The Potential Use of Nanozycosil and Sodium Montmorillonite (NaMMT) Nanoclay to Decrease Water Absorption in MDF

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Abstract

In the present study, the potential use of zycosil and clay nanomaterials was examined to decrease water absorption of Medium Density Fiberboard (MDF). For this, a group of MDF samples were coated by nanozycosil and in the other group, nanoclay was used to produce the MDF. Then, water absorption and thickness swelling of the MDFs were evaluated. In order to characterize the structure of the MDF, X-ray diffraction (XRD) and SEM observation were performed. The results of different tests indicated a desirable effect of nanozycosil on water resistance properties of MDF. Nanozycosil reduced water absorption by 90% because it could modify MDF surface by reacting with the board thereby imparting a molecular level hydrophobic characteristic. Regarding the effect of nanoclay, the scanning electron microscope (SEM) images and X-ray diffraction (XRD) confirmed a suitable dispersion and exfoliation of nanoclay in the modified MDF. The water absorption presented a decrease with increasing nanoclay content. The nanoclay had no effect on the thickness swelling.

Keywords: Medium Density Fiberboard (MDF), Nanozycosil, Nanoclay, Water absorption

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