

UNIVERSITI TEKNOLOGI MARA

**THE PREPARATION AND CHARACTERISTICS OF
CHICKEN FEATHER/ EPOXY COMPOSITES**

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for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledge as reference work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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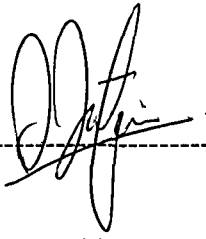
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ABSTRACT

The uses of the natural fibre in the fabrication of the composites are being studied all over the world. Most of the fibre used comes from trees. In this research, the fibre or filler used is obtained from chicken feather. The chicken feather was washed and pulverised to obtain a shorter and uniform fibre. Few tests were carried out as to ensure the processed chicken feather will not degrade due to the washing and drying. The tests are the Thermal Gravimetric Analysis and optimising drying time. The pulverised chicken feather was mixed with the epoxy resins and undergo a fabrication process called 'pressure assisted' hand-layup techniques and this requires a steel mould. The amount of pulverised chicken feather were varies at 10%, 20%, 30% 40% and 50% by weight. The sample (chicken feather composites) comes out from the mould has a dimension of (25 X 25 X 3)mm and was cut using a precision cutter to form the required sample for the physical and mechanical test. The physical test involves are the water absorption test and the density test. Tensile, 3-point bending and impact test were used to evaluate the mechanical properties of the chicken feather composites. For the comparison purposes, sample from the vein and the main shaft of the chicken feather was also fabricated (10% and 50% by weight). The water absorption test shows that with the increase percentage of the chicken feather cause an increase in the water absorption properties. The density test reveals something interesting whereby the chicken feather fabricated confer to two theoretical densities that is the bulk (0.8g/cm^3) and the keratin (1.21g/cm^3). This behaviour gives a significant effect towards the mechanical properties. The tensile and 3-point bending test shows a decreasing pattern of the strength value as the percentage of the chicken feather increases but the strength are comparably the same after 30% of chicken feather loading. The impact test on the other hand shows an increasing pattern with the increase of chicken feather loading. From all the test that was carried out, a simple correlation studies was carried out and it shows that it is insignificant to separate the main shaft and the vein of the chicken feather in order to obtain an overall good mechanical properties for the chicken feather composites. From the research that was carried out, it shows that the higher the chicken feather loading (30% and above), it will give good overall performance for the mechanical properties and also increased the water absorption behaviour.

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