

TARO (*Colocasia esculenta*) STARCH AS HABLON STIFFENER

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Abstract

This research investigates the application of taro starch (*Colocasia esculenta*) as a stiffening agent for hablon, a traditional woven fabric from the Philippines. The abundance of natural resources such as Taro (*Colocasia esculenta*) can be a good source of stiffening agent for Hablon fabric. This developmental-experimental study aimed to determine the acceptability of Taro Starch as Hablon Stiffener in terms of appearance, durability, effectiveness, texture, and general acceptability. Five (5) fabric samples were applied with the starch of different amount and time of soaking. The Five-Point Likert Scale and the Nine-Point Hedonic Scale were used to determine the level of acceptability of its characteristics. 5 dressmakers, 6 Hablon weavers, and 4 technical experts from Miagao were purposively selected to evaluate the samples. The results revealed that in terms of appearance, the color of the fabric remained the same. Its durability showed that fabric remained stiff. The starch showed an effective potential preventing the fabric from ravelling. Its texture was rigid, and its general acceptability was found well-accepted by the respondents. It was clear that Taro starch can be used as a natural stiffening agent as it increased the strength and the condition of the fabric.

Keywords: Fabric stiffener, Hablon, Starch, Taro.

INTRODUCTION

The quest for sustainable and eco-friendly materials in textile and garment production has led to the exploration of natural starches as potential alternatives to synthetic stiffeners. This research investigates the application of taro starch (*Colocasia esculenta*) as a stiffening agent for hablon, a traditional woven fabric from the Philippines. Taro, a widely cultivated root vegetable, is not only rich in starch but also offers unique properties that may enhance the texture and durability of hablon. By analyzing the effectiveness of taro starch in providing stiffness and support, this study aims to contribute to the sustainable development of textile practices while promoting the utilization of local agricultural resources. The findings could pave the way for innovative applications of natural materials in the textile industry, fostering both environmental sustainability and cultural heritage.

LITERATURE REVIEW

Taro starch, derived from the *Colocasia esculenta* plant, has emerged as a promising natural alternative for textile stiffening. With a high starch content (70-80% dry weight) and small granule size, it possesses excellent film-forming properties (Melese & Negussie, 2015). This makes it suitable for enhancing the stiffness, strength, and weight of fabrics without compromising their aesthetic appeal or texture (Gautam & Sharma, 2022).

Several studies have demonstrated the efficacy of Taro starch as a sizing agent. Rena and Kusum (2012) found that increasing the amount of starch applied directly correlates with increased fabric thickness and stiffness. Azhar & Khan (2013) further support this claim, highlighting the

favorable performance of Taro starch compared to commercial alternatives. Additionally, Kusum and Rena (2012) noted the stability of extracted Taro starch, even after prolonged storage, making it a reliable option for industrial applications.

Research by Komalasari *et al.* (2019) highlights that increasing the concentration of stiffeners improves fabric properties such as crease recovery, tensile strength, and drape value.

Beyond its functional benefits, Taro starch aligns with the growing demand for sustainable textile practices. As consumers become more environmentally conscious, biodegradable and non-toxic materials like Taro starch are gaining popularity (Melese & Negussie, 2015). By incorporating Taro starch into their processes, textile manufacturers can reduce their environmental impact while enhancing product quality.

The reviewed literature underscores the potential of Taro starch as a valuable natural resource for textile stiffening. Its ability to improve fabric properties, coupled with its eco-friendly nature, makes it a compelling choice for the industry. Further research is necessary to fully explore its applications and optimize its use in various textile processes. As the textile industry continues to evolve, Taro starch may offer innovative solutions for sustainable and high-performance fabrics.

RESEARCH METHOD

The study “Taro (*Colocasia esculenta*) Starch as Hablon Stiffener” utilized the Developmental method. The respondents of the study were 15 evaluators who were divided into three (3) groups, composed of six (6) Hablon weavers, five (5) dressmakers, and four (4) technical experts from DOST-PTRI Regional Yarn Production and Innovation Center within the Municipality of Miagao. They were purposively chosen because of their knowledge and expertise. The study was conducted within the Municipality of Miagao.

