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DEVELOPMENT OF ORGANIC CLOTH DIAPERS WITH DISPOSABLE COCONUT COIR FIBRE LINING

P.Thilakavathi[1], Dr. G. Ramakrishnan[2]

[1]M.Tech Scholar, Department of Fashion Technology, Kumaraguru College of Technology, Coimbatore.
[2]Professor and Head, Department of Fashion Technology, Kumaraguru College of Technology, Coimbatore

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Abstract - *The handling of baby diapers is a significant concern. This project aims to develop a disposable coir fibre lining for cloth diapers. This research uses a quantitative method of an experimental type. Coir–a lignocellulosic natural fibre–has emerging importance as an engineering material due to its high tensile strength and elongation properties. Coir fibre powder is used as an absorbent material because of its water retention, holding capacity, and moisture retention, breathable and flexible properties. A large amount of residual water from filtration has shown the quality of the coconut coir's absorbency. This research is expected that was deepened with the manufacture of baby diaper products made from coconut coir powder as a lining*

***Key Words*: baby diapers, coir fibre, organic cloth diaper, water retention, absorbency**

1. INTRODUCTION

An important area of textiles is the field of health care and hygiene among other medical applications .The range of products includes disposable and non-disposable items such as surgical clothing, mask, surgical drapes, towels, gloves, baby nappies, napkin sanitary and more used in hospitals [9] .As nappies For children who come in contact with the skin, consumers are concerned about the cause of the skin or not. Water transport features such as absorption capacity and timely strike are important in terms of wet comfort nappies [7]

Coconut is a ubiquitous plant, but the quality of the coconut is certainly influenced by the mineral and other nutrients contained in the soil in which the coconut grows. Coconut produces fruits with a fiber component such as packing fruit flesh. These coconut fibers can absorb water [2]. The coconut fibers are ground into a powder and analyzed by their absorption. Coconut coir powder has an absorption capacity of 1.5% which can increase the absorption capacity of coconut fiber [1]. This indicates that the absorption capacity of the water through the coconut husk is very good [6].

Coir fiber has excellent features such as waterproofing, water retention, while allowing enough water, flexibility and aeration that make it ideal for baby diapers. Its unique antimicrobial properties protect the baby from infection [1] .As coir fiber is a living and perishable substance, it decomposes slowly over time but does not harm the environment. According to the properties of coir fiber, it is suitable for nappy fabrics fabrics [10] This fiber membrane does not affect the baby in ways such as rashes, diseases, etc. and also keeps the baby safe from microbes and very organic [5].

The change in baby diaper material is intended to get people to consider their diapers made by exploiting the energy available in their area. This is done to reduce baby diaper spills in Indonesia. With the use of coconut fibers instead of baby, diapers will produce naturally friendly products. Production of this product should precede intensive research related to the absorption of coconut fiber [8].

This research is expected to add ideas and may provide incentives for the production of new products in the form of making coconut-based baby nappy products.

2. LITERATURE REVIEW

Coir pith is an agro-pollutant formed during the extraction of coir fiber from coconut husks. It causes air, water and soil pollution and is considered an environmental problem. The only advantage of coir pith is its ability to absorb moisture. Water stored in the internal matrix of the coir pith should be stored for as long as the coir pith is used as a baking ground. In this context, the water storage capacity of the coir pith is studied as a function of time. This study was conducted at different stages of coir pith [1]

In the industrial fiber industry, coconut fiber (Cocos nucifera L.) is extracted from coconut husks, although the second crop is in the forefront in terms of its mass production. The FAO report (FAO, 2013; FAO, 2015) shows that, there is a steady growth in coconut fiber production (at a rate of 37%) and is high (at a rate of 10%) in India (Fig. 10.1) due to growth of understanding the use of eco-sustainable, decaying, natural resources in the world. Interestingly to look at, the growing trend in land production of the coconut fence is very much in line with the growing trend of coconut fiber production in India [2]

The effectiveness of different chemicals in reducing the absorption rate of coconut coir fiber and how it varies over time. In addition, in addition to previous activities where the duration of treatment is different or the duration of the test is different, we present the effect of these variations in both long-term. The results showed that by increasing the treatment time, eg dipping the coir time in chemicals, the tendency to absorb water decreased significantly. In

addition, coir is a natural fiber with a high content of lignin and hemicellulose, which is very hygroscopic, over time, the therapeutic effect actually became minimal. Therefore, as was the case with previous researchers in which only a few days' absorption dose was studied, with natural coir-like fiber, this study recommends a longer detection of its absorption symptoms [3]

