



“Gheorghe Asachi” Technical University of Iasi, Romania



CONTROLLED THERMOPHILIC COMPOSTING OF HOUSEHOLD BIOWASTES OVER FOUR SEASONS IN SALE CITY-MOROCCO

Chadia Majdouline^{1,2*}, Mohamed Khamar^{1,2}, Mounaim Halim El Jalil^{1,2},
Essediya Cherkaoui^{1,2}, Abdelmjid Zouahri³

¹Civil Engineering and Environment Laboratory (LGCE), Materials Water and Environment Team,
Mohammed V University in Rabat, High School of Technology (ESTS), MA11060 Sale, Morocco

²Doctoral Studies Center, Engineering Sciences and Techniques, Mohammadia School of Engineers (EMI),
Mohammed V University in Rabat, Morocco

³Research Unit on Environment and Conservation of Natural Resources, Regional Center of Rabat,
National Institute of Agricultural Research (INRA), BP 6570, Rabat-Institutes, Morocco

Abstract

The mismanagement of household waste in Morocco poses a significant threat to public health and the environment, demanding swift and decisive action. Composting, a sustainable process that converts organic waste into nutrient-rich soil, represents a promising solution to mitigate this issue. This study investigates the controlled bio-transformation of biodegradable household waste in Salé city, using a monitored rotary drum composter (RDC) over four seasons spanning 25 days each. The findings indicate that the composting process consistently reduced the waste's weight by 24-30% across all seasons, yielding a compost product with an average gain of 29.5%. The compost reached a peak temperature of 72°C to 78°C on the 3rd to 4th day, then decreased to match the ambient temperature. The C:N ratio declined from 22:1-30:1 to 12:1-15:1, the pH ranged between 5 and 8, while Electrical conductivity (Ec) ranged between 3 and 7 dS.m⁻¹, Moisture content (Mc) and organic matter(OM) decreased gradually, reaching from 61% to 16% and 67% to 56%, respectively. The composting process increased the concentrations of microelements and macronutrients, except for phosphorus. This study is the first of its kind in Morocco and North Africa, providing valuable data on the composting process. It highlights the potential for household waste to be transformed into a valuable end product through composting in RDC and offers insights into optimal composting conditions across four seasons. The research would be an impressive decision-support tool for waste management strategies (WMS) in the region and serve as a model for other cities in North Africa and beyond.

Key words: household waste, physicochemical parameters, rotary drum composter, seasons, waste management

Received: August, 2022; *Revised final:* April, 2023; *Accepted:* April, 2023; *Published in final edited form:* April, 2023

* Author to whom all correspondence should be addressed: e-mail: chadiamajdouline@research.emi.ac.ma, chadia_majdouline@um5.ac.ma; Phone: +212 770 880 692; Fax: +212 530 031 565