**Fabrication of fuel briquettes from coconut industry based agricultural wastes**

DRSK Pathirana1\*, BGRR Bandara2\*, LLWC Yalegama2, LP Vidhana Arachchi1, and DDMO Dissanayake1

*1Department of Export Agriculture, Faculty of Agricultural Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*

*2Coconut Processing Research Division, Coconut Research Institute, Lunuwila, Sri Lanka*

*surajkrishan57@gmail.com* and *ranahansibandara@gmail.com*

**Abstract**

Most of the energy sources used in the world is not economically feasible and affordable and most of these are non-renewable sources. Developing countries and poor countries need alternative energy source. Therefore, biomass energy sources are good substitute for this crisis. Combinations of agricultural wastes that give better heating values compared to its individual performance. Hence, the present study aims to compare and analyze the properties of fuel briquettes fabricated at varying proportions of coconut shells, coconut sheaths, and coconut petiole charcoal using extraction of “Dawul kurundu” (*Neolitsea cassia*) leaves and “Habarala” (*Alocasia macrorrhiza*) tuber as a binding agent as a sustainable approach to fulfill the energy needs. The produced briquettes were evaluated for their physical and combustion properties using standard methods. Calorific value, burning rate, ignition time and cooking efficiency were evaluated under combustion properties and moisture content, ash content, volatile matter content, fixed carbon content, and shatter index were examined to compare the performance of treatments. Combination of 100% coconut shell charcoal with the extraction of “habarala” and “dawul kurundu” yielded the highest calorific values at 28675.39 J/g and 28604.21 j/g respectively. The highest shatter index was examined in 100% coconut shell charcoal with “habarala” tuber extraction (0.55±0.5488). Moreover, the best cooking efficiency was also given in 100% coconut shell charcoal with “habarala” tuber extraction. Coconut shell charcoal with “habarala” tuber extraction treatment showed favorable physical and combustion characteristics compared to that of other treatments. Meanwhile, “Habarala” tuber extraction resulted in better binding properties compared to the extract of “dawul kurudu” leaves. Therefore 100% coconut shell charcoal with “habarala” tuber extraction can be efficiently used as an alternative energy source for the future energy demand.

**Key words**- *biomass energy, calorific value,* *charcoal briquette, shatter index*