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# RADIATION ATTENUATION PROPERTIES OF NATURAL PRODUCT-BASED ADHESIVE BONDED RHIZOPHORA SPP. PARTICLEBOARDS FOR TISSUE SUBSTITUTE PHANTOM APPLICATIONS

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The present study investigates the radiation attenuation characteristics of particleboard phantoms made from Rhizophora spp. wood using natural product-based adhesives (SPI – soy protein isolate and SPC – soy protein concentrate) and sodium hydroxide (10 wt%) with two itaconic acid polyamidoamine-epichlorohydrin resin levels (10 and 15 wt%) at three different particle size (149 – 500, 74 – 149, and  $\leq 74 \mu\text{m}$ ). The radiation attenuation characteristics were evaluated with photons at 16.59 – 25.26 keV and 0.662 – 1.20 MeV gamma energies using X-ray fluorescence and Ludlum configurations. The most optimum characteristics of SPI-SPC-based particleboard phantoms compared to those of water and Perspex® were achieved with fine particles ( $\leq 74 \mu\text{m}$ ) and 15 wt% IA-PAE resin. The overall findings demonstrated that cured SPI-SPC/NaOH/Rhizophora spp. particleboards with 15 wt% IA-PAE are potential materials for development of tissue substitute phantoms that mimic the radiation characteristics of human tissue at low and high photon energies.

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