Humaniora, 16(1), April 2025, 79-87
DOI: 10.21512/humaniora.v16i1.13416
P-ISSN: 2087-1236
E-ISSN: 2476-9061

THE APPLICATION OF INDIGO *STROBILANTHES CUSIA* NATURAL DYE PASTE USING BLOCK PRINTING TECHNIQUE ON TEXTILE

Hasna Maritza Darusiam[1]; Mochammad Sigit Ramadhan[2]*; Gina Shobiro Takao[3]

[1-3]Program Studi Kriya, Fakultas Industri Kreatif, Universitas Telkom
Bandung, Indonesia 40257
[1]maritzahasna@student.telkomuniversity.ac.id; [2]sigitrmdhn@telkomuniversity.ac.id;
[3]ginashobirotakao@telkomuniversity.ac.id

Received: 23rd April 2025/ **Revised:** 21st July 2025/ **Accepted:** 22nd July 2025

How to Cite: Darusiam, H. M., Ramadhan, M. S, & Takao, G. S. (2025). The application of indigo *Strobilanthes cusia* natural dye paste using block printing technique on textile. *Humaniora, 16*(1), 79-87. https://doi.org/10.21512/humaniora.v16i1.13416

ABSTRACT

Natural dyes can promote environmental sustainability while offering a unique and attractive aesthetic. This approach enhances the appeal of textile products, adding value and creating a competitive advantage in the creative and fashion industries. Indigo from Strobilanthes cusia is a well-known natural dye primarily used by textile artisans and designers to create vibrant indigo-colored fabrics. In surface textile design, there is potential to modify indigo solutions into a paste, which can be used to create motifs on fabric through block printing techniques. The research aims to develop an optimal indigo paste formula for block printing and to examine the application of natural dyes on fabric. The research employs a mixed-methods approach, collecting data from literature reviews, direct observations, social media analysis, and experimental work. During the experimental phase, block printing techniques are applied using different paste formulas on various fabric types to assess the optimal viscosity and fixation methods of the paste. The findings indicate that the natural dye derived from the indigo paste of Strobilanthes cusia yields an effective formula for block printing, particularly in terms of motif sharpness and color durability. The optimal composition was found to be 10 g of paste mixed with 5 mL of water, resulting in a viscosity value of 191 mPa·s. These findings can inspire the development of more sustainable textile products and expand the use of natural dyes across various textile printing techniques, potentially leading to innovative fashion products.

Keywords: *block printing, natural dye, indigo Strobilanthes cusia, fashion products*

INTRODUCTION

Natural dyes are one of Indonesia's abundant natural resources. They can be used as colorants for fabrics, food, and various textile applications (Abdurahman & Kahdar, 2021). Usually derived from plants, natural dyes are sustainable and eco-friendly (Putri M & Permanasari, 2021). Their use supports environmental conservation by addressing pollution caused by the chemical industry's production of synthetic dyes, which can have harmful effects on human health (Nasir et al., 2024). Additionally, natural dyes provide a unique aesthetic value that enhances the appeal and marketability of textile products (Widowati et al., 2023). One commonly used natural dye for textiles is indigo.

In Indonesia, indigo dye is sourced from several plant species, including *Indigofera tinctoria* and *Strobilanthes cusia* (Hartl et al., 2024). Indigo dyes are preferred for textiles that require high durability, as they produce vibrant blue colors and exhibit excellent colorfastness. The indigo paste from *Strobilanthes cusia*, known as sour indigo, is created through a fermentation process. This plant belongs to the *Acanthaceae* family and requires multiple processing stages to develop the blue indigo dye. The dye cannot be directly extracted from the plant; instead, it involves several chemical reactions, specifically oxidation

*Corresponding Author

and reduction of the eight compounds present in *Strobilanthes cusia*, including indoxyl glucose, to achieve the characteristic indigo color (Kurniawan, 2020).

Natural indigo dye is frequently used in both the dipping and batik-making processes. This involves immersing the fabric in a water-based mixture that contains the dye and a mordant, which helps ensure color fastness and prevents fading (Fadlillah et al., 2024). Additionally, natural indigo paste dye can also be utilized in printing processes.