The discovery and discovery of a wide range of natural fibers are major reasons for developing new interest from sustainable technologies. Natural fibers, such as reinforcement, have recently attracted the attention of researchers because of its advantages over other inventions. At low cost, some special mechanical properties, natural fiber exhibits a suitable renewable and decaying boiling point in a commonly synthetic material that means fiber glass. Starting with research and following their properties, the production process and refining. Mechanical features, tensile strength, Impact strength and bending strength. Test results show, a compound made up of 50% -50% weight of coconut coir & fiber straw fiber has been shown to have the best impact strength 47.27 N / mm2 compared to other coconut coir & fiber-based materials. 70% coconut 30% has good tensile strength 108.7 MPa and bending capacity 19.80MPa [4]

Coir pith, a biomass residue, is produced as a product during the extraction of coir fiber from a coconut shell. It is considered a waste in the coir industry. Excessive production of coir pith can cause environmental pollution due to improper management of the coir pith which will not be naturally damaged. The current paper deals with the use of coir pith as a growing source of the plant. Different parameters such as pH and coir pith conduction were tested to confirm the micronutrient source in which the plants. These parameters were controlled by washing in the next phase. The coir medium reservoir was also tested to determine the internal water handling capacity. The results obtained showed that the parameters were not only based on washing but also on coir pith particle size. [6]

Management of baby nappies is very important. This study aims to determine the efficacy of the reduction of infant powder based on coconut from the soil of Java, Kalimantan, and Papua. This study uses a measurement method for the type of test. Each sample of coconut powder used in this study was 200 mg wrapped in filter paper. The large amount of residual water from the filter indicates the absorption quality of the coconut shell. Data collected on the three islands is analyzed to determine its absorption capacity. It was found that this coconut coir powder has good absorption quality and is identified by each soil culture as a separate plant [8]

Friendly child-friendly health care products are very much needed, to care for a sensitive baby skin, and to avoid common skin problems. The current study was conducted to assess maternal satisfaction, in the use of baby nappies - fabric compared to disposable nappies. The study was conducted with 50 mothers of young children, using a systematic interview program in the city of Udaipur. The findings indicated that, most respondents were satisfied with the existing diapers used by them for their children, even if; it was a cloth diaper or disposable diapers [10]

Since the above documents, coir fiber has taken a long time to store the material. It can hold water for a long time making it suitable for diaper membranes. He studied the properties of fiber coir. Its use in other fields. Coir fiber readings are studied. Coir fiber treatment with various chemicals is studied and it has been found that the treatment can also have a good level of absorbency. It is found that chemical treatment is a small factor in the preparation of the powder. It is found that coconut coir has better strength than wheat grass, so it can be used as a moisturizer. Coil lining of the coir is important, so it does not harm the environment. The coir powder particle is an important element of high absorbency, it is found that the small particle has high absorbancy.The coconut husk fibers are used in nappy suction tubes with the effect of interaction. Fiber structure .So coir powder is used. This coconut coir powder has been found to have good absorption quality. Find out the effectiveness of infant formula

From literature research, Coir fiber properties show good water retention and tendency to absorb, so it can be used for diapers. The antibacterial properties of coir fiber make it ideal for children to be away from germs and diseases. Organic diapers are highly preferred by mothers, so the market for organic diapers is growing. Therefore, the project aims to use coir fiber in the use of baby diaper membranes. Because the above documents did not make diapers with coir fiber

3. MATERIALS

3.1 Souring of organic cotton fabric

Natural cottons are grown using methods and materials that have a low impact on the environment. Organic production systems replenish and maintain soil fertility, reduce the use of toxic pesticides and persistence and fertilizers, and create biologically diverse agriculture, making natural cotton an eco-friendly fabric.

With fabric diapers, you can be sure what materials you use. However, because cloth diapers are less thin than discarded ones, babies may become accustomed to the diaper rash. No matter what nappy you use, do not leave your baby in a dirty, wet nappy for a long time

3.2 Souring of Coir Fibre

Coir is a fibrous material found between a hard, inner shell and outer layer of coconut. Other uses of brown coir (made

from ripe coconut) are for upholstery padding, sacking and horticulture. The white coir, harvested from the unripe coconut, is used to make fine brushes, cords, ropes and fishing nets. [2] It has the advantage of immersion, so it can be used for long distances in deep water without the added weight of gravity and boats.

