

DRAFT MANUSCRIPT

Laboratory Leaching Tests to Study the Effects of Post-Treatment Storage Periods on CCA Leachability and Fixation in Treated Permeable and Refractory Malaysian Hardwoods

by

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Abstract

The biological resistance and environmental safety of CCA-treated wood relies on the extent of post-treatment storage fixation of CCA in wood prior to being utilized. A study on the comparative leachability (fixation) of CCA-treated refractory and permeable heartwoods of 3 Malaysian hardwoods subjected to different post-treatment storage (fixation) periods of up to 4 weeks, at 2 laboratory leaching tests of the general procedure of EN84 was conducted. End-sealed test wood blocks of Malaysian species [permeable Menggris (*Koompassia malaccensis*) and Perah (*Elateriospermum tapos*), refractory *Acacia mangium*] were treated with CCA to target retention of 5.6 kg/m³, immediately stored to fix at ambient conditions for 0 and 48 hours, 1, 2 and 4 weeks, followed by a 2 weeks leaching test to determine cumulative leaching losses of copper (Cu), chromium (Cr) and arsenic (As). Generally, levels of leached CCA components were: 4.0 – 47.4 µg/cm² Cu, 9.1 – 127.0 µg/cm² Cr, and 5.2 – 56.9 µg/cm² As. For all leachate elements, there were less distinct variations in leaching losses ($P < 0.05$) between 4 storage (fixation) periods, more significant variation between unfixed and stored fixed blocks and between refractory and permeable wood species. Component leaching losses were greater in refractory than permeable heartwoods of timbers, while increasing with reduced storage periods overall. No significant differences in CCA leaching losses were found between EN84 method (consisting of initial vacuum impregnation of wood in water) and the variant of the EN84 method (initial immersion of wood in water), implying that the former method could not result in higher CCA leaching losses than the latter method.

Keywords: Leaching test, EN84 method, CCA fixation, tropical timbers, *Elateriospermum tapos*, *Acacia mangium*, *Koompassia malaccensis*