Jurnal Biotik. P-ISSN: 2337-9812, E-ISSN: 2549-1768
Vol. 12, No.1 Ed. April 2024, Page: 12-22

ETHNOBOTANICAL STUDY IDENTIFICATION OF PLANT TYPES THAT CAN BE USED IN ECOPRINT PRODUCTION

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DOI: 10.22373/biotik.v12i1.19431

ABSTRAK

Penggunaan pewarna sintetis pada industri tekstil menghasilkan limbah cair apabila tidak dilakukan *recycle* dapat menyebabkan pencemaran bagi lingkungan. Selain itu dapat menyebabkan terjadinya kontaminasi pada air, baik di permukaan maupun setiap tetes yang digunakan oleh manusia serta terganggunya ekosistem bahkan dapat membunuh kehidupan pada ekosistem perairan. Sehingga diperlukan alternatif pengganti pewarna sintetis berupa tumbuhan sebagai pewarna alami. Organ daun pada tumbuhan dimanfaatkan kandungan warnanya, tulang daun serta permukaan daun dapat dijadikan motif tekstil yang disebut dengan *ecoprint*. Tujuan dari penelitian untuk mengetahui jenis-jenis tumbuhan yang dapat dijadikan sebagai bahan pembuatan ecoprint sebagai pengganti pewarna sintetis serta mengetahui bagian-bagian tumbuhan yang dapat dijadikan sebagai bahan pembuatan *ecoprint*. Metode dalam penelitian ini menggunakan deskriptif kualitatif berbasis dari data hasil studi literatur dan referensi kepustakaan mengenai data dan informasi yang terkait dengan penelitian. Hasil penelitian menunjukkan bahwa terdapat 30 jenis tumbuhan yang dapat digunakan dalam *ecoprint*. Jenis tumbuhan berupa habitus herba, rambat, semak, perdu dan pohon. Pada habitus herba ditemukan 5 jenis tumbuhan, 3 jenis dari habitus rambat, 7 jenis dari habitus semak, 10 jenis dari habitus perdu dan 5 jenis dari habitus pohon. Bagian-bagian tumbuhan yang dapat digunakan dalam pembuatan ecoprint adalah bagian daun, bunga, batang dan akar. Hasil penelitian menunjukkan terdapat 30 jenis tumbuhan dari 21 famili yang digunakan dalam pembuatan *ecoprint*. Bagian-bagian tumbuhan yang dimanfaatkan dalam pembuatan *ecoprint* adalah bagian, daun, bunga, batang dan akar. Akan tetapi tidak semua bagian-bagian setiap jenis tumbuhan dapat digunakan untuk proses pembuatan ecoprint.

Kata Kunci: Etnobotani, *Ecoprint*, Pewarna Sintetis, Pewarna Alami, Habitus.

ABSTRACT

Used of synthetic dye in the textile industry produced liquid waste if it is not recycle with properly, it can cause pollution and contamination of water both on the surface and every drop used by humans, disrupting ecosystems and even killing life in aquatic ecosystems. Therefore, an alternative to synthetic dye is needed by using plants as natural dye. Leaves can be used for their color content; leaf bones and leaf surfaces can be used as textile motif called ecoprint. This research purposing to find out the types of plants that can be used as materials for making ecoprint as a substitute for synthetic dye and also to find out the parts of plants that can be used as material for making ecoprint. The research method used is descriptive qualitative from literature study and literature references regarding data and information related to research. The results showed there are 30 types of plants that can be used in ecoprint. This habitus plants are herbaceous, vines, shrubs, shrubs and trees. From herbaceous habitus found 5 species of plants, 3 species of vine habitus, 7 species of bush habitus, 10 species of shrub habitus and 5 species of tree habitus. The parts of plants that can be used in making ecoprints are the leaves, flowers, stems and roots. The results showed there were 30 species of plants from 21 families that could be used in making ecoprint. The parts of plant can be used in making ecoprint are parts, leaves, flowers, stems and roots, but not all parts of every type of plant can be used in the process of making ecoprint.

Keywords: Ethnobotanical, Ecoprint, Synthetic Dyes, Natural Dyes, Habitus

INTRODUCTION

Various types of plants have been used as a source of food, clothing, medicine, building materials, cosmetic materials, and raw materials in industry [1]. In the textile industry, for example, the plant can be used as natural dye.

