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Evaluation of Energy Properties of Nataw (*Xylopia Parviflora*), a Lesser Known Species as a Dry Matter Energy Source for Industrial Boilers

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Abstract

According to geography and climatic conditions, Sri Lanka is blessed with several types of renewable energy resources namely biomass, hydro, solar, and wind. Among them, in 2016, biomass is the most common source of energy supply in the country and the largest use of biomass is in the domestic sector for cooking purposes. In Sri Lanka, it has been revealed that nearly 72% of industrial boilers which use biomass as fuel consumes fuel wood, 15% of paddy husk and saw dust, and 13% of coconut shells. Also overall fuel wood demand in industries has been increasing steadily in the recent past. Hence, industrial sector in Sri Lanka use fuel wood as the major source of biomass energy. Current study was conducted with the objective of evaluating fuel wood characteristics of Nataw (*Xylopia parviflora*) which is a wet zone lesser known species. Selected individuals were categorized in to three Diameter (DBH) classes (i) 5 cm-14.99 cm, (ii) 15 cm- 24.99 cm, (iii) 25 cm-34.99 cm. From each class, 5 individuals were measured and sample wood disk were extracted at 1.3 m height level. Moisture content, density, specific gravity, ash content, volatile matter, fixed carbon, and biomass/ash ratio were measured using standard methods. Certain characteristics including moisture content, density, specific gravity, and ash content showed no significant difference at 0.05 level among three DBH classes. Volatile matter of DBH class (iii) is significantly higher among other DBH classes. Fixed carbon content is significantly lower than other two types of DBH classes. When compared the *Xylopia parviflora* with *Hevea brasiliensis* which is a commonly used fuel wood species in biomass boilers in industry, moisture content (31.22%), ash content (1.24%) of *Xylopia parviflora* is lower than that of *Hevea brasiliensis*. Even though Calorific values of both species are very close to each other *Xylopia parviflora* has highest calorific value of 18.92 kJ/g which is 18.74 kJ/g in *Hevea brasiliensis*. Fuel Value Index (FVI) of *Xylopia parviflora* is 3055 and while 1122 in *Hevea brasiliensis*. Study finding concluded that *Xylopia parviflora* performs better than the *Hevea brasiliensis* as a fuel wood hence can be a good fuel source for biomass boilers in industries.

Keywords: Rubber wood residues, Wood pellets, Energy properties, Mechanical properties

Proceedings of the 23rd International Forestry and Environment Symposium 2018 of the Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Sri Lanka

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