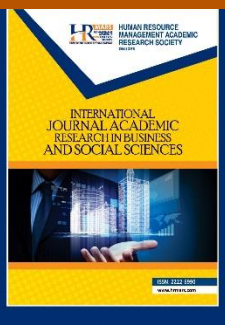

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Preliminary Production of Material Compound from Sago Waste

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Abstract
Sago palm or its scientific name, Metroxylon sago Rottb is commonly found in tropical low forests and processed into sago flour. Processing of sago flour will produce sago waste (SW).This excess waste has been found to cause ecosystem imbalance. The research looks into the preliminary process of recycling the sago waste into a new material compound that can be used by any modeler as a substitute in the production of any products that are compatible with the material. The process goes through the filtering stage, drying stage and molding stage using only natural resources as the main ingredients with different level of contents tested. The compound is also tested for its durability as a

modeler material. The research shares the results from the process, the end product that can be used for model making and a sample of a product that is produced from the material compound.
Keywords: Sago waste (SW), Ecosystem, Binding, Dried Sago Waste (DSW)

Introduction

Malaysia has the largest amount of sago cultivation with its cultivated area covers 200,000 hectares. The largest sago cultivation area is located in Sarawak. Most sago plants are planted around Dalat, Pusa and Mukah. The sago planting area is 111,383 hectares planted by smallholders while 24,531 hectares are planted by the estate (Abner and Balitka, 1999). 75% of sago cultivation is recorded in Mukah and 50% sago flour is produced from the cultivation. According to a mill producer in Mukah, at present 2000 to 3000 logs of sago trees are processed daily which accumulates to 100 tonnes of waste daily for one mill. Previously, sago waste was dumped into the river Mukah and without strict regulation from the authority, the chances of sago waste being dumped into river was high. At present, the sago waste is still being dumped into the river (interviewed with the Mukah sago mill owners in 2017). Many research have been conducted related to sago waste, such as Bujang (2014) using sago as food and fuel alternative, Zainab (2012) in using sago as sound absorbing panels and Awg-Adeni et al., (2012) on sago for bioethanol production. However, there is yet any research that look into transforming sago waste into substitute materials that are currently used to model making products such as car model and anything similar. Therefore this research looks into conducting a process of transforming sago waste into material compound that can be used for model making products.

Material and Method

Material

Dried sago waste fiber

Sago waste was obtained from Herdsen Sago Mill,Pusa, Sarawak. Sago wastes are produce at the end of the process of sago flour production. The wet waste are filtered and squeezed to separate water from sago waste. This water and drained sago waste fiber (SWF) have their own benefits. After that the fiber are treated with cinnamon powder for curing or treatment as recommended by Retno (2016) in the curing and treatment method. The treated sago waste are dried in the oven at 120^{o}C for 24 hours to prevent bacterial growth in the fiber. Additionally, drained wastes are easier to blend into powder. 58% of the starch content is still present in the drained sago waste although it has been dried and this conform the findings by Awg-Adeni (2012) in his research on sago waste for bioethanol production.

Binding

Three types of binders are used for the production of compound materials. The binders are mixed with dried sago waste separately. Three types of starch used were sago flour, commercial starch flour and corn flour (Table 1). These three different starch can be combined with dried sago waste fiber and the suitability of each starch are assessed separately.