

ABSTRACT

Loss of fingers due to work accidents, domestic trauma, or diseases such as diabetes and leprosy impacts motor function, psychology, and quality of life. In Indonesia, access to prostheses remains low, with only 18-38% of people with disabilities covered by national health insurance. High cost and lack of local manufacturers are the main obstacles. This research refers to the ISO 22523:2006 standard related to the performance and safety requirements of external upper limb prostheses, with a focus on designing and fabricating a finger prosthesis based on epoxy resin-reinforced glass fiber composite or Glass Fiber Reinforced Plastic (GFRP). This material was chosen because it has good mechanical characteristics, such as tensile strength and resistance to deformation, as well as being more affordable and compatible with simple manufacturing methods.

In this study, glass fiber-epoxy composites have been produced using the wet hand lay-up method, with stages ranging from material selection to assembly of the right finger prosthesis for adult women. The composite is composed of six layers of glass fiber with 0° orientation, using AM892-A epoxy resin and AM8927-B catalyst with a mixing ratio of 100:30. Tensile test results showed a maximum strength of 334.7 MPa, bending tests reached 230 MPa, and compressive tests recorded a maximum load of up to 306 N, indicating resistance to bending and compressive forces common when grasping or supporting objects. The average material density was 1.399 g/cm³, supporting the need for lightweight design. Microscopic analysis also showed good fiber distribution and minimal voids, strengthening mechanical performance and shape stability. Overall, the characterization results prove that the glass fiber-epoxy composite meets the functional, ergonomic, and structural criteria as a safe and feasible finger prosthesis material for use in the daily activities of people with disabilities.

Kata Kunci: *Characterization, Epoxy. Glass Fiber Composite, Prosthetic Finger.*