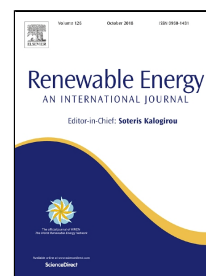


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Arwa Sandouqa, Zayed Al-Hamamre



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# Energy Analysis of Biodiesel production from Jojoba Seed Oil

Arwa Sandouqa, Zayed Al-Hamamre

Department of Chemical Engineering, School of Engineering,  
The University of Jordan, Amman 11942, Jordan

Corresponding authors: [z.hamamre@ju.edu.jo](mailto:z.hamamre@ju.edu.jo), [a.sandouqa@ju.edu.jo](mailto:a.sandouqa@ju.edu.jo)

## Abstract

In this work, energy analysis is carried out to account for inputs and outputs of energy and GHG emissions associated with the biodiesel production system. Jojoba oil is obtained by cultivation of the jojoba plant, harvesting of seeds followed by extraction of oil, which is then converted to biodiesel by the process of transesterification. Energy efficiency is expressed in terms of the net energy balance (NEB) and the net energy ratio (NER). The use of the byproducts (husk, cake or meal, waste residues and glycerin) are also included as a part of the system boundary. The results show that the NEB and NER values are calculated at 46724.1 MJ/ha (28.9 MJ/L biodiesel produced) and 2.16, respectively. At the same time, the total amount of GHG emissions are estimated at 2.28 kg-CO<sub>2</sub>eq/L biodiesel produced (66.0 g CO<sub>2</sub>eq/MJ biodiesel produced). Nevertheless, if manure is used as fertilizer for jojoba plant cultivation, the primary energy input will fall by 9.52 % (to 22.49 MJ/L of biodiesel).

**Keywords:** Energy analysis, Jojoba oil, Biodiesel, GHG emission, Jordan

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