Dyeing process in the textile industry using natural dye and synthetic dye. However, the coloring process using synthetic dye can produce waste that needs to be reprocessed so as not to pollute the environment [2]. Synthetic dyes are also toxic to several types of organisms in the surrounding environment [3].

The textile industry considered as one of the biggest polluting industry on the world. One of the forms of pollution produced is liquid waste that is not properly reprocessed, such as synthetic dye, suspended solids, heavy metal, and complex chemical component [4].

The results of laboratory analysis on kale from the study site

showed that there were heavy metals Cd with 12.06 mg.kg, Cr with 41.54 mg/kg, Pb with 69.42 mg/kg, As with 2.0 mg/kg and Zn with 424 mg/kg derived from textile industry waste. The content of these heavy metals is actually higher when compared to the metal content in the soil where the kale plants grow. Therefore it can be concluded that heavy metals accumulate more in plants than in water and soil. The accumulation of heavy metal in plant is very dangerous for life because they are toxic [5].

The other impact resulting from the disposal of liquid waste is not recycle properly can causing pollution and contamination of water both on the surface, disruption of ecosystem and even kill life in aquatic ecosystem, causing odors resulting from the decomposition of anaerobic substance. and inorganic, and producing mud causing blockages resulting in flooding [6]

From the situation, needed as a substitute for synthetic dye by using plant as natural dye. Leaves used as color content, leaf bones and leaf surfaces used as textile motif called ecoprint. Ecoprint is a process of printing colors and shapes in fabric by direct contact. Technic of ecoprint producing color from natural material used to decorate the surface of a cloth with various shapes [7].

Ecoprint can be an alternative ways of dyeing to reduce ecosystem and environment damage because the liquid waste produced by textile factory. In addition, from an economic point of view, ecoprint can be a very promising business opportunity because many people have not yet worked on it, so there are fewer competitors. Besides that, the capital spent in making ecoprint is also not too much because the dyes are already available in nature so that people with intermediate to lower economic status can be involved in this ecoprint business.

Several types of plants that can be used in making ecoprint are Teak, Noni, Kenikir, Sweet Potato, and Roses. The leaves can produce the color like Teak leaves producing a red color, Noni leaves producing a yellow color, Kenikir leaves producing a yellowish green color [8].

Sweet potato leaves used in the manufacture of ecoprint fabric but

must use fixator auxiliaries as a color locking agent [9]. The Rose petal used as motif through ecoprint on cotton fabric with a combination of mordant tunjung and quicklime because they producing the best pattern sharpness and fastness [10].

However, not all types of plant used in making ecoprint. Further study needed to find out the type of plant used in making ecoprint.

This study aim to determined the type of plant used as material for making ecoprint as a substitute for synthetic dye and to find out the part of plant used as material for making ecoprint. By knowing some of these plant species, it can attract the interest of the community, especially those with a intermediate to lower economy, to utilized plant species in the surrounding environment in making ecoprint businesses as an effort to help improved the local community's economy. In addition, ecoprint used a substitute for synthetic dye in clothing because the waste generated from the using of synthetic dye is very dangerous for human health and can pollute the surrounding environment.

Therefore, the research team is interested in conducting research on ethnobotanical studies identifying plant species that can be used in making ecoprint.

RESEARCH METHODS

The research method used descriptive qualitative with taken data from literature study and literature references regarding data and information related to researching. Research activity were carried out in Tampok Blang Village, Sukamakmur District, Aceh Besar, in May to June 2023.

The population in this study were all plant species found in Tampok Blang Village, Sukamakmur District, Aceh Besar. While sample in this study are plant species that can be used as ecoprint.

The research step described as follows:

1. Preliminaries Stage

The research team conducted the literature study to find out what types of plant used in the process of making ecoprint. Furthermore, the research team conducted initial observations to determine the

condition and presence of plants in the study area.

Implementation stage, the researcher documents these plant in the form of photographs using a camera to prove the existence of these plants in the area where the research is being carried out. Then, the research team identified morphological and taxonomic features with the guidance of several literature. After that, identification is carried out through a literature study regarding the parts of plant organs that can be used in making copoint. Furthermore, the data analysis was carried out by tabulating data obtained and described it.

