

Effects of peroxide and oxalic acid bleaching on the colour and gluing properties of some tropical bamboos

Abstract

The effects of bleaching on the colour and gluing properties of *Gigantochloa scortechinii*, *Dendrocalamus asper* and *Bambusa vulgaris* bamboos were studied. The bamboo strips were bleached with sodium hydroxide (NaOH, 1% w/v) followed by **hydrogen peroxide** (H_2O_2 , 12.5% w/v) and in a mixture of oxalic acid ($(\text{COOH})_2 \cdot 2\text{H}_2\text{O}$, 1% w/v) and NaOH (0.5%, w/v). The bleaching was carried out by cold soaking. The colour changes (ΔE) and whitish value (W) of the strips before and after bleaching process were examined using colour meter and Munsel soil colour chart. The unbleached and bleached strips were glued parallel to each other using phenol formaldehyde adhesive to produce three-ply laminates. The gluing properties were evaluated based on their shear strength and wood failure percentage. The tests were carried out in dry and cyclic boiling conditions (CBR) in accordance with BS 6566: Part 8: 1986. Regardless of species, strips that were soaked in NaOH followed by in H_2O_2 solution had better colour properties than soaking in NaOH + $(\text{COOH})_2 \cdot 2\text{H}_2\text{O}$. *B. vulgaris* had the highest ΔE (10.8-24.5%) whilst the *G. scortechinii* had the highest W (64.6-67.3%) when bleached with these two processes. Bleaching with oxalic acid did not increase the W of *D. asper* even though the ΔE was 19.98%. The bleaching agents to some extent, reduced the gluing properties of the laminates. The unbleached *G. scortechinii* had dry shear strength of 4.60 Nmm^{-2} and CBR shear strength of 3.47 Nmm^{-2} whilst *D. asper* had 4.40 and 2.11 Nmm^{-2} , respectively. Nonetheless, the glue bond quality of the bamboo laminates still meets the minimum standard requirement.