FISHPOND MOSS *(Bryophyta)* AS DECORATIVE ECO PAPER

A SCIENCE INVESTIGATORY RESEARCH

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Research Abstract

Most companies, institutions and offices often use decorative papers as bulletin sheet, evaluation. crafts and demonstrations. but these advertised decorative papers made up of tree fibers that is decreasing in number. Out of curiosity, the researchers made an organic solution which is decorative eco paper made up of fishpond mosses (Bryopheta) without using any chemicals. The researchers thought of a good substitute to wood fibers for a good solution to limit the damage in nature, to help minimize the cutting of trees for production and to determine the result of using fishpond moss as the raw material in the production of paper.

This study predominantly targets to regard economic and environmental issues with the use of fishpond moss fiber in the production of decorative paper and to increase the surpass of non-wood fibers. Specifically, to determine the feasibility and the physical properties such as tensile strength, texture, and its effectiveness of fishpond moss *(Bryopheta)* as decorative eco paper.

This study aims to contribute an indigenous way of making an Eco board and is significance to Students and school to help our society amidst of deforestation, in the society to help the sectors of the society with the use of fishpond moss fibers in decorative paper production, to reduce deforestation, in fishpond farmers. It helps them to keep away the polluted mosses so that new mosses will grow. In Paper Industry, this could contribute to paper industries for them to substitute the wood fibers for paper crafting. It is also significant to the environment and will be highly benefited because trees have vital function in our environment.

Dedication

This research was truly dedicated to their beloved parents:

Mr. & Mrs. Jothan S. Tatang

Mr. & Mrs. Reynaldo E. Alinton

Mr. & Mrs. Leoncio C. Domider Jr.

Who had been their constant source of inspiration, for untiringly supporting their children and teaching them, that made the study accomplished and completely done on time.

This research study is also humbly dedicated to their Capstone teacher Mrs. Junette N. Bitgue, EdD for giving her full support, discipline, encouragement and duties with patience, love and determination.

The Researchers

Acknowledgement

The researchers would like to express their heartfelt thanks, gratitude and appreciation to those people who help them for the completion of their research study.

Firstly, to the parents for giving their financial and moral support, love, care and time.

Secondly, to our adviser Ms. Cassandra Pearl Emperado, to our Capstone teacher Mrs. Junette N. Bitgue, EdD for willingly imparted their knowledge, suggestion and for guiding the researchers.

Above all, to the One who sustained them throughout the making of this study, Jesus Christ, for the wisdom, strength and endurance He had given them. Glory and honor belongs to God alone.

The Researchers

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Chapter I

Introduction

Background of the Study

Presently, people, especially teachers, students, workers, usually use decorative papers in their beatification of their outputs, for their projects, and some are for their crafts, but instead of buying commercial decorative paper with such expenses, the researchers used fishpond moss *(Bryophyta)* as decorative eco paper with less expense and highly contributes in lessening of cutting down trees used for decorative papers, also, making fishpond polluted moss useful as it useless in fishponds.

Fish ponds often be filled with mosses, it is one of the major sources of food among fishes and other organisms present. Mosses is a great source of fiber, when it is polluted, dark, it is not needed in some fishponds. When it dries, it turns brown and a result, fiber. In that matter, fishpond moss contains organic fiber which can be used as decorative eco paper. The researchers conclude that moss is efficient because of its availability anywhere in the world, and it can make as a minor substitution in the production of fibers amidst paper.

Mosses have spread all around the world and are found in wet environments such as rainforests, wetlands and alpine ecosystems. They are also common in urban areas with a wet climate and often establish on driveways, sidewalks, brick walls and other man-made structures. Mosses require water to reproduce which is why they struggle to survive in drier climates. Humans have also utilized mosses for a number of reasons. Traditionally, moss has been used for packing food, helping to insulate houses, and peat formed from semi-decomposed Sphagnum moss was used as a fuel in the Northern Hemisphere. More recently, mosses have been used in the florist trade.

Eco-friendly paper, is exactly what its name implies: A greener version of traditional paper, with a smaller carbon footprint and overall environmental impact. There are two main kinds of eco-friendly paper.

