

World Summit on ORGANIC AND INORGANIC CHEMISTRY

February 09, 2022 | Webinar

Production and evaluation of bagasse derived activated carbon from chemelil sugar factory in Kenya as a substitute sugar syrup decolorizer**Humphrey Lumadede***Kenya Industrial Research & Development Institute, Kenya*

The high cost of sugar refining is due to the high cost of commercial decolorizing adsorbents used in the refining. This is manifested in beverage companies which use refined sugar as an ingredient importing activated carbon which is a loss in foreign exchange. The objective was to synthesize activated carbon from bagasse from Chemelil sugar factory on laboratory scale in a two-step batch process of a fabricated retort which carbonizes the bagasse into char and a fabricated furnace which transforms the char into activated carbon at selected temperature and time, characterize, evaluate on its syrup de colorization effectiveness and give a comparison with the commercial activated carbons.. The synthesized activated carbons were characterized for their physical properties (bulk density, surface area, and micro pore volume and pore size), chemical properties (ash, pH, conductivity) and their color adsorption properties from iodine and molasses solution were determined. The results were plotted on the graph and isotherms determined. Bagasse derived activated carbon, 600/C5 had highest BET surface area with 800.6 m²/g, comparable to the commercial activated carbon WP320 and CS200 which had high BET surface area values of 1327.4 m²/g and 858.5 m²/g, respectively. Their pore volumes were as follows; WP320 (1.3 cm³/g), 600/C5 (0.68 cm³/g) and CS 200 (0.54 cm³/g). The 600/C5 pore volume of (0.68 cm³/g) surpasses that of the commercial activated carbon CS200 with (0.54 cm³/g). In the bagasse-activated carbons, 600/C5 (pH 6.2), and 600/C4 (pH 6.1), fit well into the pH range (6.0-8.0) for good color removers. Considering the effectiveness of syrup decolorization values, commercial activated carbon WP 320 was 73.1%, CS 200 was 59.2% followed by bagasse 600/C5 with 65.0%. The activated carbon 600/5 surface area, and syrup decolorization were comparable to the commercial WP320 and CS200 hence can be a used as an inexpensive substitute as raw material for activated carbon production and can be used in raw sugar refining.

Biography

Humphrey Lumadede working as a faculty at Kenya Industrial Research & Development Institute, in Department of Research Technology and Innovation Nairobi, Kenya.