



Development Of An oil Sorbent material from bamboo Fiber and Silica fume for water sources

Sasipim Srisuwan¹, Orathai Arbu², Chawalak Pawsranoi³

¹Princess Chulabhorn Science High School Chiang Rai, 345 Moo 2 Rob Wiang Subdistrict, Muang District,
Chiang Rai 57000, Thailand

*E-mail: Corresponding Author 05850sasipim@pcccr.ac.th

Abstract

This study aimed to determine the optimal mixing ratio of silica fume and bamboo fibers for the fabrication of oil-absorbent materials and to evaluate the absorption efficiency of each formulation. The cellulose structure of bamboo pulp was modified by incorporating silica fume, which provides hydrophobic characteristics that enhance oil uptake. The mixing ratios of bamboo fiber to silica fume were prepared at 10:0, 9:1, 8:2, and 7:3 by weight. The samples were tested for oil absorption efficiency, and the results showed that the 9:1 ratio exhibited the highest performance, achieving an efficiency of 97.83% at 30 minutes and maintaining stable absorption throughout the experiment. The 8:2 ratio yielded the second-highest efficiency, with an average of 88.04% at 30 minutes, while the 10:0 ratio showed the lowest efficiency with an average of 54.89%. Furthermore, pore structure analysis using Scanning Electron Microscopy (SEM) revealed that the sample with the 9:1 ratio exhibited a porous morphology characterized by a dense, interconnected network with a high degree of surface roughness with an average pore size of 12.89 to 21.16 micrometers, indicating that this specific pore structure significantly increases the surface area and creates effective capillary action for oil entrapment, resulting in the highest absorption efficiency among the tested ratios.

Keywords: Bamboo, Oil, Silica Fume, Absorbent Material