Data Collection Technique

Data collection technique carried out by combining several data collection technique such as literature study, field observation and documentation of plant species used for making ecoprint. This technique known as the triangulation technique, namely different data collection technique to obtain data with the same purpose [11].

Data Analysis Technique

The data obtained from the result of literature study presented from tabular form and then the result described. Data analysed used technique of Miles and Huberman model, the stages of which consisted reduction of data, data presentation, conclusion and verification [11].

RESULTS AND DISCUSSIONS

From research that has been conducted in Tampok Blang Village, Sukamakmur District, Aceh Besar, it can be seen there are several type of plant used as material for making ecoprint. The types of plants are listed in table 1 below:

Table 1. Types of Plants that can be Used in Ecoprint

No.	Region Name	Species	Familia	Habitus
1.	Jati	*Tectona grandis*	Lamiaceae	Tree
2.	Kembang Kertas	*Bougainvillea spectabilis*	Nyctaginaceae	Shrub
3.	Pakis Tropis	*Nephrolepis falcata*	Lomariopsidaceae	Bush
4.	Telang	*Clitoria ternatea*	Fabaceae	Creep
5.	Marigold	*Tagetes erecta*	Asteraceae	Herbaceous
6.	Kenikir	*Cosmos* sp.	Asteraceae	Herbaceous

No.	Region Name	Species	Familia	Habitus
7.	Lengkeng	*Dimocarpus longan*	Sapindaceae	Tree
8.	Pepaya jepang	*Cnidoscolus aconitifolius*	Euphorbiaceae	Shrub
9.	Jambu biji	*Psidium guajava*	Myrtaceae	Shrub
10.	Singkong	*Manihot esculenta*	Euphorbiaceae	Bush
11.	Pepaya	*Carica papaya*	Caricaceae	Shrub
12.	Mawar	*Rosa* sp.	Rosaceae	Bush
13.	Sirih	*Piper betle*	Piperaceae	Creep
14.	Kamboja	*Plumeria* sp.	Apocynaceae	Shrub
15.	Calincing kupu	*Oxalis triangularis*	Oxalidaceae	Herbaceous
16.	Zinia	*Zinnia elegans*	Asteraceae	Bush
17.	Miana/Iler	*Plectranthus scutellarioides*	Lamiaceae	Bush
18.	Kembang Sepatu	*Hibiscus rosa-sinensis*	Malvaceae	Shrub
19.	Alamanda	*Allamanda cathartica*	Apocynaceae	Shrub
20.	Mengkudu	*Morinda citrifolia*	Rubiaceae	Pohon
21.	Asoka	*Ixora coccinea*	Rubiaceae	Shrub
22.	Waru	*Hibiscus tiliaceus*	Malvaceae	Tree
23.	Kersen	*Muntingia calabura*	Malvaceae	Shrub
24.	Jaranan	*Lannea grandis*	Anacardiaceae	Tree
25.	Jarak pagar	*Jatropha curcas*	Euphorbiaceae	Bush
26.	Tembelekan	*Lantana camara*	Verbenaceae	Bush
27.	Pakis Pedang	*Nephrolepis cordifolia*	Lomariopsidaceae	Herbaceous
28.	Bunga kencana	*Ruelllia* sp.	Acanthaceae	Herbaceous
29.	Salam koja/temurui	*Murraya koenigii*	Rutaceae	Shrub
30.	Bukkang-bukkang/ Bilajang Bulu	*Merremia vitifolia*	Convolvulaceae	Creep

From the results of research conducted in Tampok Blang Village, Sukamakmur District, Aceh Besar District, it can be seen that there are 30 plant species from 21 families that can be used in making ecoprint. The type of plant used have different habitus, including herbaceous habitus, vines, shrubs, shrubs and trees. From herbaceous habitus there were 5 species of plants, 3 species of vine habitus, 7 species of bush habitus, 10 species of shrub habitus and 5 species of tree habitus. The type of plant from the shrub habitus is the type of plant that can be used the most in making ecoprint.