The research-made checklist was used in evaluating the differences in the level of acceptability of Taro starch as Hablon stiffener in terms of appearance, durability, effectiveness, texture, and general acceptability. The criteria were based on the Five-Point Likert Scale and Nine-Point Hedonic Scale. The instrument contains the title of the study, direction, and criteria on how to evaluate the finished product in terms of appearance, durability, effectiveness, texture, and general acceptability.

This study investigates the use of Taro starch, extracted from Palawan corms, as a stiffening agent for Hablon fabrics. The research is organized into three phases:

1. Preparation of Taro Corm: The study begins with the harvesting of Taro corms, which are then washed and peeled to prepare for starch extraction.
2. Extraction and Testing of Taro Starch: After the corms was prepared, the researchers conducted trials using five fabric samples, each measuring 5” x 5”. Different amounts of starch were mixed with heated water to create stiffening solutions. Each fabric sample was soaked in the respective starch solution for 30 minutes and then dried in sunlight for four hours. The researchers aimed to determine the optimal starch concentration for achieving desired stiffness without compromising fabric properties. They noted potential drawbacks of excessive starch use, such as over-stiffness, reduced flexibility, cracking, and possible discoloration.
3. Evaluation: The final phase involved a structured evaluation by selected assessors who rated the fabric samples based on appearance, durability, effectiveness, texture, and general acceptability. Evaluators were given specific instructions and a set timeframe to complete their assessments.

The study's outcome focuses on the acceptability of Taro starch as a stiffener for Hablon fabrics, providing insights into its effectiveness and practicality in textile applications.

The data gathered were computed, tabulated, analyzed, and interpreted accordingly by the appropriate statistical tools. The Five-Point Likert Scale and Nine-Point Hedonic Scale were used to determine the level of acceptability of Taro starch in terms of appearance, durability, effectiveness, texture, and general acceptability.

The results obtained from the Five-point Likert Scale and Nine-point Hedonic Scale are the scores that each evaluation gives on the product.

RESULTS AND DISCUSSION

Table 1. Acceptability of taro starch as hablon stiffener in terms of appearance

Sample	M	SD	Description
1	5.00	.000	The color of the fabric retained or remained the same.
2	4.40	.507	The color of the fabric retained or remained the same.
3	3.20	.775	The color of the fabric slightly retained.
4	2.33	.976	The color of the fabric has faded.
5	1.40	1.056	There is discoloration or the fabric's color changed.

Table 1 shows that in terms of appearance, Sample 1 (M=5.00, SD=.000), has the better result wherein the color of the fabric remained the same after the Taro starch is being applied. This only shows that the amount of stiffener greatly affects the appearance of the fabric. The smaller the amount, the more the color of the fabric retained. The greater the amount, the more the color changes or fades.

This implies that the formulation of Sample 1 maintained the appearance of the fabric even there is a stiffener being applied.

Table 2. Acceptability of taro starch as hablon stiffener in terms of durability.

Sample	M	SD	Description
1	2.20	1.474	The fabric became slightly stiff.
2	2.67	.900	The fabric became moderately stiff.
3	3.13	.834	The fabric became moderately stiff.
4	4.00	1.134	The fabric remained very much stiff.
5	4.47	1.407	The fabric extremely remained stiff.

Table 2 represents that Sample 5 (M=4.47, SD=1.407) remained very much stiff after being folded or crumpled. This shows that the larger the amount of starch being used, the more durable the fabric is.

This implies that the Taro starch made the fabric to become more durable preventing it from weakening the woven threads that results to fraying as it improved the fabric's strength increasing its lifespan especially on fabric made of cotton fibers.

Table 3. Acceptability of taro starch as hablon stiffener in terms of effectiveness.

Sample	M	SD	Description
1	2.40	1.502	The Taro starch applied to the fabric is slightly effective.
2	2.93	1.280	The Taro starch applied to the fabric is moderately effective.
3	3.60	.828	The Taro starch applied to the fabric is effective.
4	4.27	.799	The Taro starch applied to the fabric is extremely effective.
5	4.73	1.033	The Taro starch applied to the fabric is extremely effective.

Table 3 represents that Taro starch as Hablon Stiffener is shown effective in Sample 5 (M=4.73, SD=1.033) showing the highest result of effectiveness. The fabric became more stiffer and more resistant to ravel.

