Mechanical and physical properties of particleboards made from Ailanthus wood and UF resin fortified by Acacias tannins blend

ABSTRACT

In this study the influence of adding a blend of tannins extracted from the bark of two Acacia species on the mechanical and physical properties of laboratory particleboards made from UF resin and underutilized raw materials was investigated The comminuted bark of Acacia seyal var. seyal (Ass) and Acacia nilotica spp. tomentosa (Ant) was extracted with hot water (initial temperature was 90°C) using a ratio of 1:6 powdered bark to water (w/v). Their spray dried tannins powder was blended (BT, 1:1) and was added as concentrated solution (35%) to UF resin at three different levels (5%, 10% and 15%, w/w) The obtained panels were evaluated for their mechanical and physical properties according to the BS EN relevant standards. The obtained results revealed an increase in the modulus of rupture (MOR), modulus of elasticity (MOE), and internal bond strength (IB) of these panels when small amount (5%) of BT was added. In contrast addition of higher percentages (10&15%) was found to decrease the mechanical properties. It was also observed that the addition of BT to UF did not improve the physical properties (Thickness swelling (TS, 24 h) and water absorption (WA, 24 h), which remained comparable to the control panels.

Keyword: Tannins; UF; Ailanthus excelsa; Acacia nilotica subsp tomentosa; Acacia seyal; Particleboard