Most companies, institutions and offices often use decorative papers as bulletin sheet, evaluation, crafts and demonstrations, but these advertised decorative papers made up of tree fibers that is decreasing in number. Out of curiosity, the researchers made an organic solution which is decorative eco paper made up of fishpond mosses *(Bryopheta)* without using any chemicals.

Statement of the Problem

In this study, the researchers thought of a good substitute to wood fibers for a good solution to limit the damage in nature, to help minimize the cutting of trees for paper production and to determine the result ofusing fishpond moss as the raw material in the production of paper. With this, the researchers pursue to answer the following questions:

1. How is it feasible that fishpond moss can be a raw material in making a decorative eco paper?

2. What is the significant difference in using different treatments of fishpond moss to test the tensile strength of decorative eco paper?

3. Is there a significant difference in using different treatments of fishpond moss to the texture of decorative eco paper?

Objectives

This study predominantly targets to regard economic and environmental issues with the use of fishpond moss fiber in the production of decorative paper and to increase the surpass of non-wood fibers. Specifically:

- to determine the feasibility of fishpond moss to produce a decorative eco paper;

- to determine the physical properties of fishpond moss to produce a decorative eco paper such as tensile strength and texture; and

- to determine which treatment is more efTective in making of decorative eco paper.

Hypothesis

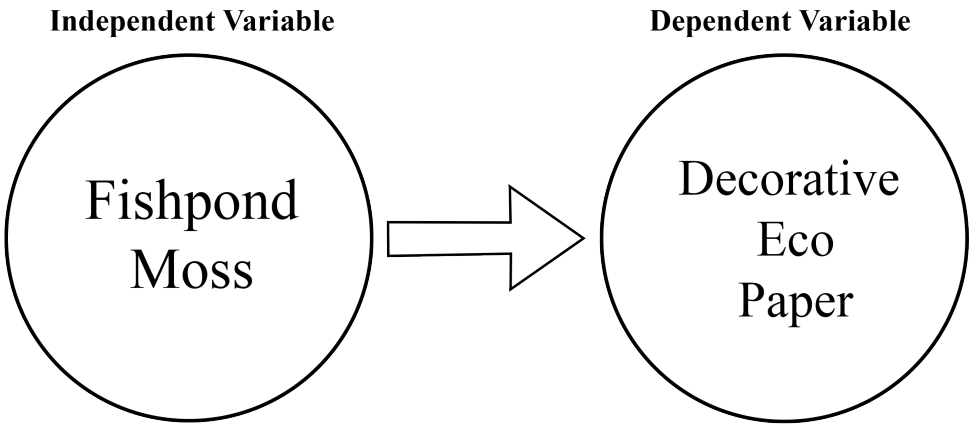
H_o (Null Hypothesis) - There is no significant difference of using different treatments of fishpond moss to its tensile strength and texture of the decorative eco paper.

H_a (Alternative Hypothesis) - There is a significant difference of using different treatments of fishpond moss to its tensile strength and texture of the decorative eco paper.

Conceptual Framework

This part focused on the variables. This investigation was determined whether the strategies used in the experiment were reliable. The researchers found out that the Fishpond Moss *(Bryopheta)* as independent variable whereas Decorative Eco Paper as the dependent variable.

Figure 1
Representation of Conceptual Framework



Significance of the Study

This study aims to contribute an indigenous vvay of making an decorative eco paper and is significance to:

Students and School. Instead of buying, this study will lower the consumption of advertised decorative papers for students. Thus, the students are also helping our society amidst deforestation.

Society. Likewise, instead our society is using wood as papers, we can often use this material in order that some of our trees can be preserved that greatly contributes benefits. This study targets to help the sectors of the society with the use of fishpond moss fibers in decorative paper production, to reduce deforestation and to introduce fishpond moss as decorative eco paper product.

Fishpond Farmers. Since polluted mosses in such fishponds are prohibited because it doesn't

contribute as food for the fish so it needs to be takeru In such manner of significant midst, it helps them to keep away the polluted mosses so that new mosses will grow.

Paper Industry. Moreover, this could contribute to paper industries for them to substitute the wood fibers for paper crafting.