In a research by Rahmah and Hendrawan (2020), the application of indigo paste dye is tested using the screen printing technique. The results indicates that the dye formula was semi-thick, consisting of 500 g of indigo paste mixed with 125 g of hydro. Once thoroughly combined, the mixture transformed into a bluish-green color and became suitable for screen printing.

The paste is formulated to achieve an optimal viscosity, ensuring it was neither too thick nor too runny. This ideal consistency allowed the paste to flow smoothly through the screen mesh without clogging, making it well-suited for screen printing applications. Furthermore, this paste formula has the potential for development in other printing techniques, such as block printing, with adjustments made to accommodate the specific requirements of that method.

Block printing is a technique that involves carving patterns onto a wooden plate. The engraved plate is then coated with dye. After that, the coated plate is repeatedly pressed onto fabric to create a motif. This method is recognized as the oldest printing technique from China, dating back to the early 3rd century (Rinjani & Ramadhan, 2020).

Block printing plates are typically categorized as either wooden or metal, although there is potential to explore the use of various materials for creating these plates (Fobiri et al., 2021). To make a printing plate, the design is carved into the material, resulting in a raised relief pattern. The carved block is then coated with dye paste and pressed onto the surface being printed.

The application of color in block printing is essential, as the type of dye used significantly affects the outcome of the carved motif. Dyes can be either synthetic or natural; however, synthetic paste dyes have been more commonly used in block printing to date. The use of natural dyes presents an opportunity for innovation, as it allows for the development of dye pastes suitable for block printing. This advancement could potentially lead to new possibilities for integrating natural dye pastes into fashion products, promoting sustainability, and expanding the range of eco-friendly printing techniques.

The research focuses on developing a dye paste specifically designed for block printing, utilizing natural indigo derived from *Strobilanthes cusia.* The study is supported by data collected from literature reviews, observations, and interviews. An experiment is conducted to determine the optimal formula, mordant, and printing plate for effective block printing.

To differentiate the research from previous studies that utilized indigo paste for screen printing, the focus here is on optimizing the paste formulation for block printing, which requires a different consistency and application method. The objective is to create an ideal natural dye paste that can be applied to fabric through block printing. This innovation aims to enhance the application of natural dyes and facilitate their use in fashion products, promoting sustainable and eco-friendly textile printing.

METHODS

The research employs a combination of qualitative and quantitative methods for data collection through various techniques. These include literature reviews, both direct and indirect observations, interviews, and experiments. The literature review utilizes secondary data from multiple journals and books focused on natural indigo dye and block printing. This study builds upon several findings from previous research conducted by Rahmah and Hendrawan (2020), who applied natural indigo paste dye using a screen printing technique to fabrics.

Direct observation was conducted at Indonesia Fashion Week 2024 to examine several brands that utilize natural dyes, particularly in their block printing techniques. This involves analyzing the creative processes, material selection, and the motifs produced by each brand. Additionally, a social media analysis was performed to identify and evaluate brands that promote the concept of natural dyes, including the techniques they employ in their production processes. Interviews were also conducted with brand owners who incorporate natural dyes into their products.

The final data collection process consisted of two main phases: experimentation and application. The initial experiment involved replicating formulas from previous studies to evaluate the effectiveness of print results on fabric. During this phase, the viscosity of the paste was adjusted to determine which formula yielded the best print results. Appropriate printing plates, fabrics, and mordants were also selected.

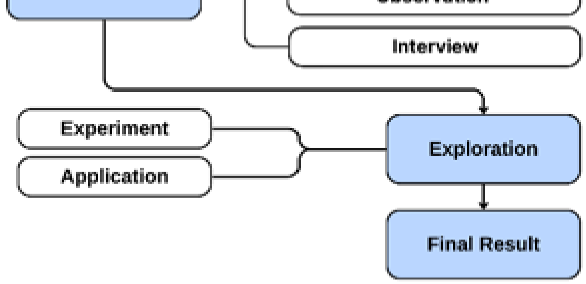


Figure 1 Research Methodology Framework

In the advanced experimentation phase, the study focused on implementing the most suitable formula and material combinations to create fabric motifs. This stage aimed to demonstrate that the results of the indigo paste formula experiment could be effectively applied to various types of fabric materials. A summary of the research methodology is presented within the framework provided in Figure 1.

