Influence of the addition of ZnO nanoparticles on wood particleboards

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The timber sector has been showing steady growth in recent years, in special, the panel area has stood out for presenting new technologies in the manufacturing process, attending to large companies for new products. An interesting approach is the use of nanoparticles, that it comes draw attention owing its potential in changing the materials properties. Therewith, this work aimed to produce particleboards of three layers (MDP) with the addition of nanoparticles of zinc oxide (ZnO) to improve the water repellents properties, the thermal conduction properties of the panels, perfecting both the plates as of resins used, as well as to promote an improvement in its performance. Physical properties as swelling in thickness, water absorption, moisture content and density of the plates, and mechanical properties as determination of module of rupture (MOR) and module of elasticity (MOE) in flexion and perpendicular strain (internal adhesion) were analyzed according to normative specifications of NBR 14810:2013[1]. All results were subjected to statistical analysis and duly compared with studies found in the literature and regulatory specifications. It was possible to check that the addition of 1% of nanoparticles of zinc oxide regarding to the particle weight of the panel didn't negatively affect in physical-mechanical properties, showing that a higher percentage may show an improvement in them, especially in terms of performance in contact with water and making possible the prevention study against xylophagous agents, like the termites.

[1] ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS NBR 14810-2013 – Chapa de madeira aglomerada. Parte 2: Requisitos e Métodos de ensaio. ABNT. Rio de Janeiro, 2013