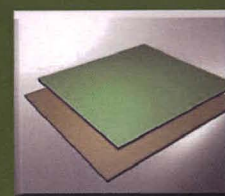


# ADVANCES IN COMPOSITE MATERIALS

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Iskandar Idris Yaacob  
Md Abdul Maleque  
Zahurin Halim



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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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**Iskandar Idris Yaacob  
Md Abdul Maleque  
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## Mechanical Behaviour of Oil Palm Empty Fruit Bunch (OPEFB) Albumen-Composites Concrete

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**Keywords:** composite, concrete, empty fruit bunch, flexural strength, compressive strength.

**Abstract:** The purpose of this chapter is to clarify the mechanical properties of composites concrete utilizing oil palm empty fruit bunch (OPEFB) fiber as the reinforcement and biopolymer from albumen as matrix material. The composite mixture comprised of short-randomly distributed OPEFB fibers at 0, 1, 2, 3, 4, 5 and 6 wt. % while albumen maintains its optimum volume fraction at 65 wt. %. Flexural strength and compressive strength test were carried out on sample with the size of 160 x 40 x 40 mm and 50 x 50 x 100 mm respectively. All samples were tested after 28 days of curing. Maximum flexural strength was achieved at 2.01 MPa for 3 wt.% of fiber content whilst the highest compressive strength was at 5.30 MPa.

### Introduction

Empty fruit bunch from the palm oil tree (*Elaeis guineensis Jacq*) [1] has promising possibility in the construction application [2] where the OPEFB fiber can be utilized as reinforcement. Malaysia produces a great amount of biomass from oil palm industry since this country is one of the largest exporters of oil palm [3-4]. Due to the ecological concerns, the oil palm by-products should be fully utilized into value-added products which shall not only provide environmental benefits but create a new economy to the country. Table 1 summarizes the properties of OPEFB fiber [5-6].

Table 1. Physical and mechanical properties of OPEFB fibre

Property	Value
Diameter ( $\mu\text{m}$ )	248.63 – 551.31
Density ( $\text{g}/\text{cm}^3$ )	0.7 – 1.55
Moisture content (%)	2.21 – 9.53
Tensile strength (MPa)	70.59
Young's modulus (MPa)	1702.71
Elongation at break (%)	11.35