Environment. If they will use this gradually, it will decrease the volume and production of commercialized paper craft and but utilized fishpond moss instead. It is also significant to the environment and will be highly benefited because trees have vital function in our environment. This study could help the environment by preserving the trees. Lesser trees could be cut if there is a replacement for wood fibers.

Scope and Delimitation

This study focuses on making a decorative eco paper from fishpond moss. This study is limited only on fishpond moss. The size of the product varies from the frame. This study mainly tocuses and delimited on the physical properties of the product such as its texture and tensile strength out of fishpond moss as decorative eco paper.

The research study was conducted in Domider's residence located at Purok 1, Buayan, Kabasalan, Zamboanga Sibugay, and also where all the materials are gathered.

Definition of Terms

- Bryopheta- scientific name of Moss.
- Water- an inorganic, transparent, tasteless, odorless. and nearly colorless chemical substance, used in the study where moss is submerged for framing.
- Fishpond - a controlled pond, artificial lake, or reservoir that is stocked with fish and is used in aquaculture for fish farming, or is used for recreational fishing or for ornamental purposes.
- Eco board - Paper which manufactured using non wood material.
- Mosses - are a phylum of non-vascular plants
- Paper craft- the collection of art forms employing paper the primary artistic medium for the creation of three-dimensional objects.
- Fiber- a thread or a structure or object resembling a thread.

Chapter II

Review of Related Literature

Fishpond mosses are useful in some way where we can make it in the midst of fiber. Moss plays a critical role in your pond health, but an imbalance can be catastrophic to your overall pond health. So, to make used of that waste or dead moss the researchers conduct a study that the fishpond moss will be use as decorative eco paper with the help of the following information from other sites.

Budke (2015) stated that it always amuses her when she bumped into bryophytes when reading, especially when it is her recreational fiction reading. It is pretty common for mosses to be described as part of the background scenery, such as 'The lush verdant forest was covered in a layer of soft moss'. Mosses are also used as part of a survival strategy either as an insulating layer to keep warm or an absorptive padding to pack a wound. Using mosses for wound care is not a fictional idea, but was actually a practice in World War L Sphagnum mosses are highly absorptive and have antimicrobial properties, which make them ideal for this purpose.

According to The Editors of Encyclopedia Britannica (2020), moss (division Bryophyta), any of at least 12,000 species of small nonvascular spore-bearing land plants. Mosses are distributed throughout the world except in salt and are commonly found in moist shady locations. They are best for those species that carpet woodland and forest floors. Ecologically, mosses break down exposed substrata, releasing nutrients for the use of more complex plants that succeed them. They also aid in soil erosion control by providing surface cover and absorbing water, and they are important in the nutrient and water economy of some vegetation types. Economically important species are those in the genus Sphagnum that form peat.

Ibrahim (2012) said that starch is a natural carbohydrate material that can be obtained from green plants like (rice, wheat, potato and corn). Pure starch is a white, tasteless and odorless powder- It is renewable, biodegradable, and inexpensive material that has polymerization properties for extrusion, injection molding and compression molding, but it is

hydrophilic and has relatively poor mechanical properties. The properties of polymerized starch can be enhanced by different ways such as; blending with more hydrophilic thermoplastics, graft co-polymerization and chemical modification. Starch is one of the most extensively studied biodegradable polymers-

D. Dainelli (2008) Recycled paper is an important source of raw materials for the paper industry: about 42 million tonnes of waste paper were recycled in Europe in 2001, confirming a substantial growth in the last 10 years (there were 26 million tonnes recycled in 1991, which indicates a growth of 38%) (Fig. 12.2). These 42 million tonnes represent 52.1% of the total paper used in Europe. It also represents the vast majority of the total amount of paper collected, which was 44.7 million tonnes in 2001.

Chapter III

Methodology

This chapter deals with study design, locale, instruments, and method of data collection, as well as plan for data analysis. In the whole it gives the general pattern for gathering and processing research data.

Research Design

An experimental design was selected for the present study, were the researcher has attempted to measure variables and the relationship between the variables. The researcher wanted to determine the effectiveness of fishpond moss *(bryopheta)* as decorative eco paper and its durability using weights.