RESULTS AND DISCUSSIONS

The experiment is conducted in three steps. The first step involved duplicating the formula. The second step focuses on experimenting with various alternative printing plates and fabrics. The third step includes investigating the moisture content of the selected formula, followed by laboratory tests and mordant fixation. The phases of this experiment are illustrated in Figure 2.

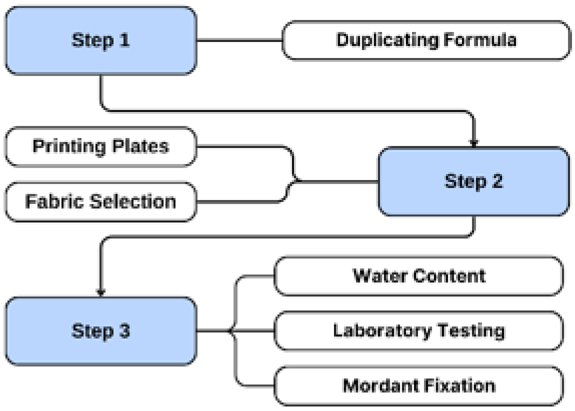


Figure 2 Phases of the Experiment

The duplication process is conducted using the block printing technique without modifying the formula used in previous research. Its goal is to identify the optimal dye paste formula for block printing by examining changes in the paste's color when activated, its adhesion to the printing plate, and its ability to produce an even color distribution on the fabric surface. Through this investigation, a suitable dye paste formula is anticipated for block printing applications.

The first step involves preparing the fabric by scouring and mordanting. Scouring cleans the cloth by removing dirt, oils, and other impurities, while mordanting opens the fabric's pores, allowing it to absorb the dye more effectively (Alfiyani et al., 2024). Since several of these formulas use natural indigo dye, it is essential to understand its characteristics and processing methods to ensure a successful exploration.

Natural indigo requires a specific preparation procedure, as it is initially in a paste form and must be activated to reveal its color and bind to the fabric. In its natural state, indigo is insoluble in water. It must be converted into a water-soluble form (alkali leuco) by adding reducing agents such as brown sugar or molasses (Lisdiana & Saefurahman, 2023). Alternatively, sodium hydrosulfite can be used as a reducing agent, but it is susceptible to oxidation as seen in Figure 3. Therefore, it must be handled in a closed environment and stirred gently to maintain the paste's stability. Suppose the indigo paste does not turn green during the activation process. In that case, it indicates that the reduction has failed or the reducing agent is no longer active, rendering the dye unusable. This failure can result from improper storage, exposure to air, or the use of expired reducing agents, which prevent the dye from being effectively reduced to its soluble form.

The next step involves preparing the formula for the first phase of the experiment, which will utilize four different formulations. These include Gama Indigo powder (Ikhsanti & Hendrawan, 2020), *Indigofera tinctoria* paste and *Strobilanthes cusia* indigo paste (Rahmah & Hendrawan, 2020), as well as a combination of Gamaindigo powder and alginate (Pasaribu et al., 2023). During the formula duplication stage as shown in Table 1, observations were made on the color changes in the paste to achieve the best results. Once all formula preparations were completed, the next step was printing using the duplicated paste formulas.

Based on the findings presented in Table 2, it can be concluded that Formula 3, which utilizes indigo from *Strobilanthes cusia*, as shown in Figure 4, successfully produces a functional dye paste suitable for block printing applications. The resulting paste exhibits a color change to greenish, as confirmed in an interview with the founder of the Rosita Batik Shibori brand. Additionally, the printed colors hold up well and do not fade when washed.

