CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

The growing environmental awareness has resulted in a renewed interest in the use of natural material for many applications. Natural fibres are prospective reinforcing materials and their uses until now have been more traditional than technical. They have long served many useful purposes but the application of the material for the utilization of natural fibres as reinforcement in polymer matrix took place quite recently. It show the paradigm has forced industries like automotive, packaging and construction to search for new materials to make the conventional composite materials be a environmentally friendly material. These inorganic fibers present disadvantages like their non-biodegradability, expensive, abrasive and non-renewable.

Furthermore, compared to inorganic reinforcing fibers, natural fibers have a number of benefits, including low density and bio-degradability, less abrasiveness, lower cost and renewable. Natural fiber composites are likely to be environmentally superior to glass fiber composites in most cases. But sugar palm fiber mostly has mechanical properties lower than inorganic fiber. However, there are some solution's to increase the mechanical properties of sugar palm fiber like treated with alkali solution.

Many studies had been carried out on natural fibre likes kenaf, bamboo, jute, hemp, coir, sugar palm and oil palm. The advantages of these natural resources are low weight, low cost, low density, high toughness, acceptable specific strength, enhanced energy recovery, recyclability and biodegradability. For these reasons, synthetic fibre reinforced polymers have emerged as a major class of structural materials and are widely used as substitution for metals in many weights critical components in aircraft, aerospace, automotive, marine and other industries. In general, plant fibre can be classified based on their origins coming from plants, animal or mineral. Thus, a good number of automotive components previously made by glass fiber composites are now being manufactured using natural fiber reinforced composites.

However, in this research, according Bachtiar D., Sapuan S. M. and Hamdam M. M. (2010), natural fiber that is *ijuk* fiber (*Arenga pinnata* or *Arengasaccharifera*) is used as a suitable candidate to reinforce polymer matrix in composite. *Ijuk* fiber is a kind of natural fiber that comes from *Arenga pinnata* plant, a forest plant that can be found enormously in Southeast Asia like Indonesia and Malaysia. This fiber seems to have properties like other natural fibers, but the detail properties are not generally known yet. Generally, *ijuk* has desirable properties like strength and stiffness and its traditional applications include paint brush, septic tank base filter, clear water filter, door mat, carpet, rope, and chair/sofa cushion.

1.2 PROBLEM STATEMENT

The sugar palm fibre is still not been studies widely. Sugar palm can be used to reduce the usage of epoxy as it is a chemical that is not environmental superior. This is also to determine the tensile strength and young modulus of the sugar palm. The fact is sugar palm fibre can be obtained directly from natural resource, cheap and also has advantages due to their renewable nature, low cost, and easy availability. But, the mechanical properties such as tensile strength and young modulus of sugar palm fiber

still lower than inorganic fiber. In this work, the alkali treatment is used for the improvement of the properties of strength.

1.3 OBJECTIVE

The objective of this project are to identify how effect of alkali treatment on the tensile properties of sugar palm fiber reinforce and determine mechanical properties of tensile strength and also to determine tensile modulus (Young modulus).

1.4 SCOPES

To improve mechanical properties of natural fiber like sugar palm fiber. The experiment is conducted for the fiber treatment alkalization and examination of the effect of fiber on mechanical properties such as tensile strength and the result to compare with untreated sugar palm fiber. The experiment will using different concentration of alkali 2%, 4%, 6% sodium hydroxide solution to investigate the change on mechanical properties like tensile strength. It includes the determination of mechanical properties under tensile testing on the basis of ASTM standard.