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Engineering study on the handling of date palm fronds to reduce waste and used as energy environmentally friendly fuel

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The agricultural crop residuals are considered one of the most important problems, which face the environmental life and farmers in the world. The mechanical treatment by cutting, crushing or chopping and briquetting processes are the primary step and the suitable solution for solving this problem and recycling these residuals to be transformed into useful products. So the aim of the present work to get a high quality for agriculture residues such as date palm stalks (Fronds), date palm leaflets briquettes. Chopped date palm stalks (Palm fronds), date palm leaflets having moisture content (8, 10 and 12%) and (8, 10 and 12.8% w.b.) were densified into briquettes without binder and with binder (Urea-Formaldhyde) using a screw press machine. Quality properties for briquettes were durability, compression ratio hardness, bulk density, compression ratio, resiliency, water resistance and gases emission. The optimum quality properties found for briquettes at 8 % moisture content and without binder. Where the highest compression stress and durability were 8.95, 10.39 MPa and 97.06 %, 93.64 % for date palm stalks (Palm fronds), date palm leaflets briquettes, respectively. The CO and CO2 emissions for date palm stalks (Fronds), date palm leaflets briquettes were less than these for loose residuals.

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