With depletion of solid biomass fuels and their rising costs in recent years, there has been a shift towards using kerosene and liquefied petroleum gas (LPG) for domestic cooking in Kenya. However, the use of kerosene is associated with health and safety problems. Therefore, it is necessary to develop a clean, safe and sustainable liquid bio-fuel. Plant oil derivatives fatty acid methyl esters (FAME) present such a promising solution. This paper presents the performance of a wick stove using FAME fuels derived from oil plants: *Jatropha curcus* L. (Physic nut), *Croton megalocarpus* Hutch, *Calodendrum capense* (L.f.) Thunb., *Cocos nucifera* L. (coconut), soyabeans and sunflower. The FAME performance tests were based on the standard water-boiling tests (WBT) and compared with kerosene. Unlike kerosene all FAME fuels burned with odorless and non-pungent smell generating an average firepower of 1095 W with specific fuel consumption of 44.6 g L^{-1} (55% higher than kerosene). The flash points of the FAME fuels obtained were typically much higher (2.3–3.3 times) than kerosene implying that they are much safer to use than kerosene. From the results obtained, it was concluded that the FAME fuels have potential to provide safe and sustainable cooking liquid fuel in developing countries.

Keywords

Kenya; *Jatropha carcus* L. (Physic nut); *Croton megalocarpus* Hutch; *Calodendrum Capense* (L.f.) *Thunb.*; *Cocos nucifera* L. (coconut); Soya bean.