ANALYSIS OF CHEMICAL ELEMENTS IN MAJOR PERLIS' AGRICULTURE RESIDUE.

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Introduction

The amount of organic waste obtained from the agriculture industry is abundant in Malaysia but the utilization is still limited. In Perlis, there are three major agriculture residues, sugarcane bagasse, rice straw and rice husk. In view of the shortage of conventional raw material for pulping and the increasing demand for paper products worldwide, non-wood plants and agricultural residues attracted renewed interest. Non-wood plants offer several advantages including short growth cycles [1].

Sugarcane (*Saccarhum officinarum*) bagasse is a residue produced in large quantities by sugar industries. In general, 1 ton of sugarcane bagasse generates 280 kg of bagasse, the fibrous by-product remaining after sugar extraction from sugarcane [2]. However, the utilization of sugarcane bagasse is still limited and is mainly used as a fuel to power the sugar mill [3,4].

These polymers are important for the production of pulp. Annual world rice (*Oryzae sativa*) production was about 577 million tons for 1997 – 98. More than 50 countries contributed to this sum with the production of at least 100, 000 tons of rice annually. One of the countries is Malaysia. Among these large quantities of agricultural residues (rice straws and rice husks), only a minor portion of the residues is reserved as animal feed. However a huge quantity of the remaining straws is not used and burnt in the fields. The air pollution, therefore is a serious problem by burning these residues in this area. Therefore, the use of these straws in pulping or papermaking has many advantages including reducing the need for disposal and environmental deterioration through pollution and fires [5].

Materials and Methods

Sugarcane bagasse, rice straw and rice husk were obtained from a local factory and farmers in Perlis. The samples were first dried in sunlight and then cut into small pieces (1-3 cm). The cut sugarcane bagasse, rice straw and rice husk were ground to pass a 1.0 mm size screen. To reduce errors and confirm the results, each experiment was repeated in triplicate under the same conditions and the content of carbon and silica was given as the average of these three replicates. The fiber dimensions analysis was performed using Scanning Electron Microscope (SEM), MODEL JEOL (JSM/6460LA).

Result and Discussion

Cellulose is a carbon polymer of the sugar glucose and is used by plants to produce cell walls. Plant matter that has been processed to create a solution consisting of cellulose filaments suspended in water can be made into paper. SEM-EDS results for determination of carbon and silica content in sugarcane bagasse, rice straw and rice husk is shown in Table 1.

Table 1 : The content of carbon and silica in sugarcane bagasse, rice straw and rice husk.

Raw Materials	Content of Silica (%)	Content of Carbon (%)
Sugarcane Bagasse	9.78	90.22
Rice Straw	36.14	63.86
Rice Husk	51.70	48.30

In this study, the result from SEM-EDS showed that sugarcane bagasse has 9.78 % content of silica and 90.22 % content of carbon. Besides that, rice straw and rice husk has 36.14 % and 51.70 % content of silica and 63.86 % and 48.30 % content of carbon respectively. It concluded that sugarcane bagasse is more suitable for using as raw material for paper production compare to rice straw and rice husk. It is because high silica content can reduce the quality of paper. These handicaps can cause the need to add alkali to reduce or prevent silicate deposits or install a specific device to remove silica from the black liquors during pulping process. The need to add

alkali to reduce or prevent silicate deposites to remove silica from the black liquors currently limiting the use of rice straws in paper mills [6].

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