A preliminary study of tourists and vendors perception on the development of tourism souvenirs using natural dye from plants

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Abstract. The souvenir industry encompasses both handmade and massive scale productions. Production of coloured textiles becomes one of the basic technologies in human civilization. Based on the traditional knowledge of Temuan community lived in Taman Negara Johor Gunung Ledang, this research aims to develop souvenir products with t-shirts by adding natural color from Curcuma longa and Lawsonia inermis Linn. In order to develop the products, some steps were taken into account included the selection of plants part, extraction method, selection of mordant and technique used, and dyeing process. The color of aqueous extraction from C. longa and L. inermis were deep yellow and deep red, respectively. However, the color obtained on the t-shirts was slightly different. The perception of vendors and tourists in Taman Negara Johor Gunung Ledang (Waterfall), Tangkak, Johor towards developed souvenir using natural dye from plants are done through random survey session by distributing the questionnaire to the 122 respondents. 120 (98.4%) respondents reacted positively towards the souvenirs developed from natural plants based dye.

1. Introduction
Souvenir act as an important component of tourists’ evidence during their travel and tourism experience [1]. Souvenir using natural sources and made by local communities become a pull factor for the tourist to choose and purchased it as memento. The use of natural dye in production of food, cosmetics and also textile has become widespread as the communities start to realize the benefit of natural dyes to their health as well as to the environments. Furthermore, natural dye shades are softer, lustrous and soothing to the human eye making it easily to mix and match to other colour range [2]. Apart from plants, the natural dye sources can also be obtained from animals and minerals. In Malaysia, plants have become the main sources for colorants and this include parts of the plants such as the fruits, leaves, flower, barks and root [3]. From previous study, traditional knowledge of Temuan community on natural dye at Taman Negara Johor Gunung Ledang had identified 12 species of plants used by the community. Curcuma longa and Lawsonia inermis Linn were mostly used by Temuan community as dyeing purpose [4]. Today, C. longa or turmeric extract are used widely as textile dyestuff other than food colorant and cosmetic purposes. L. inermis Linn or known as henna is another plant used by the community that is widely used for decorating finger nails and hair dye as well as to
impacts colours to textile. It can be proved by a previous study that been conducted on henna in which it gave a deep brown colour on the clothes after the oxidation but become lighter after desizing [5].

2. Material and methods

2.1. Sampling site
Site visit and survey session had been done at Taman Negara Johor Gunung Ledang (Waterfall), Tangkak, Johor (Figure 1).

![Figure 1](Google Earth, 2019)

**Figure 1.** Map of area within Taman Negara Johor Gunung Ledang (Waterfall), Tangkak, Johor. (Google Earth, 2019)

2.2. Development of souvenir
Clothes have been chose as tourism souvenir product development using natural dye from plants. Figure 2 shows the flowchart of developing the souvenir. The finished souvenir products then act as the samples for survey session.

![Figure 2](Flowchart of developing of souvenir)
2.2.1. Selection of plants. The bulb or mother rhizomes of *C. longa* and young leaves of *L. inermis* were selected as they have been used the most by Temuan community for dyeing purposes [4].

2.2.2. Extraction of the plants. In this study, aqueous extraction was used as the method is suitable for dyeing the textiles or clothes [6]. The plant materials were grounded to pieces of about 1 mm dried under the shade for one day and dried again in a hot air oven at 80°C for one hour then grinds it into powder form to get a proper extraction result. The dyestuff extracted with boiling water by applying a liquor ratio of 1:20, corresponding to a ratio of 1 g plant material to 20 mL of water. About 100 g of plants powder were used during simmering process along with 2 liter of distilled water. The duration of the extraction fix at 30 minutes with temperature of water at 100°C. The insoluble residue was separated by sedimentation and filtration. The resulting extract then been used for the dyeing process.

2.2.3. Selection of fabric. In this study, white t-shirts made from mixture of polyester and cotton which readily in market were chosen [5]. The affinity to dye on the polyester/cotton t-shirts is high, readily available and affordable. Other than that, the t-shirts also tend to hold their shape well compared to others [7].

2.2.4. Selection of suitable mordant. Vinegar (acetic acid) and cooking salt (sodium chloride) were chosen as mordant for turmeric and henna respectively [5]. The used of mordant in this study is to brighten the dye colour. Mordant also tolerant to washing and showed good washing fastness [8]. Moreover, mordant also not alter the colour of dye solution [5].

In this study, meta-chrome mordanting method was selected. Meta-chrome or called as simultaneous method where both mordant and dye were applied simultaneously in the dye bath. The quantity of the mordant was 10 % on weight of fabrics [9].