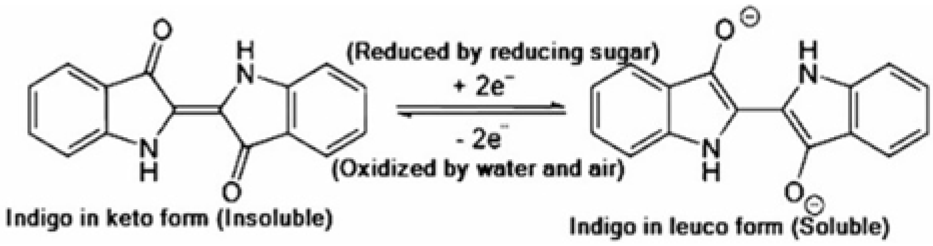


Figure 3 Reduction and Oxidation Mechanism of Indigo Dye

Table 1 Stages of The Paste Formula Duplication Process

No	Formula	Process exploration
1	Gama Indigo powder + hydrosulfite	To prepare the solution, dissolve 45 g of Gama Indigo powder in 100 mL of hot water. Next, add 7.5 g of hydrosulfite to the mixture. Allow the solution to sit for 10 to 15 minutes, and then filter it to achieve a fine, smooth consistency.
2	Indigofera tinctoria paste + fructose	Combine 50 g of Indigofera tinctoria paste with 12.5 g of fructose, stir until the mixture is evenly blended.
3	Strobilanthes cusia indigo paste + hydrosulfite	Combine 500 g of Strobilanthes cusia indigo paste with 125 g of hydrosulfite and stir until the mixture is evenly blended.
4	Gama Indigo powder with alginate + sodium carbonate and hydrosulfite	Combine 2 g of Gama Indigo powder with 0.5 g of sodium carbonate (soda ash), 0.5 g of hydrosulfite, and 1 g of alginate. Next, blend this mixture with 30 mL of warm water and allow it to sit for 5 to 10 minutes.

Table 2 Duplication Formula

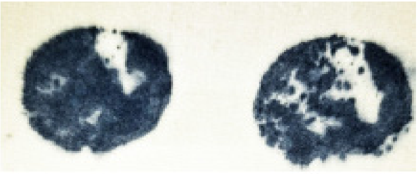
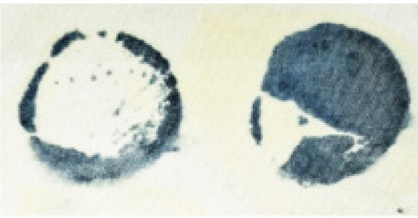
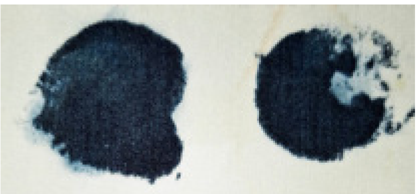
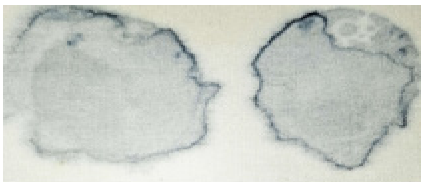
No	Result	Analysis
1.		The paste remains unchanged in color, is rather rough, and does not dissolve in water. While the resulting color is quite good, it appears uneven.
2.		The paste remains unchanged in color and is excessively thick, preventing it from adhering to the printing plate. The resulting color appears uneven, with a yellowish tint around the fabric's surface.
3.		The resulting paste has a pleasing greenish color that remains unchanged after washing.
4.		The resulting paste maintains a liquid consistency and does not change color, resulting in a very faint hue.

Figure 4 *Strobilanthes cusia* Indigo Paste Formula

After identifying a suitable paste formula for block printing, the next step is to explore the printing plates and fabrics used in the process. This experiment aims to determine the ideal printing plate that can produce sharp and clear motifs, ensure strong adhesion of the paste, maintain consistent printing quality, and provide ease of use. Additionally, the study focuses on selecting fabrics with optimal absorbency to enhance the effectiveness of the printing process. The experiment involves testing four different types of printing plates, as shown in Figure 5: wooden plates with flannel, linoleum, rubber, sponge, and Ethylene Vinyl Acetate (EVA) foam, each in various shapes and forms. The fabrics used in this exploration are Euca Super (100% Tencel), Linen Canvas (55% Linen, 45% Rayon), and Concord (100% Rayon).

The results from the experiment presented in Table 3 indicate that EVA foam printing plates provide optimal paste adhesion, high motif sharpness, and clarity. These qualities enhance the design's visibility and ensure consistent performance throughout the printing process, making it more manageable and reliable. Similarly, the Concord fabric (100% Rayon) demonstrated good absorbency, allowing the paste to be evenly distributed across its surface.

