Properties and Characteristics of Weed - As Cogon Grass Fiber Pot

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ABSTRACT

The development of fiber pot from Cogon grass has the potential to solve the problem of poly bags dumping after the replanting process. Apart from production using manual methods, through this study, cogent grass pot was tested in order to obtain its special characteristics and morphology. Cogent grass that is tied using the natural resin of corn starch is able to produce exactly the poly-bag pots available in the market today. Among the relevant tests carried out to meet the criteria for replacing existing poly-bags are porosity and absorption, where these characteristics help a good growth process for a plant. Porosity is important to ensure that no water stagnates and causes damage to tree roots and causes trees to die from over watering. The absorption test also helps to retain plant moisture. Scanning Electron Microscope (SEM) is used as an additional test to see to what extent the surface roughness of cogent grass and corn starch mixture adheres well to produce a quality pot fiber.

INTRODUCTION

Weeds are plants or weeds that live wild in temperate climates. This weed, also known as Imperata Cylindrica easily reproduces through seeds which are often called spores that are an easily carried by the medium of wind. It can also be propagated by using tuber cuttings or better known as rhizomes. Weeds are plants that multiply easily and will usually take over an area quickly. However, Lalang has its own merits. This lalang plant helps to reduce soil erosion, especially if it lives on the slopes of hills [1-2].

Weeds have strong fibers that are also biodegradable or biodegraded - they break down naturally. With its strong and naturally degradable properties, weed is seen as a suitable material to be used as a substitute for polybags in the non-biodegradable market. The black polybags that are available in the market are made of thick polyethylene. The waste of this polybag will cause pollution to the environment because the plastic material will not be decomposed or discarded.

Figure 1. Cogon Grass Fiber Pot.

The objective of this study is to ensure that Cogent Grass Fiber Pot is suitable as a natural material that can replace the existing polybag by studying its properties and characteristics to ensure that its usege can continue to conserve and preserve the environment.

METHODOLOGY

The Cogon Grass was collected from a reserved land at Kulim Golf & Country Resort. It was cut to 2.0 cm – 5.0 cm long. Several tests were carried out on the Cogon Grass Fibers that have gone through the cleaning process to eliminate dirts and other contaminants. The cogon grass also went through a blender process to remove the cellulose from the weed leaves and then the weed s were sundried before some tests were carried out on it.

Table 1 Shows the making process of Cogon Grass Pot Fiber

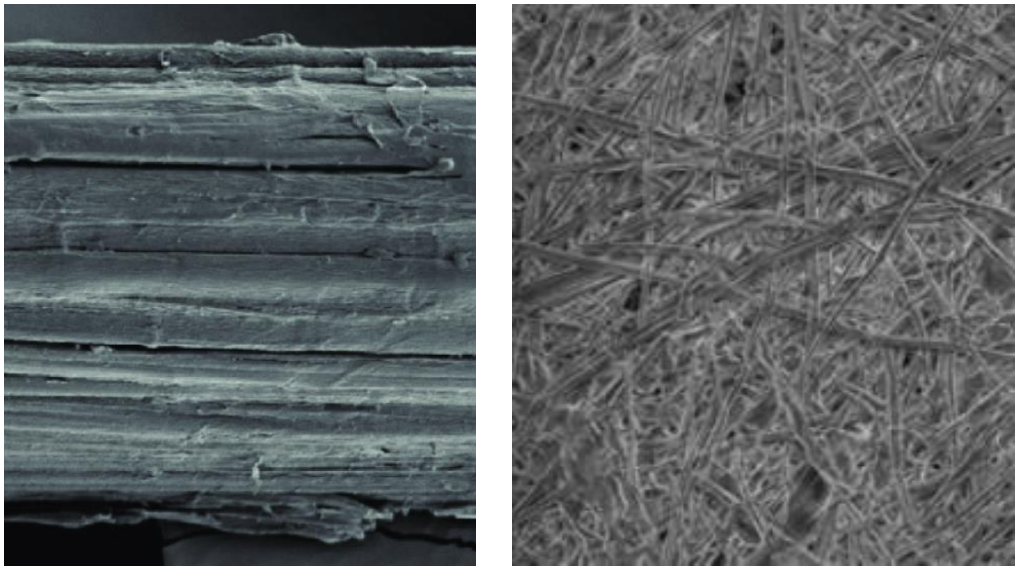
No.	Figure	Description
1		Pick a cogon grass. Clean it with water and cut into 2.0-5.0cm long, for easily blending process.
2		Cogon grass were blended with some water. Dried through filter (refer the figure) and put under the sun until completely dry.

