Valorization of a Food Residue Biomass product as a solid fuel for the production of pellets

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The scope of the present research work was to evaluate the potential of valorizing a biomass product (FORBI, Food Residue Biomass) through thermal and mechanical treatment for the production of a solid fuel (pellets). FORBI is generated through a drying/shredding process of door-to-door source-separated Household Food Waste (HFW).

The quality of pellets depends on two general factors: (1) the characteristics of the raw material (FORBI) itself, directly related to its chemical composition and (2) the operative variables of the pelletization process, which influence the physical and mechanical properties of the pellets produced. A suitable combination of these two factors is necessary to obtain a qualified energy product. The European Union has established standards, guidelines and thresholds for solid biofuels in order that they can be properly used and marketed as renewable fuels.

Co-pelletization was performed for FORBI and other green wastes such as prunings and grass. The aim of the present study was to identify the key factors affecting on the FORBI and green waste co-pelletization processes conditions. The physical parameters of pellets, i.e.: pellet length, moisture content and particle size on the physical properties were investigated. Among others, also energy parameters such as the net calorific value (NCV), the concentration of heavy metals and chlorine are subsequently determined using well-established international standards (EN and ISO). FORBI is evaluated as a potential alternative solid fuel in terms of technical feasibility and environmental impacts. Based on the characterization, FORBI is classified as a solid fuel (pellet) according *to ENplus A1, ENplus A2* and EN*plus B.*

The obtained pellets were characterized by measuring their porosity, bulk density, pore size distribution and BET surface area. The surface chemical characteristics were determined by FT-IR. The microstructure of the produced pellet was examined by scanning electron microscopy (SEM).

Keywords: pellets, household food waste valorization, FORBI, solid fuels

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WASTE 4think Moving towards Life Cycle Thinking

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