**Evaluation of fabricated fuel briquettes made out of agricultural waste in coconut industry**

**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*

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

[*surajkrishan57@gmail.com*](mailto:surajkrishan57@gmail.com)

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 extraction (DKLE) and “Habarala” (*Alocasia macrorrhiza*) tuber extraction (HTE) as a binding agent as a sustainable approach to fulfill the energy needs. 100 % coconut shell, 50 % coconut shell mixed with 50 % coconut petiole and 33.33 % coconut shell, 33.33 % coconut petiole and 33.33 % coconut sheath compositions were used. 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 HTE and DKLE 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 HTE (0.55±0.5488). Moreover, the best cooking efficiency was also given in 100% coconut shell charcoal with HTE (17.19min±0.56). Coconut shell charcoal with HTE treatment showed favorable physical and combustion characteristics compared to that of other treatments. Meanwhile, HTE resulted in better binding properties compared to the DKLE. Therefore 100% coconut shell charcoal with HTE can be efficiently used as an alternative energy source for the future energy demand.

**Keywords**: *biomass energy, calorific value,* *charcoal briquette, shatter index*