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Modelling and Simulation of Bioethanol Production from Food Waste Using CHEMCAD Software

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Abstract : On a global scale, there is an alarming generation of food waste. Food waste is generated across the food supply chain. Worldwide urbanization, as well as global economic growth, have contributed to this amount of food waste the environment is receiving. Food waste normally ends on illegal dumping sites when not properly disposed, or disposed to landfills. This results in environmental pollution due to inadequate waste management practices. Food waste is rich in organic matter and highly biodegradable; hence, it can be utilized for the production of bioethanol, a type of biofuel. In so doing, alternative energy will be created, and the volumes of food waste will be reduced in the process. This results in food waste being seen as a precious commodity in energy generation instead of a pollutant. The main aim of the project was to simulate a biorefinery, using a software called CHEMCAD 7.12. The resulting purity of the ethanol from the simulation was 98.9%, with the feed ratio of 1: 2 for food waste and water. This was achieved by integrating necessary unit operations and optimisation of their operating conditions.

Keywords : fermentation, bioethanol, food waste, hydrolysis, simulation, modelling
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