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Zakaria, A.N., Ariff, T.F.

**Mechanical and Structural Properties of Epoxy Bio-Composite Using Fish Bones as Bio-Filler**
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**Abstract**
This research investigates the mechanical and structural properties of epoxy bio-composites made from recycled bio-waste (fish bones). Epoxy bio-composites are made by embedding fish bone particles into epoxy with weight percentage compositions of 0 wt.% (E), 2 wt.% (E2FB), 8 wt.% (E8FB), and 12 wt.% (E12FB). The fish bone was washed and dried overnight at 70 °C in the oven. Fish bones were crushed and ground into small particles less than 250 µm in size using the grinder. Hardness, density, tensile, and flexural strength were tested mechanically in this study, while surface morphology was investigated structurally using a Scanning Electron Microscope (SEM). The epoxy bio-composite was measured against a 0 wt. % fish bone in epoxy (E). E2FB has the highest hardness strength (140.04 HV), followed by E12FB (138.62 HV) and E8FB (132.33 HV), whereas E2FB has the lowest density (1.14 g/cm3); density increases as the weight percentage of fish bone increased. Regarding tensile and flexural strength, E2FB takes the lead, obtaining the highest in both tests (2.03 MPa and 42.55 MPa) compared to E8FB and E12FB. According to the experimental results, using 2 wt. % of fish bones as a bio-filler in epoxy improves the mechanical and structural qualities of the epoxy biocomposite. The images produced from the Scanning Electron Microscope show that the distribution of the fish bone appeared to have sunk uniformly at the base of the samples. 

**Author Keywords**
Bio-filler; Epoxy; Epoxy bio-composite; Fish bones

**Index Keywords**
Bending strength, Fillers, Fish, Hardness, Morphology, Scanning electron microscopy, Structural properties, Surface morphology, Weibull distribution; Bio fillers, Biocomposite, Biowastes, Embeddings, Epoxy, Epoxy bio-composite, Fish bones, Scanning electrons, Weight percentages; Tensile strength

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