This implies that the amount of Taro starch being applied to the Hablon fabric in Sample 5 gives an effective result as it shown that the stiffener made the weave strong preventing it from raveling. According to Rena & Kusum (2012), stiffness considerably increased with the increased concentration of the starch. The variation in stiffness differs on the amount and on the concentration of the fabric where it resulted to the significant difference of the results showed.

Table 4. Acceptability of taro starch as hablon stiffener in terms of texture.

Sample	M	SD	Description
1	2.07	1.387	Slightly rigid
2	2.47	1.060	Slightly rigid
3	3.40	1.056	Rigid
4	4.27	.594	Extremely rigid
5	4.93	.258	Extremely rigid

Table 4 represents the results of the evaluation of Taro Starch as Hablon Stiffener in terms of texture revealed that Sample 5 (M=4.93, SD=.282) showing that the stiffened Hablon is extremely rigid.

This implies that Taro starch can make the Hablon fabric rigid but making it easy to handle especially during cutting and sewing.

Table 5. Acceptability of Taro Starch as Hablon stiffener in terms of General Acceptability.

Sample	M	SD	Description
1	8.20	1.014	Like very much
2	7.60	.910	Like very much
3	6.80	1.320	Like moderately
4	6.33	1.799	Like slightly
5	5.73	2.712	Like slightly

Table 5 represents the results of the evaluation of Taro Starch as Hablon Stiffener in terms of general acceptability. The results revealed that the acceptability of Taro starch as Hablon Stiffener shown from Sample 1 (M=8.20, SD=1.014) and Sample 2 (M=7.60, SD=.910) rated as "liked very much" by the evaluators. Sample 3 (M=6.80, SD=1.320) was "liked moderately". Sample 4 (M=6.33, SD=1.799) and Sample 5 (M=5.73, SD=2.712) were both "liked slightly".

This means that Sample 1 obtained the mean ($M=8.20$, $SD=1.014$) and “liked very much” by the evaluators got the high level of acceptability among other samples. This indicates that the starch from Taro corm is well-received by the different respondents who appreciated its quality and effectiveness. The results revealed that the product stiffened the Hablon preventing from fraying.

The result can be attributed to the appearance and the effectiveness it showed being applied to the Hablon fabric. Moreover, since the evaluators found it effective and it is made of natural raw ingredients like Taro corm, this collectively attributed to the high level of acceptability of Taro starch as Hablon Stiffener. The result of this study is similar to the study conducted by Gautam & Sharma (2022) entitled, “Colocasia starch: as an alternate natural sizing agent for textile application”, that found Taro starch was good as revive and can be safely applied on textiles as stiffening agent. The study revealed that the starch extracted from Colocasia corms can successfully be used as natural stiffening agent on cotton fabric.

Table 6 Differences in the formulations as to the identified characteristics of every samples

		F	Sig.
Appearance	Between Groups	55.464	.000
	Within Groups		
	Total		
Durability	Between Groups	9.425	.000
	Within Groups		
	Total		
Effectiveness	Between Groups	10.776	.000
	Within Groups		
	Total		
Texture	Between Groups	23.525	.000
	Within Groups		
	Total		
Gen_Ave	Between Groups	5.109	.001
	Within Groups		
	Total		

Table 6 revealed that there is a significant difference in terms of appearance, durability, effectiveness, texture, and general acceptability of Taro Strach as Hablon Stiffener. Its general acceptability showed that the null hypothesis of this study is rejected showing that the general acceptability has the p-value of .001 indicating that there is a significant difference in the level of acceptability of Taro starch as Hablon Stiffener. It suggests that strong evidence against the null hypothesis.

This relates to the study of Komalasari *et al.* (2019), evaluation for the fabric is handling test, ability to return from crease recovery fabric, tensile strength, drape ability and appearance resistance after washing.

CONCLUSION

Based on the results of the study, the following conclusions were drawn: The starch extracted from the Taro corms had a huge potential to stiffen the Hablon fabric. Based from the results that Taro starch maintained its appearance and improved the physical properties of Hablon fabric that

leads to the increase of stiffness and strength of the Hablon fabric. The developed starch out of Taro was highly appreciated and liked by the evaluators. Its development also paved way for further discoveries and innovation of eco-friendly fabric stiffeners that will be used in fashion and textile industries.

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