

Effect of Urea Concentration and Vacuum Treatment on Physical and Mechanical Properties of Methyl Metacrylate Bamboo

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Abstract

Betung bamboo (*Dendrocalamus asper*) samples were obtained from Bogor area, Indonesia. The samples were air dried, and then immersed into methyl metacrylate-urea solution for 24 hours prior to irradiation. Urea was added into methyl metacrylate (MMA) with concentration of 1%, 3%, and 5%, and without urea as control. The samples were vacuumed at 35 mmHg for five minutes prior to immersion, and without vacuum were done as well as control. The samples were wrapped up with aluminum foil and then with polyvinyl sheet, and irradiated with ⁶⁰Co gamma ray with 40 kGy. After opening the wraps, the samples were dried in the oven at 70°C for 24 hours. For comparison, the samples of control or original bamboo were also prepared. The all samples were tested for physical and mechanical properties. Factorial randomized complete design 2 × 4 was used for analytical purpose the factors were vacuum treatment and urea concentration. The results showed that polymer loading of MMA-bamboo reached 10.7-12.8%, and the physical and mechanical properties were better than the origin. Vacuum treatment enhanced hardness only, and urea enhanced polymer loading and physical properties but reduced mechanical properties, and the addition of urea at 1% could be satisfied.

Keywords: bamboo; gamma radiation; MMA; urea; vacuum