3		Natural resin was used as a binder
4		The pot had shaped in a mold and dried in room temperature.
5		The last product.

RESULTS AND DISCUSSION

Fiber Surface Morphology

Scanning Electron Microscope or SEM is a microstructure test that is most suitable for examining the fiber surface for the purpose of examining the fiber surface to see the roughness of the surface. In addition, SEM provides important information about the adhesion of the fiber surface when it is intended to be used as a Cogent Grass Fiber Pot.



(a) (b)

Figure 2. The untreated banana fibre (a) and the cogon grass fiber (b).

The untreated banana fibers (Figure 1(a)) showed higher deposits of impurities on its surface which led to poor interfacial adhesion of the fiber matrix [4]. As for (Figure (1b)) shows the SEM images of the Cogon Grass 500x level of magnifications of the fibre physical structure on the sheet produced [6]. This situation allows the production of a clean product since the natural resin is used for a binder.

Porosity

Porosity can be determined using the formula

$$\varepsilon = 1 - \left(\frac{m}{\rho V}\right) x\ 100$$

Where ε is the combined porosity of the fiber in percent (%), m is the fiber mass, ρ is the fiber density (g/cm^3), V is the compressed fiber volume (cm^3) [3].

m = 0.44 gram

ρ = 5.44 g/cm^3

v = 0.18 cm^3

V = 0.096 cm^3

Therefore;

$$\varepsilon = 1 - \left(\frac{m}{\rho V}\right) x\ 100$$

$$= 1 - \left(\frac{0.44}{(5.44)\ (0.096)}\right) \text{ x } 100$$

= 15.7%

From the observation, the porosity amount is quite low, due to the absorption properties of the Cogon Grass Fiber Pot. Lots of water will be absorbed in the fiber and helps to moist the soil in the Cogon Grass pot. In addition, the porosity of Cogon Grass Pot Fiber will protect the plant from soaking into too much water that can harm the roots.

Absorption Testing

Absorption test

Sample 1

Early mass, m_o = 1.26 gram

Mass after soaking process, m_1 = 3.76 gram

$$= \frac{m_1 - m_o}{m_1} = 0.6649$$

= 66.49 %

Table 2 The results of absorption test

Sample	Sample 1	Sample 2	Sample 3	Mean value
Percentage (%)	66.49	65.61	62.05	64.72

Since the sample has been manually made, it would be a bit difficult to handle absorption test regarding of tiny sample size and fragile properties. Regardless, the results show the good outcome of biodegradable properties for the fiber.

The moisture content and water absorption of the composites did not show any significant changes following the addition of Cogon Grass Fiber

CONCLUSION

From the SEM images, it show that the Cogon Grass Fiber for pot has the cross link uniform fiber pattern, straight with abundant long and thin fiber that make it suitable as a biodegradable pot. In addition, the cross-link fiber helps the bonding process for the pot fabrication process.

The Cogon Grass Fiber Pot was successfully tested in porosity testing, which the roots would not soak in water that can damage the plant roots. The absorption properties also helps to maintain themoisture of soil in pot.

The results from this study provide the finding and understanding of that the Cogon Grass Fiber are highly potential as a new material to produce a biodegradable pot. In conclusion, from the outcome of study, the polybag use can be reduced and help to save the environment

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