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Corresponding Author:

izyank.zainol@gmail.com

## CONSERVATION APPROACH OF UNDERUTILIZED SCREW-PINE LEAVES (DAUN MENGKUANG) MATERIAL: HOME ACCESSORIES DESIGN MADE OF SCREW-PINE LEAVES BIO-COMPOSITE

Izyan Syamimi

Khairul Aidil Azlin Abd Rahman

Saiful Hasley Ramli

Faculty of Design and Architecture,

Universiti Putra Malaysia

izyank.zainol@gmail.com

### Abstract

Screw-pine leaves is a material that widely used by local crafter to produce a daily necessity product in old time. With the fast-growing ability, the leaves are easy to be found wild in several areas in Asia. In this the modern lifestyle, Malaysian did not used the material as much as the old time. Therefore, the material has been underutilized material. As a popular craft material, screw-pine leaves are proven to be good material with decent strength and flexibility. Herein, the researcher seized an approach to conserve the utilization of screw-pine leaves as material by developing several home accessories product designs. Product design in this study is a stool, a lighting, a clock and a set of coasters. A set of questionnaires is created, and the attributes are selected through the KJ Method. The questionnaire is run online and validated offline. The analysis shows the differences between both online and offline method. The results, based on comparing the attributes, shows the respondent is positively accepting the form of the design yet least putative on the visual. While among the 4 products, the coaster design is the most acceptable product calculated followed by the stool. Though, other analysis shows that the lighting design is the most prospective product to display the potential of screw-pine leaves bio-composite. Through the study, the application of screw-pine leaves bio-composite demonstrates the example of utilization of screw-pine leaves could lead a new product line in screw-pine leaves industry in Malaysia.

**Keywords:** Screw-pine leaves, Bio-composite, home accessories product.

### INTRODUCTION

As one the main material used in local craft, screw-pine leaves or locally called *daun mengkuang* is one of the industries that highly known bring up the Malaysian handcraft industry. The application of screw-pine leaves which widely known with the skillful of hand weaving product, is mostly a daily necessity product such as mats, cloth organizer, food cover, etc. With the least demanding on those kinds of product that been preferable in different material as plastics<sup>1</sup>, the screw-pine leaves industry profit is fully depending on the custom art craft for several occasions and small tourism business (Ismail, 2016). However, this is not the only issue, according to Nor Hatina Shuib (2018), the falling number of the professional plaiter, and the company that still running the business<sup>2</sup> is another subject that could lead to the extinction of this heritage business.

According to Plant use (2016) screw-pine leaves is an easy plant to be found in place with high volume of water content such as swampy area, riverside, and coastal area<sup>3</sup>. The researcher also identifies that there are 3 types of screw-pine leaves is being used in Malaysia art-craft industry depending on the type of product. Plant Use (2016) also mention among all the screw-pine leaves species, Pandanus Atrocarpus or locally called Mengkuang Minyak have the strongest characteristic<sup>3</sup>. It is also a flexible plant that easy to adapt to various types of soil said Thomson and others (2006)<sup>4</sup>. In addition, the screw-

pine trees are a fast-growing plant according to Azahana and others (2015)<sup>5</sup>, that usually took only 3 months matured to be harvested for craft material. With such characteristic, the underutilized screw-pine leaves is a waste that may one day being endangered species because of the modernization area as already happen to several species of Pandanus (Azahana et al, 2015)<sup>5</sup>.

The application of natural fiber bio-composite in product design has been recorded and showcased in several media. For example, the T.I.K.A.R (Transformation, Innovation Conservation and Design Appreciation) program which is the collaboration between designer and local crafter in conserving the screw-pine leaves industry by introducing several new product lines during Export Furniture Exhibition at Kuala Lumpur Convention Centre and UPM Innovation Open Day at Gallery Serdang in 2015. Other than that, Nina Azarello (2016)<sup>6</sup> once mention about rush chair designed by Christopher Jenner is a well-recognized design made of rush and English oak. The use of bio-composite material with the preservation of the natural material appearance shows the uniqueness of the material such as JOOOM designed by Yoav Shavit Studio<sup>7</sup>.

## METHODOLOGY

Screw-pine in this study is supplied from a local enterprise from Melaka that still running the screw-pine leaves business with a small area of screw-pine leaves planted intentionally for their business. The conservation approach in this study is using a screw-pine leaves bio-composite which is a new material that applied on several home accessories product designs. A simple design that is just used enough to study and prove the application of screw-pine leaves bio-composite is possible. Four designs which are a stool, a lighting, a clock and a set of coasters is used to test the material application. The researcher using the KJ method with a group of professional designers to gain the attributes that used in the survey. A set of survey is put online using the Google form. The same set of questionnaires is used on, direct approach as validation with limited and selected respondent. The online survey has been run for 2 weeks, got 71 respondents of user with various backgrounds. While the offline approach using 10 respondents that have design background, academician, professional designer and manufacturer is held one day at Universiti Putra Malaysia with a session of presentation about the research and products by the researcher.