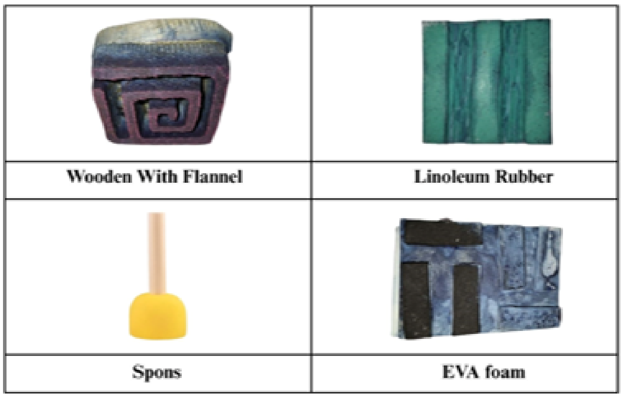


Figure 5 Printing Plates

Table 3 Exploration of Printing Plates and Fabrics using Indigo Strobilanthes cusia Paste Formula

No	Result	Analysis
1.		Printing on Euca Super (100% Tencel) fabric showed poor absorbency. The color absorption from all four printing plate materials was uneven.
2.		Printing on Linen Canvas (55% Linen, 45% Rayon) fabric demonstrated good absorbency, with colors appearing visible on all four printing plates, although the color absorption remained uneven.
3.		Printing on Concord (100% Rayon) fabric after washing showed moderate absorbency. However, the color absorption from wood and linoleum rubber printing plates was uneven compared to the sponge and EVA foam printing plates.

After completing step 1, the next step is to modify the selected *Strobilanthes cusia* paste formula by adjusting the moisture content in the paste. This exploration was conducted at the Agro-Industrial Technology Testing Services Laboratory at Padjajaran University using a viscometer to obtain more accurate data. The goal of the experiment is to understand how water content affects paste viscosity, adhesion to the printing plate, and the quality of prints on fabric. Adjusting the water content aims to create an optimal paste formula that achieves even color distribution, sharp motifs, and good color fastness in block printing techniques.

The indigo *Strobilanthes cusia* paste formula was modified by adding specific amounts of water in the following ratios: 10 g of paste formula with 2.5 mL, 5 mL, and 10 mL of water, respectively. The printing results from adding 2.5 mL of water revealed that, after washing, the color distribution in the motif was uneven. This was due to the paste's high viscosity, which made it too thick to adhere evenly to the EVA foam printing plate. In contrast, the printing results from adding 5 mL of water produced an optimal consistency, effectively balancing viscosity and adhesion. Lastly, the results from adding 10 mL of water indicated that, after washing, the paste had low viscosity, rendering it too watery and unable to adhere evenly to both the printing plate and the fabric.

Based on the experimental results presented in Table 4, it was concluded that the formula with 5 mL of water content produced the optimal viscosity. The viscosity test results indicate that this formula has a higher viscosity of 191 mPa·s compared to the other formulations. Notably, this viscosity is also the closest to the synthetic ink reference value of 183.960 mPa·s among the three variations of natural dye paste. However, it still falls short of the target value. This finding suggests that thicker formulas tend to exhibit better stability and consistency, making them more suitable for printing techniques. Therefore, the formula with a moisture content of 5 mL is considered more stable and easier to use during the printing process, thereby reducing the risk of color bleeding or spreading on the fabric's surface.

The final step of the process involves a fixation experiment using mordants. Mordants can influence color density (Takao & Widiawati, 2020) and are essential in determining the materials that can strengthen and enhance color fastness (Chafidz & Lestari, 2021) of the natural indigo paste dye from *Strobilanthes cusia*. At this stage, the fabric is printed using an EVA foam printing plate, and the natural indigo paste dye, *Strobilanthes cusia*, is allowed to air-dry. After drying, the fabric is immersed in a prepared fixation solution, which consists of three components as shown in Figure 6: 2 mL of vinegar in 500 mL of water, 6 g of alum in 400 mL of water, and 5 g of iron sulfate in 300 mL of water. The fabric is soaked in this solution for 5 to 10 minutes to ensure complete absorption of the fixation materials. After immersion, the fabric is left to dry in the sunlight to further strengthen the fixation results. Finally, the fabric is rinsed with clean water to remove any excess fixation solution. The results of this final stage demonstrate that vinegar provides the best color fastness, resulting in a more stable color that is resistant to fading and offers optimal fixation compared to the other materials tested.

