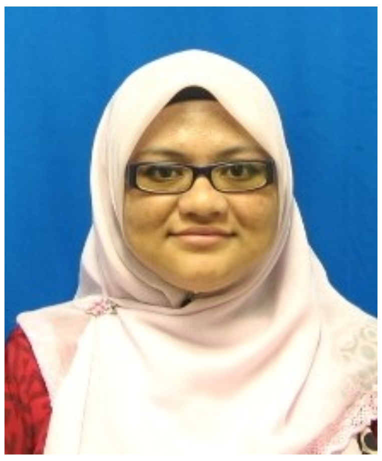


By:
Norain Idris
EFFECTS Research Group

Young Coconut Waste as Biomass Feedstock

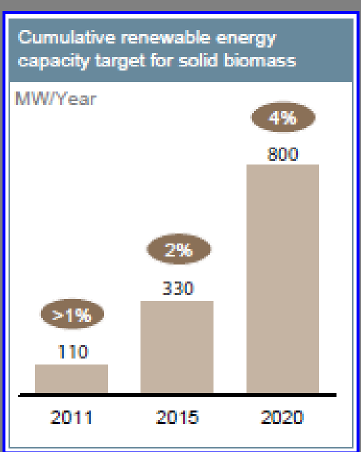
Young coconut is famous in the tropical countries for its refreshing juice and suckling flesh. It is full with moisture shell ends up normally at the dump site as locals find it useless or very hard to utilize. With the size of bigger than a football this empty shell will fill the land sooner than expected causing problem to the operator. This waste is actually can be turned into a burnable fuel by pressing the shredded and dried moist young coconut waste into YCSC pellets (Figure 1). From the literature, generally, there is no proper research that has been carried out in using young coconut waste as biomass feedstock. Among popular biomasses that are densified into biomass pellets are wood, rice, wheat and corn waste (9, 5). Other famous biomass pellets in Malaysia are originated from wood, oil palm waste and old coconut coir (1-4, 6, 8). The recent research focuses more on old coconut coir which is dry and easy to shred (4, 6, 8). Young coconut, which contains both shell and coir on the other hand is very moist and soft, makes it easy to stick to the cutter head thus jamming the shredder. Moreover, consistent optimal moisture content is also a challenge in order to produce good pellets. Consistent optimal moist grain is important to guarantee durability and stability (7). These obstacles are however evincible by utilizing the right tools and methods which are including cutting to the right size by a special cutter head and drum drying. The size of the shredded YCSC waste including the drying parameters in order to obtain consistent optimal moisture will be studied throughout this research. The optimal moisture content for biomass feedstock ranges from 8% to 20% (7). The best cutting size, drying temperature, air flow rate and retention time are hypothesized to produce feedstock for biomass pellets with consistent optimal moisture, optimal grain size and high surface area for maximum interaction with liquidized gas (LG) burner during gasification. It is hoped that further investigation on the YCSC will be conducted in order to observe the potential of this waste in producing biomass energy.

Figure 1 Biomass pellets
(*Source: www.spimpex.in/biomass-pellets.htm*)

REFERENCE

1. Ahmed, T. Y., & Ahmad, M. M. (2011). Equilibrium Model for S team Gasification of Palm Kernel Shell for Hydrogen Production.
2. Atnaw, S. M., Sulaiman, S. a., & Yusup, S. (2011). Prediction of calorific value of syngas produced from oil-palm fronds gasification. 2011 National Postgraduate Conference, 1–4.
3. Atnaw, S. M., Sulaiman, S. A., & Yusup, S. (2013). Syngas production from downdraft gasification of oil palm fronds. Energy, 61, 491–501.
4. Azlina, W., Ab, W., Ghani, K., Moghadam, R. A., Amran, M., & Salleh, M. (2002). Air Gasification of Malaysia Agricultural Waste in a Fluidized Bed Gasifier : Hydrogen Production Performance.
5. Belonio, A. A. T., & Bhuiyan, A. (n.d.). Title : Design of a Continuous – Type Rice Husk Gasifier Stove and Power Generation Device for Bangladesh Household.
6. Sabri, M., Mukhtar, A., Shahril, K., Rohana, A. S., & Salmah, H. (2013). Effect of Compatibilizer on Mechanical Properties and Water Absorption Behaviour of Coconut Fiber Filled Polypropylene Composite. Advanced Materials Research, 795, 313–317.
7. Serrano, C., Monedero, E., Lapuerta, M., & Portero, H. (2010). Effect of moisture content, particle size and pine addition on quality parameters of barley straw pellets.
8. Shafie, S. M., Mahlia, T. M. I., Masjuki, H. H., & Ahmad-Yazid, A. (2012). A review on electricity generation based on biomass residue in Malaysia. Renewable and Sustainable Energy Reviews, 16(8), 5879–5889.
9. Theerarattananoon, K., Xu, F., Wilson, J., Ballard, R., Mckinney, L., Staggenborg, S., … Wang, D. (2011). Physical properties of pellets made from sorghum stalk, corn stover, wheat straw, and big bluestem. Industrial Crops and Products, 33(2), 325–332.

INFO



Source: National Biomass Strategy 2020-New wealth creation for Malaysia's biomass