# EXTRACTION OF SILICA
# FROM EFB FLY ASH
# FOR SBA-15 PRODUCTION

BY

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# ABSTRACT

Palm Oil Empty Fruits Bunch Fibre is the waste generate during the extraction of oil from its fruits. EFB rich in silicate component that made it suitable for natural sillica production. EFB itself is ease to handle, easy to obtain and its cheap materials. In this study, Santa Barbara Amorphous-15 (SBA-15) was produce by using sodium silicate which derived from the EFB Fly Ash via chemical treatment. Before the chemical treatment a purification process is done by using 1M HCl for one hour. The purification of raw materials is needed to remove all the impurities from the sample prepared. This purification process was proving by the XRF analysis. The Sba-15 was analyzed by using FTIR to determine the functional group of the compound and Particle Analyzer to determine the porosity of the and the size of the SBA-15.

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# Chapter 1

## 1.1 Research background

Malaysia is one of the greatest manufactures of palm oil. As the human population increase thus the demands of palm oil production also increase. This palm oil production has many benefits to mankind such as cooking oil, bio-oil and such other things. In palm oil production the oil is extracted from the fruits and leave the solid as the waste product such as empty fruits bunches (EFB) fibre, kernel shell and so on. EFB result in low dispose in cost but with a large quantity, industry start to reuse the empty fruits bunch for more economical application.

In the factory, EFB has been burned for generate electricity and some factory use it as an organic fertilizer since it has numerous of beneficial effect to the soil. However, burning of EFB might turn to environmental problem and not sustainable. Burning off, the EFB can causes air pollution such as haze and heavy smoke. This may result in low air quality community at the nearby area of the industry. Thus, this may lead to healthy issue especially to the children. On the other hand, the using EFB as natural organic fertilizer, results in greener application but the decomposition of EFB may attracts insect and pest. When it starts to decompose naturally it also produce some other irritating smell.

Another utilizing of EFB is in biorefineries to produce bioethanol since it consists of highly cellulose materials. Unfortunately, the production of biofuels in Malaysia are still in development stage. The installation to make a new plant for the production of ethanol are quite expensive and lack expertise on the particular area. Other limitation in the biofuels production is its properties of high volatility, that causes the production of water molecule attach to the tank or surrounding and may cause corrosion. Secondly, this biofuel was not having the same carbon content as the hydrocarbon, thus the measurement of performance is difficult.

Thus, another potential of EFB has been explored to produce more valuable product. In this study it gives a new breath solution to utilize the uses of EFB fly ash. By using this method other impact towards the environment can be reduced. In this study EFB ash are used as silica precursor to produce a catalyst which is SBA-15.

SBA-15 is a Mesoporous component which is more favoured for its remarkably organize mesostructure, aside from high surface area, which let diffusion and adsorption of