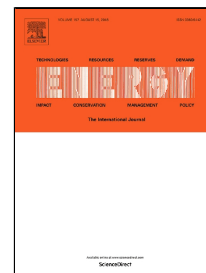


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Production of value-added liquid fuel via microwave co-pyrolysis of used frying oil and plastic waste

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1 **Production of value-added liquid fuel via microwave co-pyrolysis of used frying oil and**
2 **plastic waste**

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25
26 **Abstract**

27 The production of household wastes such as used frying oil (UFO) and plastic waste (PW) are
28 increasing each year, thus representing potential feedstocks for conversion into an energy source.
29 Microwave co-pyrolysis was investigated for its potential to transform a mixture of UFO and
30 polyolefinic-based plastic waste into fuel product with desirable properties. The co-pyrolysis
31 approach demonstrated positive synergistic effects in providing fast heating rate (up to 50
32 °C/min) and a lower reaction time (≤ 25 minutes), and generated up to 81 wt.% yield of liquid oil
33 and 18 wt.% yield of pyrolysis gases for use as potential fuels. The liquid oil showed promising
34 green properties comprising low oxygen content, free of nitrogen and sulphur and higher energy
35 content (42-46 MJ/kg). The oil product also demonstrated improved stability and desirable fuel
36 properties nearly similar to transport-grade diesel, thus indicating the great potential of
37 microwave co-pyrolysis as an approach for transforming household wastes into value-added
38 liquid fuel.

39
40 **Keywords:** pyrolysis, co-pyrolysis, microwave, oil, plastic, waste, fuel

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