

**Dried Nata De Coco Fiber:
An Alternative For Polypropylene (PP)
Plastic**

An Undergraduate Thesis
Presented to
The Faculty of the College of Engineering and Technology
De La Salle University-Dasmariñas
Dasmariñas, Cavite

In Partial Fulfillment
of the Requirements for the Degree
Bachelor of Science in Industrial Technology

Jose Herbert D. Espeleta
B.S. INT 4-1

2003

ABSTRACT

Name of Institution: **De La Salle University-Dasmariñas**

Address: **Dasmariñas, Cavite**

Title: **Dried Nata de Coco Fiber: An Alternative For Polypropylene (PP) Plastic**

Author: **Jose Herbert D. Espeleta**

Funding Source: **Personal/Parents**

Date Started: **June 2003**

Date Completed: **November 2003**

OBJECTIVES OF THE STUDY

A. General

This research was primarily conducted to be able to utilize and produce commercially plastic material using dried nata de coco.

B. Specific

1. Determine the several physico-chemical properties of dried nata de coco fiber
 - a. Density
 - b. Tensile Strength
 - c. Thickness
 - d. Heat Resistance
 - e. Solubility
 - f. Combustibility

2. Compare the physico-chemical properties of plastic made of dried nata de coco fiber to that of the commercially produced non-biodegradable plastic material.
3. Identify the advantage and disadvantage of dried nata de coco fiber from plastics.
4. Identify the uses of nata de coco plastics.

SCOPE AND DELIMITATION

This research was concentrated on the study of dried nata de coco as a substitute for plastic. Some of the physico-chemical properties of plastic such as density, tensile strength, thickness, combustibility, heat resistance, and solubility was analyzed and tested in this study. The test on these properties were conducted at the laboratory site of the Department of Science and Technology.

The preparation of dried nata de coco was started from the time it is prepared until it is ready for harvesting on its 7th and 10th day of aging. The aging and sun drying process took one week and a half, then it was tested for its physico-chemical properties.

The properties of dried nata de coco material was analyzed and compared with the locally produced plastic material which is the polypropylene (PP) type of plastics that are frequently use in markets, food and manufacturing industry. Such plastics that are consumed in this kind of industry are the major contributor to environmental problems resulting to pollution.

METHODOLOGY

RESEARCH METHOD

This research involves the use of experimental and descriptive methods of research. The experimental method of research will be going to implement with the preparation of mother liquor, and nata de coco and in the process of sun-drying while several properties of dried nata de coco plastics will be analyzed and observed by means of descriptive method of research.

RESEARCH LOCAL

The data needed to make this study possible will be gathered from the results of the experiment as well as information's obtained from books, encyclopedia, journals, related studies, magazines and also through internet.

INSTRUMENTATION

Conducting the experiment is considered as the principal instrument of this study. The researcher will prepare the necessary materials needed for the experiment such as sugar, coconut meat, water, acetic acid and mother liquor. After performing the experiment, the dried nata de coco will then be subjected to analysis and observation of its numerous properties.

MAJOR FINDINGS

Dried nata de coco fiber was tested to determine its several important physico-chemical properties like its density, tensile strength, thickness, heat resistance,

solubility and combustibility.

In density, it was found out that plastic out of nata de coco has higher density with a 1.42g/cm^3 which is acceptable in the standard range for density in most plastic materials.

Nata de Coco has a tensile strength of 66.4N/mm^2 which means that its strength can withstand a pressure without being broken.

The property of thickness in nata de coco depends on their aging period. The longer the aging period of fermenting it would have a much thicker result. In this case, nata de coco is harvested on its 10th day of aging and fermentation which is a good time for harvesting and it was found out to have a thickness of 0.276mm.

In heat resistance, it was found out that nata de coco plastic decreases in weight to a percentage of -5.22% when it was heated in an oven at 60°C for 1 hour.

The solubility test of nata de coco plastic were found out insoluble in the three solvents used namely ethyl alcohol, ethyl acetate, and ether. All the specimen in three solvents have no significant change in appearance.

In combustibility test, both were found out to be combustible in which nata de coco plastic produced an ash as a finished product when it was burned which is good and environmental friendly.

CONCLUSION

From the results of the different test performed, it was therefore concluded that the plastic from nata de coco can be a good possible substitute for polypropylene

(PP) plastic materials. It was found out that both have a similar properties to that commercially plastic sample. Some of these similar properties which is tested are the density, tensile strength and solubility except from the thickness, heat resistance and combustibility test which gives a minimal difference from each other but it was found out much better because it is more safe and friendly to use for the people and environment. Thus, it will minimize different pollution especially in air where in hazardous plastics are the one whose destroying it.

RECOMMENDATION

Based on the conclusions, the researchers were able to formulate the following recommendations.

1. The Food packaging industry should take in consideration the utilization of nata de coco plastics and should be tested as for food packaging material, since its strength can be compare to commercially produced plastic material and there is no adverse effect to the food and health of people.
2. An extensive tests of nata de coco plastics on its shell life and biodegradability.
3. The utilization of nata de coco as a product that can be moulded and use it as a packaging material and container for different medicines in drug companies.