Research Locale

The materials used by the researchers were available at Barangay Calapan, Kabasalan, Zamboanga Sibugay. This study was conducted at Domider's residence, Purok 1, Buayan, Kabasalan, Zamboanga Sibugay. This study was carried at Francisco Ramos National High School for classroom beatification and bulletins.

Research Instruments

Materials for making the product:

- Wood Frame
- Fishpond Moss
- Water
- Grinder
- Cloth
- Sponge
- Basin
- Hanger
- Hanger Clips

Materials for making the product

- Wood frame
- Fishpond Moss
- Tap water
- Chopping board (plastic)
- Knife
- Cloth
- Sponge
- Basin
- Hanger
- Hanger clips

Data Collection Process

Procedure in making the wood frame

1. Prepare all the needed materials.
2. Cut the 1x1 wood into 4 with the pieces measurement of 13 inches as length and 4 pieces of 9.5 inches as width
3. Attach the wood by pair, having each width and length to form a rectangular frame.
4. Repeat the procedure on attaching the wood for another wood frame in forming another rectangular frame.
5. Tack the silk screen on the 1st wood frame made. Make sure to tack it on tightly.
6. The wood frame is now ready for framing the moss.

Procedure in making the product

1. Prepare all the needed materials.
2. Wash the thoroughly with tap water then put it in a container
3. Chop the moss into smaller granule then put it in a container
4. Prepare a basin with 9L of tap water then soak the frame.
5. Spread the moss inside the frame.
6. Let it soak for a while then shape it into the frame to make it even.
7. Take off the frame out of the basin, then take off the upper frame.
8. Transfer it to a cloth then press it with sponge.
9. Hang it slowly and let it dry.
10. Then the product is done and ready to use.

Treatment of the Study

T1 - Fishpond Moss (150 grams), Tap Water (9L)

T2 - Fishpond Moss (200 grams), Tap Water (9L)

T3 - Fishpond Moss (250 grams), Tap Water (9L)

The table below shows the measurement applied in every treatment.

Table 1
Measurement applied in every treatment

Treatments	Amount of Fishpond Moss (g)	Measurement of Water (L)
T1	150g	9L
T2	200g	9L
T3	250g	9L

Data Collection Technique

There are three treatments with different measurements. In each treatment, there are three trials wherein the researchers will test the tensile strength and texture of produced paper. To test the tensile strength, the researchers use weighs of kilograms to determine how long it can carry until it is ripped off For the texture, the researchers test the product through conducting a survey.

Statistical Analysis

A single statistical test was used in the analysis of the quantitative data This was the one way Analysis of Variance. It was employed to determine if there is a relationship between the three treatments (treatment 1 , treatment 2 and treatment 3), and if the results are statistically significant. The confidence value chosen was 0.05.

The result of this test is ap value; if this is below the significance interval (0.05), the null hypothesis is rejected. If it is above the significance interval, the null hypothesis is accepted. Least Significant Difference (LSD) test was also used to determine which of three treatments are significantly different.

Chapter IV

Results and Discussion

This chapter presents the result of the experimentations and discussion.

Result

The physical property of the (Ecorative eco paper such as its texture was determined through survey of the product satisfaction. The respondents were asked to rate the paper samples using 5-point Rating Scale Quality Scoring as they perceive it