## ATTRIBUTES BY KJ METHODS

Implementing KJ methods are a process and technique of discussion that highlights subjective and qualitative data priorities (Spool, 2004)<sup>8</sup>. The attributes requirement in the survey is the focus characteristic that used to validate the application of screw-pine leaves bio-composite in product designs.



Figure 1 The record during the discussion using KJ Method

The figure 1, shows that the conclusion on KJ Methods diagrams that illustrate by the researches during the discussion. The professional designer begins with throwing out all the keywords when the researcher keeps circling the words with different color whenever the words is spoken twice or more. The more repetition of words and circle, color, the attributes are selected. 12 attributes are selected in this study is; visual, form, texture, practicality, color, concept, lifestyle or trends, function, traditional material, green material, quality, and marketability.

## **THE HOME ACCESSORIES PRODUCT DESIGN**

Four designs that demonstrative different type of sector is design. A stool is indicated the furniture industry, the lighting design and two small product design of clock and coasters.



**Figure 2** Stool made of screw-pine leaves bio-composite (Source: researcher)

Figure 2 shows the stool design that made of screw-pine leaves bio-composite. The application of the screw-pine leaves bio-composite in this design is produced by using molded cold press method. The implementation of screw-pine leaves in furniture design is an approach to introduce the screw-pine leaves new product line.



**Figure 3** Lighting features made of screw-pine leaves bio-composite (Sources: researcher)

Figure 3 shows the lighting features that also produced by the molded cold press method. Similar to the stool design, both of the design are used the multi directional arrangement and original strip that usually used by the local crafter in hand crafted product. This is purposely to retrieve the original looks of screw-pine leaves as heritage material. Other than that, the multi directional arrangement is used to be optional methods in the production without using professional plaiter.



**Figure 4** Clock and coaster design of woven screw-pine leaves bio-composites (Sources: researcher)

Figure 4 shows the clock and coaster design that using the woven screw-pine leaves bio-composites with different numbers of layers. The clock design is using a triple layer while the coaster is using only double layers. The differences of number of layers are due to the products that needed certain stage strength.

## SURVEY AND ANALYSIS

Each of the designs is validated through 12 attributes selected from the KJ methods and several open-ended questionnaires. The analysis is split into two categories which is online survey and offline survey. The reasons of the two-way justification methods are doing the comparison between the data.

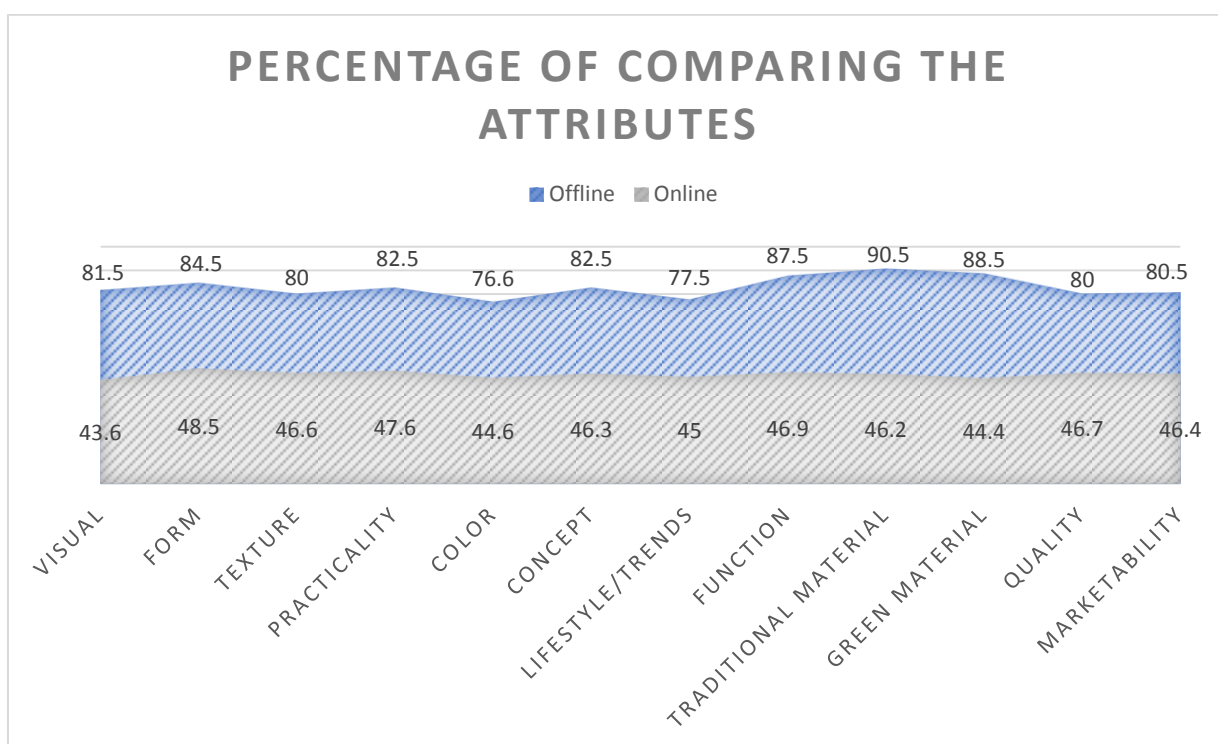
**Table 1** The analysis of survey on 4 products based on attributes (n~number of respondent)

