic acid and humins in crude 5-HMF could be easily eliminated via column chromatography technique.

Keywords: 5-HMF; Sucrose; DES; Choline chloride; High value-added chemical