The second stage is the application phase. This step involves creating a motif design module that can be used for printing plates, utilizing natural indigo paste dye derived from *Strobilanthes cusia* through the block printing technique. To serve as the foundation for this module design, a pattern board was created

Table 4 Exploration of Water Content

No	Formula	Result	Analysis
1	10 g + 2.5 mL of water (83 mPa·s)		Viscosity is not optimal because the paste tends to be thick.
2	10 g + 5 mL of water (191 mPa·s)		Viscosity is fairly optimal because the paste has a consistency that is neither too thick nor too watery.
3	10 g + 10 mL of water (72 mPa·s)		Viscosity is not optimal because the paste tends to be runny.

by combining various traditional motifs that reflect the distinctive blue hue of natural indigo dye with Nusantara elements for aesthetic enhancement.

Figure 6 Fabric Dipping in Fixation Solution

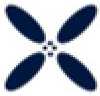
Figure 7 displays motifs that incorporate Nusantara elements in blue tones, including the Mega Mendung and Kawung motifs. The Mega Mendung motif is characterized by its cloud-like shape and predominance of blue color, symbolizing coolness and tranquility (Kusnadi, 2019). On the other hand, the Kawung motif is recognized for its elongated, oval shape, resembling sugar palm seeds, and is traditionally depicted in brown (Parmono, 2013). In this project, blue hues have been adapted as a modern innovation to attract consumer interest while preserving their traditional essence.

Figure 7 Pattern Board

The process of creating motifs starts with duplicating them and forming motif compositions. This involves copying the shapes of the modules inspired by the Mega Mendung and Kawung motifs presented in Table 5. The designs feature simple shapes, proportionate sizes, and adequate spacing between lines to ensure they are neither too small nor too tightly packed. These factors are crucial for preventing overflow or uneven prints, as discovered during the initial exploration of the printing plate. A well-thought-out design guarantees that the motifs are printed clearly and align with the properties of natural dyes.

After duplicating motifs, the next step is to design the composition of the digital motifs to be applied to a fabric sized 200x100 cm. In this phase, stylized modules are combined using several composition principles, including brick repeat and alternation. The results of the motif composition are presented in Table 6.

Table 5 Stylization of Selected Motifs

No	Selected Motifs	No	Selected Motifs
1		5	
2		6	
3		7	
4		8	

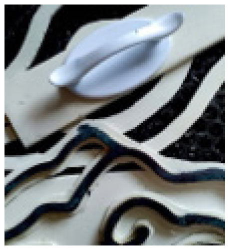
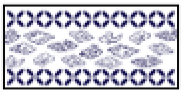
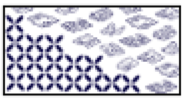
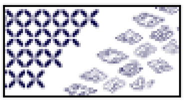


Figure 8 Printing Plate Made of EVA Foam

Table 6 Result of Motif Composition

No	Result	Analysis
1		The composition of this motif employs the brick repeat technique, where the pattern is arranged alternately, and the block repeat technique for the Kawung motifs, which are arranged repetitively.
2		The result of this motif composition is arranged using the brick repeat technique, where the pattern is arranged alternately.
3		The composition of this motif utilizes an alternating technique, creating a rhythmic flow through variations in the pattern.

After further exploration by combining several digital stylizations while still considering design principles that harmonize and ensure the accuracy of motif placement, a motif composition was produced that will be realized on fabric presented in Figure 9. The stylized digital motifs inspired by Mega Mendung and Kawung were implemented using the block printing technique.

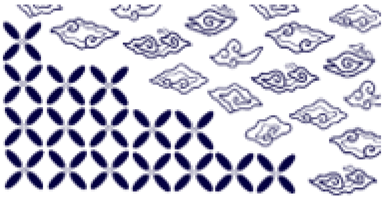


Figure 9 Selected Motif Composition Design

Figure 10 Printing Result on Fabric

During the application process, eight printing plates of various sizes are created using a laser cutting technique on 6 mm thick EVA foam material as presented in Figure 8. Based on the print results on the fabric shown in Figure 10, the natural indigo paste derived from *Strobilanthes cusia* demonstrate optimal performance when applied using the block printing technique with EVA foam plates. The resulting fabric sheet could serve as a primary or complementary component in future fashion product designs.

The evaluation of the research highlights opportunities for further development, particularly in terms of the paste's viscosity. Achieving an ideal viscosity level is essential for obtaining precise printing results. Additionally, the size and design of the printing plates can be explored further to assess the impact of the distance between lines and the thickness of the motif on print quality. By making adjustments in these areas, it is hoped that the block printing technique using natural dyes can produce textiles that are not only aesthetically pleasing but also exhibit strong technical performance.

