Conversion of Carbon Dioxide to Resorcylic Acid from Resorcinol under Ultrasonic Environment

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ABSTRACT

Carbon dioxide, more than 30 billion tons of which are annually released to the atmosphere, is believed to be responsible for global warming and consequent climate change. From the viewpoint of environmental protection and resource utilization, it is important to transform CO2 into useful chemicals efficiently. In fact, it may be relevant to both the carbon dioxide mitigation and the development of benign synthesis. On the other hand, as an abundant, nontoxic, non- flammable, easily available, and renewable carbon resource, CO_2 is very attractive as an environmentally friendly feedstock for making commodity chemicals, fuels, and materials. Various existing utilization technologies for the optimum CO_2 utilization were fixation of CO_2 into organic compounds (production of various chemical products), microalgae biomass production (pond and bioreactor production), supercritical CO_2 extraction technology, and CO_2 reforming of methane.

The present work focuses on a new approach for the synthesis of β-resorcylic acid based on Kolbe Schmitt reaction using carbon dioxide under ultrasonic and mild condition. The influences of flow rate of CO_2 and the molar ratio of resorcinol/ potassium hydroxide on the yield percentage of resorcylic acid were investigated. The β-resorcylic acid was characterized by ^{1}H NMR, and FTIR spectroscopy. The amount of CO_2 utilized in the reaction was evaluated from the yield percentage of β-resorcylic acid yield. The maximum yield of resorcylic acid of 30% was obtained at the resorcinol/potassium hydroxide ratio of 1:3 and the CO_2 flow rate of 2L/min.

Keywords: *Ultrasonication; β-resorcylic acid; Kolbe Schmitt; Carbon dioxide gas*