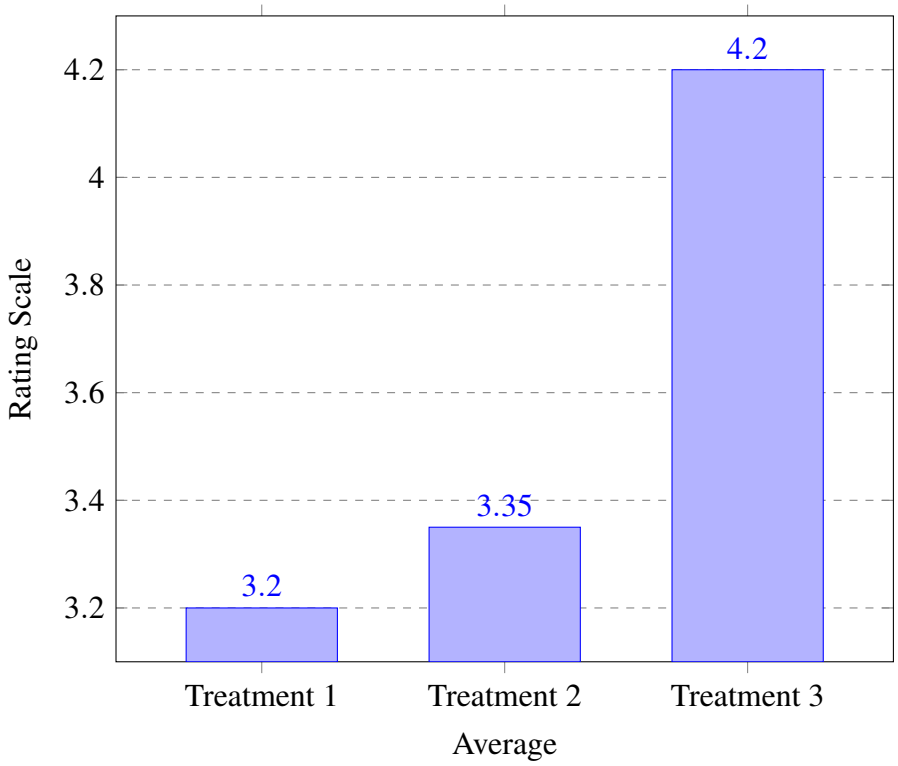
Table 2
Result of the texture that the researcher gathered

Respondents	T1	T2	T3
1	3	3	4
2	3	3	4
3	3	4	5
4	4	1	2
5	5	3	3
6	4	4	5
7	4	4	5
8	3	2	5
9	4	3	5
10	4	4	5
11	3	3	3
12	4	3	4
13	3	4	4
14	3	4	5
15	2	2	3
16	1	3	4
17	2	4	5
18	3	4	4
19	3	5	4
20	3	4	5
Mean	**3.2**	**3.35**	**4.2**

Legend:

4.21 - 5.0	- Very Satisfied
3.41 - 4.20	- Satisfied
2.61 - 3.40	- Fair
1.81 - 2.60	- Poor
1.0 - 1.80	- Needs Improvement

Figure 2
Texture



This graph shows that the treatment 3 has the highest mean. Therefore, the treatment 3 is the best among all treatment in terms of its texture.