Plant Parts Utilized as Ecoprint

Of the types of plants that can be used in making ecoprint, not all parts of the plant can be used. The parts of plants that can be used in

making ecoprint are listed in table 2 below:

Table 2. Plant Parts that are used as Ecoprints

No.	Species	Part of the Plant Used for Ecoprint			
		Leaf	Flower	Stem	Root
1.	*Tectona grandis*	√	-	-	-
2.	*Bougainvillea spectabilis*	√	√	-	-
3.	*Nephrolepis falcata*	√	-	-	-
4.	*Clitoria ternatea*	√	√	-	-
5.	*Tagetes erecta*	√	√	√	-
6.	*Cosmos* sp.	√	√	√	-
7.	*Dimocarpus longan*	√	-	-	-
8.	*Cnidoscolus aconitifolius*	√	-	-	-
9.	*Psidium guajava*	√	-	-	-
10.	*Manihot esculenta*	√	-	-	-
11.	*Carica papaya*	√	-	-	-
12.	*Rosa sp.*	√	√	-	-
13.	*Piper betle*	√	-	-	-
14.	*Plumeria* sp.	-	√	-	-
15.	*Oxalis triangularis*	√	-	-	-
16.	*Zinnia elegans*	√	√	√	-
17.	*Plectranthus scutellarioides*	√	-	-	-
18.	*Hibiscus rosa-sinensis*	√	√	-	-
19.	*Allamanda cathartica*	-	√	-	-
20.	*Morinda citrifolia*	√	-	-	√
21.	*Ixora coccinea*	-	√	-	-
22.	*Hibiscus tiliaceus*	-	√	-	-
23.	*Muntingia calabura*	√	-	-	-
24.	*Lannea grandis*	√	-	-	-
25.	*Jatropha curcas*	√	-	-	-
26.	*Lantana camara*	√	√	-	-
27.	*Nephrolepis cordifolia*	√	-	-	-
28.	*Ruelllia* sp.	-	√	-	-
29.	*Murraya koenigii*	√	-	-	-
30.	*Merremia vitifolia*	√	-	√	-

The parts of plant can be used in making ecoprints are the leaves, flowers, stems and roots. However, not all parts of each type of plant can be used in making ecoprint. For example, in noni plants, only the leaves and roots are used as a natural dye. There are 25 types of plants that can use the leaves, 13 types of plants that can use the flower parts, 4 types of plants that can use the stem parts and 1 type of plant that can use the roots as a dye in making ecoprint. The most dominant part of the plant that can be used in ecoprint is the leaf. This is because the leaf is the part that contains the most natural dyes such as teak leaves. Teak leaves have several dyes such as anthocyanins and carotenoids [12]. In addition, leaves have different spines and leaf shapes so they can produce different ecoprint motifs.

Each type of plant used in ecoprint produces different colours and motifs even though they come from the same type of plant. For example, using the shoots of young teak leaves can produce a more contrasting colour when compared to old teak leaves. This is due to the higher anthocyanin content found in teak shoot leaves [13].

The difference in leave colour and flowers is caused by natural dye produced by a plant. Several types of natural dyes produced by plant are chlorophyll, carotenoid, anthocyanin, and tannin [14]. Chlorophyll produce green pigment, carotenoid produce yellow, red and orange pigment [15], anthocyanin produce red, orange, purple, blue and yellow pigments, while tannins produce brown pigments [16].

In addition, after being applied to the cloth, the colour from the plant part and the colour produced when producing ecoprint products are the same and some are different. Like the colour that is produced from using calcining butterfly leaves which are purple in colour, after being used in making ecoprints it changes colour to brown. However, Japanese papaya leaves are green, after being applied to ecoprint they remain green.

CONCLUSION

The results showed that there were 30 plant species from 21 families that could be used in making ecoprint. The parts of plant that can be used in making ecoprint are parts, leaves, flowers, stems and roots, but not all parts of every type of plant can be used in making ecoprint.

SUGGESTIONS

The use of plants as natural dye to replace synthetic dye in clothing must be continuously developed to prevent environmental damage and prevent various health problem. Further studies are needed regarding the identification of other types of plants that can be used in making ecoprints so that they can produce more varied colours and motif when applied in making ecoprint.

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