2.2.5. Dyeing process. Tie and dye process is a method that applied in this study. It resists the dyes through deliberate and systematic tight tying of the material to produce a pattern such as swirl tie pattern. It involves simple steps; wash the cloth, fold and tie it, then dye the material, rinse and dry under the shade. Table 1 below showed the formulation for dyeing the cloth with dyestuff from turmeric and henna sources used in this study.

| Preparation          | Condition              |
|----------------------|------------------------|
| Weight of the cloth  | 100 g                  |
| Volume of dyestuff   | 1.8 L                  |
| Mordant              | 10% of cloth’s weight  |
| Mordant type         | NaCl and CH₃COOH       |
| Temperature of dyestuff | 100°C              |
| Time for immersed    | 60 min                 |
| Cloth’s motif        | Swirl tie pattern      |

2.3. Perception survey
Random survey sessions were conducted at Taman Negara Johor Gunung Ledang (Waterfall) which involving the vendors and tourists as the respondents. The structured questionnaire divide into three parts; Section A for demographic information, Section B for knowledge of the respondents about the souvenirs’ development using natural dye from plants and Section C about the perception of vendors and tourists towards the souvenirs using turmeric and henna as the dyestuffs.
3. Result and discussion

3.1. Souvenir product using turmeric and henna
The extraction of the turmeric secretes a deep-yellow colour while for the henna secrete a deep-red colour. After the dyestuff applied on the clothes together with the mordant, the result shows that turmeric producing a yellow colour while the henna is light brown (Table 2). The finish products then packaged in gift boxes and the tag card are attached on the souvenirs. On the tag card information about the types of natural dye that has been used, the methods and also the benefits of natural dye.

| No. | Extraction of the plants | Finish products | Souvenirs |
|-----|--------------------------|-----------------|-----------|
| 1   | *Curcuma longa*          | Deep-yellow     | Yellow    |
| 2   | *Lawsonia inermis Linn*  | Deep-red        | Light brown |

3.2. The perception of vendors and tourists on souvenirs based on natural dye
Figure 3(a) shows the perception of the souvenir products among the respondents towards tourism souvenir made from natural dye. It shows that 120 (98.4%) out of 122 respondents like the souvenirs, while only 2 (1.6%) dislike.

In this study, the tourism souvenir products that have been developed were focusing on the colour, pattern and uniqueness. Colour can be defined as the aspect of any object that may be described in terms of hue, lightness, and saturation. Pattern can be described as a repeating unit of shape or form, but it can also be thought of as the skeleton that organizes the parts of a composition [10]. Unique can be defined as being the only existing one of its type or more generally, unusual or special in some way. The souvenirs became unique when it was locally made, using local material and made by local people [11].

“Unique” was the highest number of respondents choose on it with 46 (37.7%) (Figure 3 (b)). 38 (31.1%) of the respondents choose “Colour” as they most like about the souvenir. In this study, the souvenir products were successfully made by using natural dye from plants which were *Curcuma longa* and *Lawsonia inermis Linn*. While 36 (29.5%) of the respondents choose on the “Pattern” of the souvenir as their answer. The pattern used in the production of souvenirs was swirl tie pattern. The respondents who answer the question with “Others”, stated that the souvenir product were nature friendly as it was made from natural sources which was natural dye from plant extract (*C. longa* and *L. inermis*) and also natural mordant (salt and vinegar). While the other respondent indicates that the packaging of the souvenir product more attractive compared to the souvenir itself.
Figure 3. (a) Perception of the respondents towards souvenir product and (b) level of interest among respondents towards souvenir from natural dye

![Perception](image1.png)

![Level of Interest](image2.png)

**Figure 3.** (a) Perception of the respondents towards souvenir product and (b) level of interest among respondents towards souvenir from natural dye

Figure 4 shows the comparison between souvenirs with similar products available in the market. Number of respondents who reacted with “Better” on the question asked was 80 (65.6%) people. This is might be due to the advantages of the natural dye to the consumers in which it were free from chemical used, environmental friendly and also save to skin if in contacted. 35 (28.7%) of the respondents choose on “Similar” while 7 (5.7%) stated that the souvenir were “Worse” than similar products available in the market. Some of the respondents stated that the colour of the cloth may change when exposed to the sun, sweat, and air.

Next, Figure 5 indicates that 94 (77%) of the respondents reacted the question with “Yes” as the products developed can be attraction to the tourists. It can be reinforced by the answer of the respondents towards the question on the similar of these souvenir products available in the market. The respondent stated that the souvenir were better than similar product, so it able to draw attention towards souvenirs’ fan. Besides that, the souvenirs are made up from natural sources in which the dyestuff are from the extract of turmeric and henna while the mordant are the vinegar and salt so it maintain the authentic value on the souvenir. 26 (21.3%) of the respondents choose on “Maybe”. It is because they not sure either this souvenir products able to magnetize the souvenirs’ fan. Some of the
respondents not familiar with the product made up from natural dyes. While the remaining respondents, 2 (1.6%) select “No” as they questioning on the tenacity of the dye on the cloth, either it will fade or not.

4. Conclusion
In conclusion, the souvenir products made from plants based natural colour are mostly accepted by the respondent. By raising the environmental concerns towards the use of synthetic dye has emphasized the need for exploring the benefits of natural dye especially for the textile sector. Moreover, it is also able to educate and encourage awareness among the communities.

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