4. A continuous test and analyzation on the study of the composition of ash of nata de coco plastics to fully know its mineral content and if it will not surely give an adverse effect to the environment and public health since it comes from the product nata de coco.
5. The fumes produced by nata de coco plastic when it burned should be observed if it will bring hazard to the people and environment.
6. A study in separating the ash of nata de coco plastics for a more useful products to be utilized it as a good raw materials.
7. Further extensive test on this physical and chemical properties of the sample dried nata de coco fiber such as density, its thickness, tensile strength, elongation, heat resistance, solubility, and combustibility and other properties like its fillers, clarity, porosity, electrical resistance, low-temperature properties, resistance to chemicals, compressive strength, and impact resistance etc. to fully compare the finished product from the commercially produced plastic material (Polypropylene (PP) type of plastics).

TABLE OF CONTENTS

	Page
Title Page	i
Approval Sheet	ii
Acknowledgement	iii
Abstract.....	vii
Table of Contents	xiii
List of Tables	xv
List of Figures	xvi
CHAPTER 1. THE PROBLEM AND ITS BACKGROUND	
Introduction	1
Conceptual Framework	3
Statement of the Problem	4
Hypothesis	4
Objectives of the Study	4
Scope and Delimitation	5
Importance of the Study	5
Definition of Terms	7
CHAPTER II. REVIEW OF RELATED LITERATURE	
Research Literature	9

CHAPTER III. METHODOLOGY

Research Method	28
Research Local	28
Instrumentation	28
Research Procedures	29

CHAPTER IV. PRESENTATION AND ANALYSIS OF DATA

Problem Tree	30
Problem Tree Analysis	31
Objective Tree	32
Objective Tree Analysis	33
Presentation of Data	35
Analysis and Interpretation of Data	39

CHAPTER V. CONCLUSION AND RECOMMENDATION

Conclusions	46
Recommendations	50

BIBLIOGRAPHY

APPENDICES

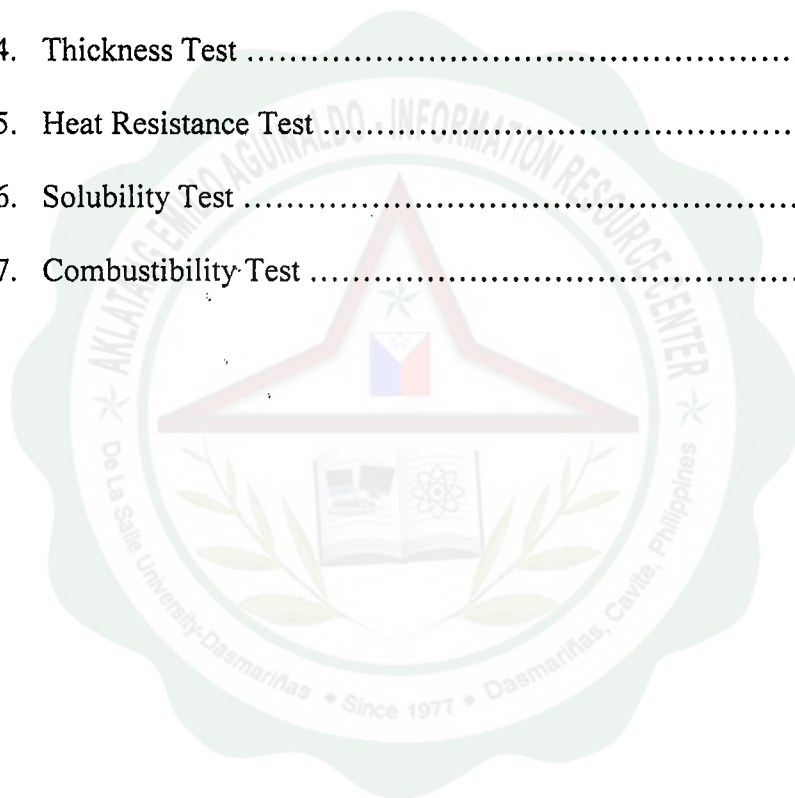
Appendix A	53
Appendix B	54

CURRICULUM VITAE

ATTACHMNET

LIST OF TABLES

Table No.	Page
1. Composition of Solid Municipal Waste	26
2. Density Test	39
3. Tensile Strength Test	40
4. Thickness Test	41
5. Heat Resistance Test	42
6. Solubility Test	43
7. Combustibility Test	45



LIST OF FIGURES

Figure No.	Page
Preparation of Mother Liquor	
1. 6 th step in the Preparation of Mother Liquor	53
2. The mother liquor after setting aside of four to five days	53
Preparation of Nata de Coco	
3. Materials for the preparation of nata de coco	54
4. Materials for the preparation of nata de coco	54
5. Materials for the preparation of nata de coco	55
6. 4 th step in the preparation of nata de coco	55
7. 5 th step in the preparation of nata de coco	56
8. 5 th step in the preparation of nata de coco	56
9. 5 th step in the preparation of nata de coco	57
10. 6 th step in the preparation of nata de coco	57
11. 7 th step in the preparation of nata de coco	58
12. 8 th step in the preparation of nata de coco	58
13. 9 th step in the preparation of nata de coco	59
14. The harvested nata de coco after 10 days of aging and fermentation	59