Environmental Engineering and Management Journal

January 2022, Vol. 21, No. 1, 137-144
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

CHARACTERIZATION AND ENVIRONMENTAL IMPACTS OF KITCHEN WASTES FROM FOOD-WASTE DISPOSER DEVICE

Abdulmoseen Segun Giwa[1,2*], Huiying Cai[3], Abdul Ghaffar Memon[4], Bamidele Segun[5], Gilbert Adie[6], Emmanuel Alepu Odey[2], Baozhen Wang[1*], Alam MD Shahin[1], Xinyi Xiong[1], Ndungutse Jean Maurice[1]

[1]Green Intelligence Environmental School, Yangtze Normal University, Chongqing, 408100, P.R. China
[2]State Key Joint Laboratory of Environment Simulation and Pollution Control, School of Environment, Tsinghua University, Beijing, 100084, P.R. China
[3]Graduate School of Global Environmental Studies at Sophia University; 7-1 Kioi-cho, Chiyoda-ku, Tokyo, Japan,102-8554
[4]Department of Environmental Engineering, NED University of Engineering and Technology, Karachi –75270 Pakistan
[5]Physics research center, Gombe State University, Nigeria
[6]Chemistry Department, University of Ibadan, UI, Oyo 200284, Nigeria

Abstract

Effective kitchen-waste management has become a challenging task because of the unabated population growth, rapid urbanization, and inherent limitations of traditional recycling technologies. The downstream application of food-waste disposer devices is a necessity, but their potential environmental impacts are of concern. This study characterized Chinese kitchen-waste fractions that were separated from the source and evaluated their physicochemical properties at the pollutant-distribution level. The samples of kitchen waste collected from households primarily comprised degradable vegetable waste, fruit, fish, bone, and meat. They had a chemical oxygen demand–total nitrogen–total phosphorus ratio of 376.2:47:1 and a high carbon–nitrogen ratio. Their biochemical oxygen demand–chemical oxygen demand ratio of ~0.5 indicated that an appropriate portion of organic matter was prone to biodegradation. An average wet weight of 160 g/(person/day) of kitchen wastes with >75% moisture content was generated. The household water consumption via food-waste disposer reached 1215 mL/(capita/day), with a crushing time between 1 and 3.5 min for 1800 g of kitchen wastes. Overall, this study revealed the potential of integrating food-waste disposers as alternative solutions to traditional kitchen-waste-disposal techniques without adverse environmental impacts.

Key words: characterization, conversion device, food-waste disposer, food/kitchen waste, impacts

Received: January, 2021; Revised final: July, 2021; Accepted: October, 2021; Published in final edited form: January, 2022

* Author to whom all correspondence should be addressed: e-mail: giwasegun@live.com; 20170076@yznu.cn; Phone: +86-18311146050; Fax: +86-18311146050