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### Analysis of Mechanical Properties of Epoxy and Silk Composite Materials

This study looks into new natural fiber reinforced composite material. The fibers are made from natural recycled materials which have some advantages over synthetic reinforcement; including lower cost, equivalent strength, lower density, and degradability. Compression Molding techniques with a pressure of 140 pa and a temperature of 60oC were used to create the composite material samples with various fiber weight ratios. The current investigations involve the fabrication of fiber-reinforced epoxy composite materials and the evaluation of their mechanical properties. Mechanical tests such as tensile testing, impact loading, flexural strength, and hardness were performed on all samples. The maximum tensile strength achieved is 45 MPa, elastic modulus of 1580 MPa, and hardness value is 21.5 Hv. The new composite materials with natural reinforcement are stronger compared to the material without fiber. The reason is due to the combination of fiber and epoxy material.

**Keywords:** Tensile strength, silk materials, fiber-reinforced epoxy, thermal, hardness, and composite materials.

#### Recent Publications

1. Akeel, N.A., Kumar, V.V., Raut, N., et al.(2022), Experimental investigation of cooling potential of a ventilated cool roof with an

air gap as a thermal barrier. Environ Dev Sustain .

2. N Akeel., VV Kumar, N Raut,et al.(2021), An experimental investigation on passive and hybrid roof cooling systems with a double skin envelope., Energy Sources, Part A: Recovery, Utilization, and Environmental Effects, 1-13
3. N Akeel., VV Kumar, N Raut,et al.(2021), Double skin polystyrene-aluminium radiation reflector roofs in arid environments for passive cooling-A case study in Sohar, Sultanate of Oman, Case Studies in Thermal Engineering 28, 101655
4. NA Akeel, V Kumar, OS Zaroog,et al.(2021), Investigation of Mechanical Properties of Silk and Epoxy Composite Materials, Key Engineering Materials 889, 27-31
5. OSZ Norie A. Akeel, Vinod Kumar,et al.(2021), Impact of the Heat Treatment Process on the Properties of Stainless Steel Material, Solid State Technology 64 (2), 1461 - 1471

#### Biography

Norie Allafi Akeel currently works at the Faculty of Engineering, Sohar University. Norie does research in Composite Materials, Failure Analysis, and using Ansys, SolidWorks for FEA. Their current project is (Fatigue Analysis and Composite Materials). His research interest is Mechanical Engineering, Materials Engineering, Finite Element Modeling, Stress Analysis, Finite Element Analysis, Fracture Mechanics, Computational Mechanics, Solid Mechanics, and Simulation Corrosion.

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