The research aligns with current fashion trends that emphasize sustainability through the use of natural materials and environmentally friendly processes. The block printing technique, utilizing natural dye paste from *Strobilanthes cusia*, offers an alternative that supports environmental conservation while preserving aesthetic and cultural values. Brands like Abhati Studio exemplify how sustainability can be effectively integrated through the use of natural dyes, responsible material processing, and the exploration of traditional motifs with a contemporary approach. This demonstrates that block printing techniques employing natural dyes remain relevant in today's fashion landscape, which values originality, handmade craftsmanship, and the unique cultural significance of each piece.

CONCLUSIONS

Based on the research, several key findings have emerged. First, the natural indigo paste derived from *Strobilanthes cusia* can be developed into a paste dye suitable for the block printing technique. The optimal formula for this natural indigo paste is composed of 50 g of indigo (*Strobilanthes cusia*), combined with hydrosulfite and 5 mL of water, resulting in a viscosity of 191 mPa·s. The formula results indicate a relatively thick dye consistency.

Second, the exploration of printing plate materials revealed that EVA foam is a practical choice for the block printing technique. An ideal printing plate should have a surface that absorbs the paste well and a design that considers motif size and spacing of the lines to prevent excessive color spread. Additionally, Concord fabric (100% rayon) has been proven to yield even printing results when vinegar is used as a fixation agent, which helps maintain color stability and prevent fading.

Third, the findings suggest that selecting simple and uncomplicated motifs is most suitable for application with the indigo dye from *Strobilanthes cusia*. Motifs such as Mega Mendung and Kawung produce sharper and neater prints, reducing the risk of paste overflow. Furthermore, these motifs work well with the flexible and highly absorbent EVA foam printing plates.

Overall, the research aligns with current fashion trends that increasingly emphasize sustainability and the use of natural materials. The combination of the block printing technique and natural indigo dye offers an eco-friendly alternative that preserves both aesthetic and cultural value, while supporting the preservation of traditional methods in the modern textile industry. Future research should explore the use of thickening agents to improve color stability and print performance. Additionally, it is essential to develop printing plates with variations in size, line thickness, and simple motif designs to suit the characteristics of natural pastes better and enhance print quality.

ACKNOWLEDGEMENT

Thank you to the Craft Textile and Fashion Study Program, School of Creative Industries, Telkom University, for the support and facilities provided throughout the research.

Author Contributions: Conceived and designed the analysis, H. M. D.; Conceived and designed the analysis (Contributed to design the research framework and analysis), M. S. R.; Collected the data (Collecting data through observations, interviews, and experiments), H. M. D.; Contributed data or analysis tools (Contribute to collecting data through literature review), M. S. R.; Contributed data or analysis tools (Contributed the experiment analysis tools), G. S. T.; Performed the analysis (Performed the material experiment analysis), H. M. D.; Performed the analysis (Performed the experiment analysis), M. S. R.; Performed the analysis (Contributed to experiment additional checking), G. S. T.; Wrote the paper (Performed the article writings), H. M. D.; Wrote the paper (Contribute to design the writing stucture), M. S. R.

Data Availability Statement: Data available within the article or its supplementary materials. The authors confirm that the data supporting the findings of the research are available within the article [and/or] its supplementary materials.

REFERENCES

Abdurahman, S. N., & Kahdar, K. (2021). Eksplorasi ekstrak pewarna alami sebagai bahan pewarna organik untuk tekstil cetak. *Jurnal Rupa, 6*(2), 134. https://doi.org/10.25124/rupa.v6i2.3792

Alfiyani, L., Mukhlisin, L., Rahman, N. E., Yulianto, A., Setiyadi, N. A., Sarjito, S., Khuzaimah, I. S., Jery, J., Sumini, S., Afifah, R. N., Arifin, A., & Kewa, K. K. (2024). Pelatihan ecoprint berbasis pemberdayaan masyarakat untuk pengelolaan limbah organik. *Journal of Human and Education (JAHE), 4*(6), 303-308. https://doi.org/10.31004/jh.v4i6.1796

Chafidz, A., & Lestari, A. Y. D. (2021). Pengenalan teknologi ekstraksi zat warna alam untuk pewarna alami batik di UKM batik tulis "Kebon Indah", Bayat, Klaten. *Jurnal Komunitas: Jurnal Pengabdian Kepada Masyarakat, 3*(2), 101-108. https://doi.org/10.31334/jks.v3i2.1271

Fadlillah, M. R., Hendrawan, A., & Febriani, R. (2024). Pengolahan pewarna alami Indigo Strobilanthes Cusia dengan teknik block printing pada tekstil. *eProceedings of Art & Design, 11*(6), 9180-9198.

