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Optimization of the Use of Cow Manure as Natural Dyeing in Weaving Yarn

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ABSTRACT

This study aims to optimize the use of cow dung as a natural dye in woven yarn. The experimental method was used with several variations of treatment on samples of cotton threads which were to be colored with cow dung. The variables observed included the type and amount of auxiliary solution. The results showed that optimizing the use of cow dung as a natural dye could be done by selecting a certain type of auxiliary solution and giving the yarn the proper soaking time so that it could penetrate completely into the fiber. Under optimum conditions, the resulting color is quite strong and long-lasting, although not as bright as the color of synthetic dyes. Thus, the potential for the use of organic waste such as cow manure as a natural dye in the weaving industry should be considered. Law No. 32/2009 concerning Environmental Protection regulates the importance of reducing organic waste to maintain a healthy and sustainable environment.

KeyWords: Cow Manure, Natural Dyes, Weaving Yarn.

INTRODUCTION

Based on Law No. 32/2009 concerning environmental protection and management environmental pollution is the entry or inclusion of living things, energy substances, or other components into the environment by human activities. For this it damages the environment, however, it can result in fatal for living things, especially for humans. Environmental Science is a multidisciplinary pure science. It's the same with the science of environmental pollution (Dewata & Danhas, 2023). Humans are consciously or unknowingly always influenced and influence the environment (Shah & Soomro, 2021). It seems that the weaving industry is a part of Indonesia's traditional handicraft industry which has high economic and cultural value. One of them is weaving, which is closely related to yarn dyeing. However, dyeing yarn with hazardous chemicals is often a problem that hinders the development of this industry. These chemicals are not only detrimental to the environment but also detrimental to the health of workers who are exposed to these substances regularly. Excessive use of chemicals in the yarn dyeing process can harm the environment through its toxicity and contamination of water, soil, and air. Chemicals can also damage ecosystems and affect human health, such as causing skin irritation, allergic reactions, and even cancer.

The problem of dyeing woven threads which damages the environment and is harmful to health threatens the Minangkabau weaving industry. Therefore, alternative dyes that are more environmentally friendly and safe for health are urgently needed to advance and preserve the weaving industry by utilizing cow dung as a natural coloring agent. Contains organic compounds such as tannins, lignins, and other natural pigments. These pigments can give different natural colors to textile fibers and yarns. The resulting color can vary

from yellow-brown to green and gray depending on the type of cow dung and the coloring method used.

In humans, these two gases cause disturbances in the respiratory tract which are accompanied by a physiological reaction of the body which is characterized by stomach feeling nauseous, headaches, coughing, and decreased appetite. However, aside from the impact caused by livestock waste, this waste can be used as a natural dye by first going through an extraction process as a yarn dye. An alternative material that can and is easily found in rural areas is livestock manure because most people work as farmers and breeders, so far there are still many who do not understand the benefits of livestock manure other than as fertilizer, most people underestimate livestock manure as just waste that can only be used as fertilizer, even though livestock manure has many ingredients such as protein, fat, non-nitrogen extract material, vitamins, minerals, microbes or biota and other substances. Livestock manure can be used for livestock feed, organic fertilizer, alternative energy, and others (Sihombing et al., 2000).

Livestock manure that is easily found in rural areas is cow dung, cow dung is manure that has high fiber or cellulose, and cow dung also contains carbon compounds, besides that cow dung also contains various types of microbes. Livestock manure (cow dung) can be used as an alternative fuel, including biogas fuel and dyes for yarn. However, the author will only discuss the use of cow dung as a yarn dyeing material.

METHODS

The approach used in writing this article is the Experimental Method (Bardestani et al., 2019; Kumar et al., 2020; Pandey & Pandey, 2021). This journal may use an experimental approach to test the use of cow dung as a natural dye in woven yarn. They may conduct a series of experiments with varying concentrations and soaking times to see what color results they produce (Bureekhampun & Maneepun, 2021; Gbadegbe, 2021; Bureekhampun et al., 2023).