4. PROPERTIES

Water soluble	5.25%
Pectin & related compounds	3.30%
Hemi-Cellulose	0.25%
Cellulose	43.44%
Lignin	45.84%
Ashes	2.22%

Table-1: Physical properties of coir fibre

Breaking Elongation	30%
Moisture regain at 65% RH	10.5%
Swelling in water	5% in diameter

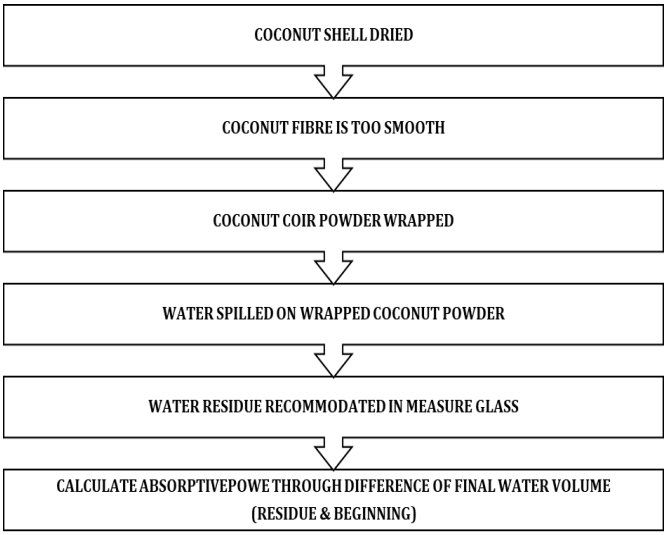
Table-2: Chemical properties of coir fibre

4.1 BENEFITS OF COCO COIR POWDER:

- Capacity High water holding capacity.
- Acceptable pH and EC.
- Wet Very good moisture, better than peat.
- Nutrient retention capacity in the fight against leaks and temporary provision.
- Capacity Water storage capacity is different.
- Drag a good water supply / aeration.
- Preserves body structures for a long time.

5. METHODOLOGY

5.1 Flow chart



COCONUT COIR

COIR SEMI POWDER

Fig -1: Diaper Lining

Fig -2: Organic cloth diaper

6. TESTING METHOD

6.1 ABSORBENCY TESTING AATCC/ASTM TEST METHOD TS-018

Scope:

This test method is designed to measure the water absorption of fabrics by measuring the time it takes for a drop of water placed on the surface of the fabric to penetrate completely into the fabric.

This research approach is in the context of quantitative-experiment research. This study begins by selecting an old coconut fruit with a yellow-colored fiber. In addition, three stranded coconuts are set aside and dried in the sun to dry for about 2-3 days. Once confirmed to be dry, the fibers are smoothed out into a powder. The fine coconut fiber powder was heavy. Repeat this process until the good coconut coir powder has accumulated as much as 200 mg. Coconut coir powder is wrapped in filter paper from food pampers and placed in dry measuring cups. In addition, 200 ml of water is added slowly to the combined powder..

LIQUID STRIKE THROUGH TEST

In the event of a water strike, diapers made of coir fibers take 1.00s and 0.94s (approx.), Respectively to move the liquid to their surface. While cotton diapers sell less time. Therefore, diapers produced from live cotton and coir fiber absorb fluids and keep the skin dry, avoiding wetness. Dietary features of diapers are dermatitis and good dressing.

7. RESULTS & DISCUSSION

7.1 PERFORMANCE OF BABY DIAPERS

ABSORPTION CAPACITY

All baby nappy pads have been tested for their absorption capacity. The results show that nappies made of coir fiber lining have a better absorption capacity than conventional cotton liners. Generally, excellent wet comfort is provided by pipes with high absorption capacity.

PRODUCT DENSITY & THICKNESS

It is evident that the diaper made of coir fiber lining is lighter than all other products. Coir fiber lining is the thinnest (7.2mm) product.

8. CONCLUSIONS

Based on the results of the experiments, it was concluded that the large amount of residual water from the filter indicates the quality of absorbing coconut shells. The absorption capacity is higher than live fabric diapers with coir fiber lining. The water strike over time is also high. The diaper lining composed of coir fibre is lighter than compared to commercial disposable diapers Therefore, this coir fibre lining is affordable because of its abundant in nature. Coir fibre lining for organic cloth diaper is high in absorption, aeration, flexible and comfort, it is highly suitable for babies.

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