Fobiri, G. K., Crentsil, T., Ayesu, S. M., & Kansanba, R. F. (2021). Hand block printing: Experimenting with assorted surfaces and inks. *Journal of Arts and Humanities, 10*(07), 44-60.

Hartl, A., Polleichtner, A., & Novak, J. (2024). "Purplish Blue" or "Greenish Grey"? Indigo qualities and extraction yields from six species. *Plants, 13*(7), 918.

Ikhsanti, N. T., & Hendrawan, A. (2020). Pengolahan pewarna alami indigo dengan teknik cap pelepah pisang pada produk busana. *eProceedings of Art & Design, 7*(2).

Kurniawan, C. (2020). Ekstarksi indigo dari daun Strobilanthes Cusia dan kajian pembentukan kompleks dengan ion Ni2+. *Jurnal Kimia Dan Kemasan, 42*(2), 93. https://doi.org/10.24817/jkk.v42i2.5977

Kusnadi. (2019). Motif batik mega mendung Cirebon dalam pemaknaan desain baru. *Jurnal Teknologi, 8*(1), 1-14.

Lisdiana, H., & Saefurahman, G. (2023, May). Utilization of Indigofera leaves as natural dyes for silk fabrics. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1187, No. 1, p. 012014). IOP Publishing. https://doi.org/10.1088/1755-1315/1187/1/012014

Putri M, M., & Permanasari, M. D. (2021). Pengembangan pengolahan pewarna alami dengan teknik fabric manipulation pada produk Sarana Bawa. *Itenas,* 1-25.

Nasir, M., Azmin, N., Fauzi, A., Ruslan, R., Sandi, A., & Sitaman, S. (2024). Pemberdayaan kelompok tenun Muna Pa'a Desa Ranggo melalui teknologi pewarnaan alam dalam menunjang pembangunan berkelanjutan. *Bima Abdi: Jurnal Pengabdian Masyarakat, 4(*4), 270-281. https://doi.org/10.53299/bajpm.v4i4.1148

Parmono, K. (2013). Nilai kearifan lokal dalam batik tradisional Kawung. *Jurnal Filsafat, 23*(2), 135-146. https://jurnal.ugm.ac.id/wisdom/article/download/13217/9459%0A%0A

Pasaribu, S. P., Hendrawan, A., Cory, M., & Siagian, A. (2023). *Pengaplikasian pewarna alam Gama Indigo menggunakan teknik lukis pada perancangan produk tekstil*. [Undergraduate thesis, Telkom University]. Telkom University Open Library.

Rahmah, S. L., & Hendrawan, A. (2020). Pengaplikasian teknik screen printing dengan pewarna alam pasta indigo pada produk fashion. *eProceedings of Art & Design, 7*(2). 3141-3152.

Rinjani, B. A., & Ramadhan, M. S. (2020). Pengaplikasian teknik block printing pada material kain tenun ATBM untuk perancangan produk fashion. *eProceedings of Art & Design, 7*(2).

Takao, G. S., & Widiawati, D. (2020). Pengolahan mordant pada zat warna alami Jelawe (Terminalia Bellirica) untuk menghasilkan motif dengan teknik cap. *Prosiding Seminar Nasional Industri Kerajinan Dan Batik*, 1-10. https://proceeding.batik.go.id/index.php/SNBK/article/view/78%0Ahttps://proceeding.batik.go.id/index.php/SNBK/article/download/78/50

Widowati, W., Sa'diyah, A. A., & Khoiriyah, N. (2023). Pendampingan pewarnaan Batik Singonegoro menggunakan pewarna alami dari tanaman Indigofera Tinctoria. *Jurnal Abdi Insani, 10*(3), 1755-1766. https://doi.org/10.29303/abdiinsani.v10i3.1049