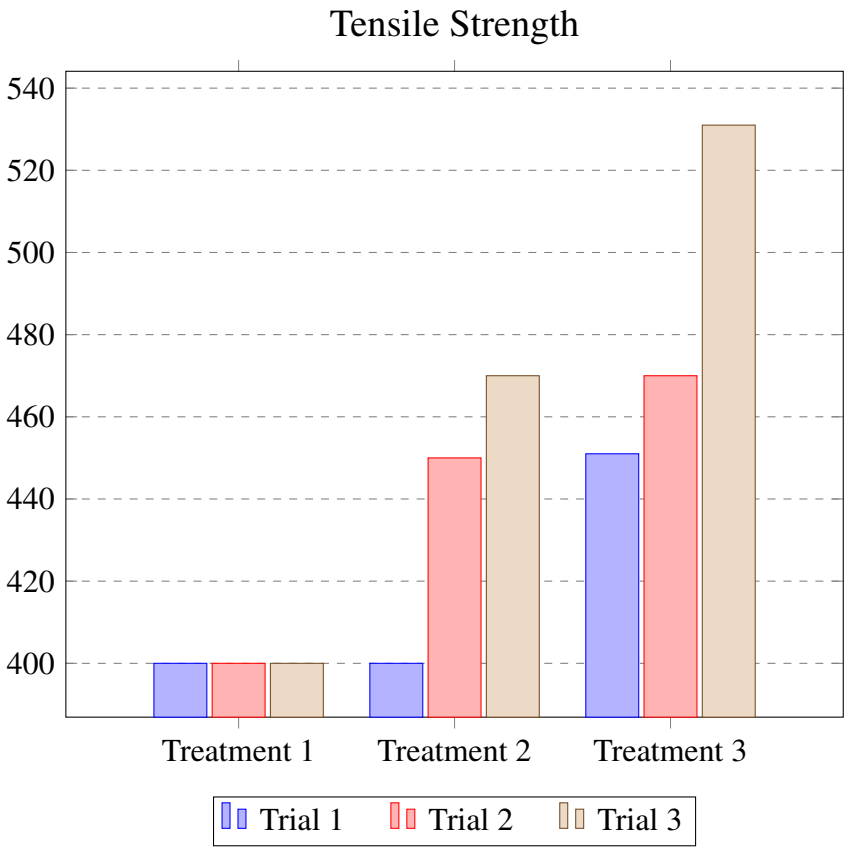
Table 3

Tensile strength of decorative eco paper from different treatments

Treatment	Trial 1 (g)	Trial 2 (g)	Trial 3 (g)
Treatment 1	*399.5g*	*399.75g*	*400g*
Treatment 2	*400.10g*	*450g*	*470.20g*
Treatment 3	*451.20g*	*470g*	*530.5g*

Figure 3

Graphical representation of tensile strength of decorative eco paper from different treatments



The graph shows that Treatment 3 has the higher tensile strength that can carry a maximum weight of 530.5 g until it rips off.

Table 4
ANOVA Data Analysis

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Column 1	3	270	90	0
Column 2	3	600	200	2500

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	18150	1	18150	14.52	0.018932	7.708647
Within Groups	5000	4	1250			
Total	23150	5				

The result shows at alpha level 005 with 95% confidence level, the *p-value* is equal to 0.0189 which is less than 0.05, therefore, the null hypothesis that there is no significant difference among the three treatments in terms of its tensile strength is rejected This implies that there is a significant difference of using different treatments of fishpond moss to its tensile strength and texture of the decorative eco paper.

Discussion

From the table 2, the table that shows the result of the texture that the researcher gathered, there are 20 respondents to test the texture of the product Trial 1 have the average number of 3.2 which is fair Trial 2 have the average number of 335 which is also fair and in trial 3, the average number of4.2 which is satisfied. The graph shows that the treatment 3 has the highest mean. Therefore, the treatment 3 is the best among all treatments in terms of its texture.

In table 3, shows the tensile strength of decorative eco paper from different treatments. Treatment 1 have 399.5g in trial 1, trial 2 is 399.75g, and in trial 3 is 400g of weights until it rips off Treatment 2 have 400.10g in trial 1, trial 2 is 450g, and in trial 3 is 470.20g of weights until it rips off. Treatment 3 have 451.20g in trial 1, trial 2 is 470g, and in trial 3 is 530.5g of weights until it rips off The graph shows that Treatment 3 has the higher tensile strength that can carry a maximum weight of 530.5 kg until it rips off.

The result shows that the treatment 3 has the highest mean. Therefore, the treatment 3 is the best among all treatments in terms of its texture and tensile strength.

Chapter V

Conclusion and Recommendation

In this chapter, the final decision of the researchers that was formed throughout the study and the suggestion of the researchers to enhance this research study.

Conclusion

The following facts have been established the following analysis of results obtained from the experiments described in the above sections. In summary:

- Fishpond moss *(Bryopheta)* is feasible to be the raw material in making a decorative eco paper through utilizing the least amount of 250g of fishpond moss.
- The relationship between different treatments of fishpond moss to test the tensile strength and texture of decorative eco paper is significantly different, the more mosses is utilized, the more it is durable.
- The attainment of most effective tensile strength of the paper is upon using treatment 3 (250g) of fishpond moss.

Moreover, to assure the texture and tensile strength of the decorative eco paper, the product must be at least 250 grams of fishpond moss *(Bryopheta)* as decorative eco paper.

Recommendation

The result of the study suggests to:

- to conduct a decorative eco paper in white or with other colors to produce beautiful craft paper and unique sheets of paper;
- conduct more procedures to further test the feasibility of the Fishpond Moss *(Bryopheta)*;
- conduct more studies to further improve the quality of the decorative paper.

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