



HIGH DENSITY POLYETHYLENE MATRIX COMPOSITE AS FILLER IN WOOD FIBERBOARD

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ABSTRACT

Wood fiberboards are composed by lignocelulosic fibers, agglutined by the addition of adhesives and consolidated by pressure and heat. They have advantages when compared to solid wood, such as the suppression of the anisotropy; however they present compromised dimensional stability in the presence of moisture. The addition of hydrophobic materials emerges as an alternative to reduce this characteristic. Even though it may lead to a loss of mechanical resistance and an increasing of cost production. So, this study aimed to produce wood fiberboards with a high density polyethylene (HDPE) matrix composite and determinate their properties compared to fiberboards using or pure HDPE or none filler agent. The composite was produced in a single screw, using 5% of *Pinus* spp fibers. The treatments used variations from 10% to 50% of pure HDPE or HDPE/*Pinus* spp composite and fiberboard with no filler was used as control treatment. The panels were analysed according to its thermal, morphological physical and mechanical properties. Thermal characterization showed similar behavior related to melting temperature and crystallinity, for both panels. The panels presented a negative influence on compaction ratio and positive on dimensional stability, with a decreasing of water absorption, swelling thickness, and non-return thickness rate. The addition of the polymers was positively related with the properties of perpendicular

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tension and screw withdrawal, due to a higher rate of resin available to promote a well established union of fibers. The modulus of elasticity and rupture were negatively influenced by the increasing of polymer loads. SEM images showed a good homogeneity of the fibers in the polymer matrix and with no pull out failures. The treatment with addition of 40% of HDPE/*Pinus* spp composite was the one that attended to all requirements of the commercial standard, being the most suitable for use as an alternative to the traditional wood fiberboards.

Palavras-chave: fiberboard; HDPE; composite; *Pinus* spp.