ABSTRACT

Finger prosthetics play a vital role in medical rehabilitation by replacing lost or damaged fingers, improving individuals' ability to carry out daily activities. This study evaluates three biomaterials PLA, PETG, and TPU focusing on elasticity, strength, temperature resistance, and user comfort. PLA excels due to its ease of 3D printing, precision, and consistent strength. With a maximum tensile strength of 405.4507 MPa and stability at temperatures up to 100°C for less than 10 minutes, PLA's hydrophobic nature with a contact angle of 70° and 72° makes it ideal for finger prosthetic applications. PETG is noted for its high tensile strength, suitable for mechanical applications, though PLA shows superior high-temperature stability. TPU offers good low-temperature resistance despite variations in UTS values. PLA emerges as an efficient and effective solution for finger prosthetics due to its ease of fabrication, strength consistency, and temperature stability. Personalized approaches ensure prosthetics are tailored to individual needs, providing precise solutions for enhancing finger function in medical rehabilitation.

Keywords: *Finger prosthetics, PETG, PLA, TPU.*