	Attributes	Stool	Lighting	Clock	Coaster
ONLINE SURVEY : 71 n	Visual	2.29	2.09	2.21	<b>2.57</b>
	Form	2.64	2.16	2.3	<b>3.4</b>
	Texture	2.36	2.21	1.55	<b>2.66</b>
	Practicality	<b>2.7</b>	2.28	2.24	2.47
	Color	2.31	2.04	2.18	<b>2.5</b>
	Concept	<b>2.49</b>	2.0	2.39	<b>2.49</b>
	Lifestyle/Trends	2.34	2.18	2.26	<b>2.43</b>
	Function	<b>2.6</b>	2.14	2.25	2.52
	Traditional Material	<b>2.54</b>	2.15	2.23	2.45
	Green Material	<b>2.46</b>	2.0	2.15	2.38
	Quality	<b>2.56</b>	2.08	2.44	2.38
	Marketability	2.57	2.18	2.04	<b>2.61</b>
	<b>Total (%)</b>	<b>49.83</b>	<b>43.21</b>	<b>43.78</b>	<b>50.23</b>
OFFLINE SURVEY : 10 n	Visual	4.2	<b>4.6</b>	3.3	4.2
	Form	<b>4.7</b>	4.6	3.4	4.2
	Texture	4.0	<b>4.2</b>	4.0	3.8
	Practicality	4.1	4.1	<b>4.4</b>	3.9
	Color	3.8	<b>4.6</b>	3.0	3.5
	Concept	4.3	<b>4.4</b>	3.9	3.9
	Lifestyle/Trends	3.8	<b>4.4</b>	3.6	3.7
	Function	4.2	<b>4.6</b>	4.2	4.4
	Traditional Material	<b>4.9</b>	4.5	4.3	4.4
	Green Material	4.3	<b>4.6</b>	4.3	4.5
	Quality	4.1	<b>4.3</b>	3.5	4.1
	Marketability	4.1	<b>4.6</b>	3.5	3.9
	<b>Total (%)</b>	<b>77.3</b>	<b>89.16</b>	<b>75.6</b>	<b>52.2</b>

Source: data collected and analysis by the researcher 2018

Table 1 shows the documentation of the survey analysis based on the attributes and categorized by two methods which is online survey and offline survey. Obviously, it is showing the huge differences of data between both methods. From online survey, the product with the highest percentage is the coaster's design. While from the offline survey, the lighting shows the highest percentage. Comparing to each product, different attributes shows different highest record (red bold mark). For example, the marketability attributes, the online survey shows the coaster design is most marketable. While offline survey shows that the products with high marketability is lighting. Some of the respondents do give their opinion in these attributes mentioned that the coaster is the smallest item, in terms of costing it may lesser than others, however, lighting design have more attractiveness because the arrangement of the screw-pine leaves bio-composite in this design is using 3 colors of screw-pine leaves.

While comparing the attributes listed, the online survey shows the respondent highly thought that the stool design has a good practically. The offline survey also highly agreed that the stool has represented the awareness on using the traditional material.



**Diagram 1** percentage of attributes comparison.

Overall, the researcher also analyzes the comparison between the attributes on the survey. Another gap has been illustrated between the online survey and offline survey. The highest attributes from online survey are the form of the design while manual survey respondents appreciate the study objective that utilized the traditional material. Through this study, it is showing the significant of the validates the data by running another survey directly approach to the respondent. By approaching the respondent and gets the respondent to understand the whole concept, objective and real live visualizing the research and study is much more appropriate in validating data.

Through an online survey, the respondent that came from various backgrounds is a direct user. The opinion from direct user that did not fully understand the research objective is the reasons the data from online survey is lesser than the offline. However, the online survey does receive 46.5% opinion and 57.7% support from the total number of respondents. Mostly, shows their attractiveness on the researcher approach on utilizing traditional material. Some of them also suggested some recommendation. Generally, the suggestions are more on developing the design in better appearances.

## CONCLUSION

In the nutshell, this study is focusing the application of screw-pine leaves bio-composite in several designs of home accessory products. Four different types of design in this study is validated through survey online and offline. The attributes used in the survey are the sets of subjective keywords and data selected by using KJ methods. The researcher analyzes and found the higher preferable product by online survey are the sets of coasters. While the offline survey shows that respondent choose the lighting design. The implementation of new material of screw-pine leaves bio-composite in this study is an example and proof of the material potential.

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