

Properties of composite boards from oil palm frond agricultural waste

Abstract

Properties of composite boards from oil palm frond agricultural waste were researched. Phenol and urea formaldehyde resins were used as the binders. The oil palm fronds were obtained from 20 year-old trees in an oil palm plantation in Kota Belud, Sabah. The fronds were segregated into three groups of matured, intermediate, and young oil palm fronds and further subdivided into bottom, middle, and top sections. The leaflets and the epidermis were removed from the fronds before they were sliced longitudinally into thin layers. The layers were then compressed into uniform thickness of 2 to 3 mm. The layers were air-dried and later mixed with resins using 12 to 15% of phenol and urea formaldehyde and recompressed with other layers, forming composite boards. The composite boards samples were then tested for their physical and mechanical properties. Testing was conducted in accordance with the International Organization for Standardization (ISO) standard. The results for physical and mechanical properties showed that the oil palm composite boards were better than composite boards from oil palm trunks and slightly worse than the rubberwood. Statistical analysis indicated significant differences between composite boards made from each group and section, but no differences were observed in the type of resin used. The composite boards from oil palm fronds agricultural residues has the potential to be used as an alternative to wood to overcome the shortage in materials in the wood industry.