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STUDY ON ECO-FRIENDLY MENSTRUAL ABSORBENTS FIBERS

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Abstract - The use of Super Absorbent Polymers in absorbent hygiene products is safe. Cross-linking gives the superabsorbent polymers their unique absorbency properties. They are not renewable or biodegradable because their origin is still synthetic. There is a demand for organic solvents or biodegradable fibers to replace synthetic polymers in feminine hygiene products because they are poorly soluble and harmful to the environment. It would be possible to find a natural fiber with the necessary absorbent characteristics to replace the superabsorbent materials in feminine hygiene products with the aid of this straightforward study on the absorbency of degradable fibers.

Key Words: absorbency, natural fibres, absorbent polymers, biodegradable, environment, hygiene.

1. INTRODUCTION

Products for healthcare and hygiene are often the ones that aid in halting or regulating the spread of germs. In addition to providing cleanliness and being infection-free, these goods aid in preventing the spread of diseases. Having your essential hygiene supplies on hand and ready to use whenever you need them is always preferable and safe.

In terms of hygiene, self-care and self-grooming are crucial. Accordingly, discussing intimate hygiene is still forbidden. Despite rising literacy rates in both urban and rural areas of our nation, women still practise poor menstrual hygiene. Despite the availability of a wide range of feminine hygiene products, their use is rather low.

Products used to clean the vulva and vagina as well as those used during menstruation are considered feminine hygiene items. Menstrual hygiene goods are items used during a period. These products work to absorb, hold onto, and separate menstrual fluids from the body. Sanitary napkins, tampons, menstruation cups, maternity sheets, maternity pads, period panties, panty liners, menstrual sponges, and others are some of the menstrual products. These products' primary objectives are to reduce discomfort and promote hygiene while preventing leakage, odour, and unattractive colour look.

Generally, these products are either disposable or reusable. Products such as sanitary napkins, panty liners and maternity sheets are non-reusable because of the presence of Super Absorbent Polymers in them. These polymers are non-biodegradable. Super Absorbent Polymers has good absorbent properties and act waterproof in these products. These polymers are non-biodegradable and harms environment. Hence, this study enhances the need to make menstrual products sustainable.

The aim of this investigation is to analyze the absorbent properties of available biodegradable fibers to replace the absorbent polymers in menstrual hygiene products.

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2.MENSTRUAL HYGIENE PRODUCTS

Nowadays, many sanitary products are available in the market made of synthetic fiber rayon. These products contain chemicals that have antibacterial property. Due to their chemical composition they kill the soils microflora, when buried in the soil and delay the process of decomposition. About 49 billion and 19 billion single-use menstrual products are used in US and Europe every year. In which plastic components of 87% in US and 80% in Europe ends up being in landfills that take about 500 years to break down. All such data creates an immediate urge to use reusable or sustainable menstrual products. Sustainable refers to disposal of sanitary products in reduction of these wastes being dumped in landfills or water bodies causing harm to the environment. And the way to make these products eco-friendly is to replace the absorbent polymers present in it.

2.1 SUPER ABSORBENT POLYMERS

In the 1970s, the polymers were first employed in the production of diapers and sanitary napkins. Aqueous fluids can be absorbed by absorbent polymers up to 300 times their own weight. They are primarily made of sodium polyacrylate, which is typically found as fibres or granules. These granular components in the polymers undergo cross-linking to create a three-dimensional structure that resembles a chain-fence. The chain extends and uncoils when they absorb fluids, but it does not release the network again afterward. When liquid is kept in the spaces between molecules in a molecular network, the materials turn into gels. Due to their synthetic origin, they cannot biodegrade and must instead be burned to be disposed of, which harms the environment.

2.2 COTTON FIBER

The fiber is of pure cellulose and they are biodegradable under aerobic conditions. It is most often spun into yarn or thread for producing soft and breathable

textile products. The standard moisture content of cotton fiber is 7.34%. Cotton(fig-1) has the ability to absorb liquids in large quantity and can absorb water up to 24 - 27 times its own weight. Oil, wax, protein, pectin, and some coloring contents are also present in cotton. Cotton fabric allows air to pass through freely and absorbs sweat, releases it on its surface. Hence it is comfortable to be worn in hot and humid climates.

Fig-1

2.3 BAMBOO FIBER

G.Malarvizhi had proposed that Bamboo fibers(fig-2) have excellent wet permeability, moisture vapor transmission proprieties. It is a newly founded, great prospective green fabric. Bamboo fiber is naturally soft, down to the core of its very structure. Bamboo has the function of antibiosis, bacteriostatic. Bamboo fiber keeps the moisture away when it gets wet so that the fabric does not stick to the skin, and dries fast so that you feel cooler and more comfortable while you wear it. Bamboo fibers have been shown to be able to absorb much more water, i.e. up to 26.2% equilibrium moisture content at around 90% RH, compared to polyester resin that can only absorb up to 0.71% water (at 20 °C). Bamboo fiber is naturally absorbent and speedily wicks away moisture - up to four times faster than cotton.

Fig-2

2.4 BANANA FIBER

Banana fiber(fig-3) is one of the strongest natural fiber available today. The physical structure of banana fiber looks similar to the ramie fiber. It is a lignocellulosic structured natural fiber composed of cellulose, hemicelluloses, lignin, etc. The moisture absorbency of this fiber is 10% - 11.5%. This fiber has strong moisture absorption quality as it absorbs and releases moisture very fast. It is bio- degradable and has no negative effect on environment and thus can be categorized as eco-friendly fiber. With the increasing development of sustainable textile products, the application of banana fibers has also been increased in apparel garments and home furnishing.

Fig-3

2.5 PINA FIBER

Pina is a cellulosic natural fiber extracted out from pineapple leaf(PALF) that is different from the regularly grown fruit. Fiber from pineapple can be done both manually and mechanically. This fiber(fig-4) is creamy, white and lustrous as silk with good bio-composite qualities. It is 10 times as coarser as cotton but as fine as jute. It consists of high cellulose content, a large amount of hemicellulose, and some lignin, too. The moisture content of this fiber is 10% - 11.5%. The advantage of being cost-effective and delicate in texture adds value to its application in traditional formal wears and accessories.

Fig-4

2.6 HEMP FIBER

The long fiber strands that make up the plant's stalk are used to make hemp fabric(fig-5). The "retting" process is used to separate these fibers from the bark. In order to create a continuous thread that can be woven into a fabric, these fibers are then spun together. Original hemp hurd samples are primarily made up of lignin and sugar-based polymers (holocellulose, including cellulose and hemicelloses). Waxes or oils (toluene-ethanol extract), as well as structural water, were discovered as additional components. Weighing hemp samples before and after they were dried for 24 hours at 105 °C yielded average moisture contents of hemp materials of 10.13 and 10.78 wt%, respectively.

Fig-5

3.CONCLUSIONS

At present plant fibers are widely used for various applications among textile product because of their bio-degradable and renewable properties which leads a way to sustainability. In the above study, absorbency of various natural fibers was investigated and it was found that bamboo has more absorbent capacity than the other fibers such as cotton, banana, hemp and pina. Hence bamboo will be a better choice to replace the absorbent polymers in menstrual hygiene products.

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