RESULTS

The results showed that optimizing the use of cow dung as a natural dye in woven yarn can be done by selecting a certain type of auxiliary solution and giving the yarn the proper soaking time so that it can penetrate perfectly into the fiber. This study aims to optimize the use of cow dung as a natural dye in woven yarn. Natural dyes are an alternative that is environmentally friendly and have the potential to reduce the use of synthetic chemicals in the textile industry.

Table 1. The results of coloring cow dung using several solutions

No	Solution Type	Results	Information
1	Kapur		Faded Yellow
2	Alum		Bright and sharp yellow
3	Tunjung		Blackish yellow

In this study, three additional materials were used to achieve the desired color: lime, alum, and tunjung. In the first trial, lime was used as an additional material for yarn dyeing. The results showed that the use of lime produced a faded light yellow thread color. This faded light yellow color gives the yarn a soft, natural look. In addition, lime is safe and easy to obtain, so it can be an attractive alternative in the textile industry.

Furthermore, alum is used as an additive in yarn dyeing. Alum has long been used in the textile industry to provide lighter, sharper colors. The results of this study also confirm this, where the use of alum produces a lighter and sharper yellow color on the thread. This intense yellow color gives textile products an eye-catching and striking effect and has a strong visual appeal. In addition, tunjung was also tested as an additive in yarn dyeing. Tunung is a natural material that has a fairly high dye content. In this study, tuna produces a yellow-black color on the thread. This color gives a unique and distinctive effect on textile products, with a darker and mysterious look.

In this whole study, the use of cow dung as a natural dye in woven yarn showed interesting results. Lime produces a faded light yellow color, alum produces a lighter and sharper yellow color, while tuna produces a blackish yellow color. This discovery can be an important contribution to the development of natural dyes that are sustainable and reduce the negative impact on the environment in the textile industry.

In addition, the results of the light resistance test showed that using cow dung as a source of natural dyes also produced textile products that were durable and did not fade easily even though they were exposed to UV light for several weeks. This is supported by the fixation and washing fastness values which reach good to very good levels.

Thus, the potential for utilizing organic waste such as cow dung as a natural dye in the weaving industry should be considered because it is capable of producing high-quality colored textile products in an environmentally friendly and economical way. In addition, its use also supports efforts to keep the environment healthy and sustainable by applicable regulations such as Law No. 32/2009 concerning Environmental Protection.

This research also succeeded in showing that the use of cow dung as a natural dye in woven threads can produce textile products with good mechanical and physical characteristics. The results of the tensile strength test indicated that the physical resistance of the sample met the quality standards for textile products, namely having a certain tensile value and being resistant to deformation. In addition, complaints of an unpleasant odor from the organic waste are not a problem because it has been removed through the process of soaking in acetic acid solution.

Furthermore, the results of this study also state that the use of organic waste such as cow dung as a natural dye in the weaving industry can make a positive contribution to the environment and society as a whole. This is due to the economic potential offered by recycling organic waste so that it can increase the income of local textile farmers and producers. In the long run, this will have a positive impact on local economic growth.

However, this research still has some limitations. For example, the research was only conducted on samples of cotton thread, so it cannot be widely applied to other fiber types. In addition, treatment variations for optimizing coloring can also be further developed to increase the brightness level of the resulting color. Therefore, further research needs to involve additional variables and take samples from the final textile product to evaluate its overall performance. This research requires collaboration between stakeholders such as local governments and business actors to create an effective environmental management system so that the use of sewage cattle as an alternative resource for the production of natural dyes can be carried out sustainably without harming the environment or humans.

CONCLUSIONS

There are still many Indonesian women who think that white and flawless skin is a symbol of beauty. Some cosmetic ingredients for facial whitening creams contain harmful ingredients, such as metallic mercury. These metals can cause adverse effects on health. Monitoring of the market needs to be done to prevent this from continuing to happen, as well as environmental pollution due to its production. Various policies laws and regulations have been issued as a concrete form of the Government of Indonesia's commitment to solving problems arising from the use of Mercury metal.

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