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VALORIZATION OF PALM DATE BY-PRODUCTS AS SELF-BONDED MATERIALS

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Last few years, binderless or self-bonding fiberboards have received increased attention. In such concern, an amplified interest in the use of agricultural residues and by-products from agro-industries has been growing recently [1]. In this work, we investigated the possibility of valorization of date palm by-products fibers as self-bonded materials.

Four by-products from Phoenix dactylifera were used, leaflets, rachis, leaf sheath and fibrillum. After chemical characterization and morphological analysis of the raw materials, the fiberboards composites were manufactured by thermopressing process without any addition of water or synthetic resin. Mechanical properties of the resulting composites were characterized using bending test and dynamical mechanical analysis. The chemical characterization of the dried date palm by-products showed high NDF values (between 65% and 91%). The fibrillum showed the highest content of cellulose (50.6 %) and lignin (31.9%). Mechanical properties were higher for fibrillum and leaflets based composites which could be related to the cross-linking of phenolic compounds present in high percentage in the fibrillum substrate and to high molecular soluble carbohydrates (24.3%) and condensation of cell components carbohydrates in leaflets substrate. Further research should concentrate on methods for improved mechanical strength of these fiberboards because it may have potential for future boards applications when wood based fiber decline.

¹NDF: Neutral Detergent Fiber

Reference: