



“Gheorghe Asachi” Technical University of Iasi, Romania



FROM WASTE TO FUEL: SCIENCE MAPPING OF CURRENT AND FUTURE TRENDS IN WASTE COOKING OIL BIOFUEL

**Muhammad Ashraf Fauzi¹, Chin Wei Chong^{2*}, Lester Naces Udang³,
Ahmad Samed Al-Adwan⁴, Walton Wider⁵**

¹*Faculty of Industrial Management, Universiti Malaysia Pahang Al-Sultan Abdullah, 26300 Gambang Pahang Malaysia*

²Faculty of Management, Multimedia University, 63100 Cyberjaya, Malaysia

³Faculty of Education, Shinawatra University, Pathumthani, Thailand

⁴Business Technology Department, Business School, Al-Ahliyya Amman University, Amman, Jordan.

⁵Faculty of Business and Communications, INTI International University, Nilai, Malaysia

Abstract

This study presents the fundamental knowledge structure of waste cooking oil as a potential biofuel. Waste cooking oil has gained popularity as the energy sector seeks sustainable alternatives to fossil fuels. Using a science-mapping method, this study applies two techniques to uncover current and future themes in this field. The emerging trends in waste cooking oil production form 5 clusters related to its sustainability applications and technological innovation. Future trends focus on the sustainability, emission reduction, biofuel optimization, and engine performance of waste cooking oil. These findings contribute to understanding the knowledge base and thematic evolution of waste cooking oil research. It offers clear directions for advancing its adoption in the energy sector and addressing environmental concerns. Future research directions are expected to address the sustainable impact of waste cooking oil utilization as a sustainable biofuel on engine performance.

Key words: waste cooking oil, used cooking oil, energy sector, bibliometric analysis, science mapping

Received: December, 2025; Revised final: July, 2026; Accepted: August, 2026

* Author to whom all correspondence should be addressed: e-mail: cwchong@mmu.edu.my; Phone: +603 83125653; no fax