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Natural Fibres Used in Wipes

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***Abstract*: The wipes are most commonly used in kitchen purposes like to wash and scour the pans, casseroles, kitchen surfaces like sinks, stove tops and refrigerator. For manual washing of dishes, brushes are dominantly used. Around 29% use brush for cleaning the utensil. For sponge usage, around 50% use it for cleaning utensils. 77% (which is the most number of users) use cloths for utensil cleaning. The wipes have 6 - 9 log CFU of bacterial content in it. When the wipes are checked after usage, they have pathogens like bacteria like Salmonella and Campylobacter, virus like Eukaryota and Archeae. When the wipes are used to remove the food soils from the utensils, it reduces the bacterial content. But it transfers the pathogens from the wipe to the utensil. Here, the wipe acts as a reservoir to spread the pathogens. The wipes have the ability to absorb larger volume of fluids. They remain wet after use. This makes a suitable condition, for the pathogens to grow. When there is rapid drying of them, the growth of the pathogen is controlled and there will be killing of pathogens. Whereas in humid atmospheric storage of wipes, the wipes won't dry off soon. The brushes will take less fluid, when compared with wipes.**

***Keywords*: Banana, fibres, jute, natural, plants, scrubber, wipes.**

1. Introduction

The wipes are most commonly used in kitchen purposes like to wash and scour the pans, casseroles, kitchen surfaces like sinks, stove tops and refrigerator. For manual washing of dishes, brushes are dominantly used. Around 29% use brush for cleaning the utensil. For sponge usage, around 50% use it for cleaning utensils. 77% (which is the most number of users) use cloths for utensil cleaning. The wipes have 6 - 9 log CFU of bacterial content in it. When the wipes are checked after usage, they have pathogens like bacteria like Salmonella and Campylobacter, virus like Eukaryota and Archeae. When the wipes are used to remove the food soils from the utensils, it reduces the bacterial content. But it transfers the pathogens from the wipe to the utensil. Here, the wipe acts as a reservoir to spread the pathogens. The wipes have the ability to absorb larger volume of fluids. They remain wet after use. This makes a suitable condition, for the pathogens to grow. When there is rapid drying of them, the growth of the pathogen is controlled and there will be killing of pathogens. Whereas in humid atmospheric storage of wipes, the wipes won't dry off soon. The brushes will take less fluid, when compared with wipes [1]. Disinfection of utensils is a good way to control the pathogen spreading. They can be limited in spreading in the kitchen. When the spreading is controlled, the utensils will have more life time. The pathogens spread can be controlled by washing the wipes with Hypochlorite and dish washing detergents. It will reduce the pathogen level by 1.5 – 5 log CFU. When the wipes are kept in micro wave oven for 60 seconds, most of the pathogens will be killed. For 16 – 20 hours, the wipes can be soaked in the chlorine with 4000 ppm, is the most efficient way of cleaning the wipes. The household sponges that has the possibility of multiplying the bacteria which is used for the frequent number of times under the perfect conditions. The same usage of the dirty sponges are having the maximum possibility of spreading the virus to the other cleaning process easily. To reduce the accumulation of the bacteria, decontamination should be followed regularly. There are two ways in reducing the bacteria contamination in the sponges are, firstly, microwave the sponges for one minute it has the maximum possibility of reducing the bacteria percentage up to 99.9% in the number of bacteria [2].

Fig. 1. Wipes

Secondly, soak the contaminated sponges in the solution of bleach or cleaner that contains the ammonium compound which results in the reduction of 99.9% of the bacteria in numbers. In every year the food poisoning cases are rising up to 5 to 6 million cases every year. The reasons are likely to be the contamination of the bacteria in the sponges or they use the same sponges for various activities. In European countries, the survey says that food poisoning happens mostly in the household environments, where the cleaning process was not in a proper manner. And it results in the contamination of the bacteria or dust in the plates. The bacteria in the sponges are grown when there is a moisture content. Proper decontamination and cleaning of food contacts surface, and sponges may help to minimize the spread of the micro-organisms present in the utensils of the kitchen. These sponges are used commonly in cleaning the food present in the pots, pans, dishes, cutting boards, sinks, refrigerators and faucet

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handles. The bacteriological survey conducted in the household activities are having the bacteria like Escherichia coli, Klebsiella pneumonia and Enterobacter cloacae. They are grown in the favorable conditions where they are spread even faster in their climatic conditions [3].

Fig. 2. Metallic scrubber

2. Wipes

They are used in the cleaning process, which are used in the form of scrubbers. They are made in both ways either natural (or) man-made. Mostly, they will be using this scrubber in dishwashing. They are used to the dirt from the dishes. During those times, the dishes are washed using Steel wool which are made using the thin sheets of iron. This method is followed at the time of world war, where the soldiers are used to clean their utensils [4]. By this idea, people started to use a steel wool made from iron sheets which gave them a good result during those time. Also, they faced the main problem, like the sharpness of the steel wool is getting low. And it is the major problem arise mostly in all the times. The steel wool should be replaced at the regular period of time. After the years rolled on, people started to use the natural method of scrubbers where they found at a very low cost. This helped the people to clean the utensils with the products they have. Instead of replacing the steel wool every time, it is better to use the natural scrubbers as they are very eco-friendly in nature [5].

The natural scrubber are mainly used is coir fibre, which are found in the coconut. This is been really a helping hand for all the people till date. Also, they have used charcoal and ash to clean the dishes before the invention of the detergents (or) bars. This product is also a natural one where it is been used for many years. And by the rise of an invention and new technologies, the new method is planned to solve this issue. They used the synthetic fibres and made them as a composite, then finally moulded them into a required shape [6].

Fig. 3. Disposable wipe

Most of them showed a great interest in them as they contain both the soft side and hard side of the scrubbers. Like, in one side they had sponges and in other side they have a rough fibre. This invention helped them to clean the dishes as per their wish. More number of positive reviews are being received from the users but they are not biodegradable. As they cause a great damage to the environment, people started to use the natural scrubbers to overcome these problems. The natural scrubbers are biodegradable and it is eco-friendly to the nature. By the recent survey, the usage of the natural scrubbers is up to 68% of the world population as they could not afford the expense of the synthetic scrubbers. Also in these recent times, the synthetic scrubbers are not giving the desired results so people are getting used to the old method of cleaning the dishes [2].

3. Jute

Jute is one of the important cash crop in Bangladesh and in West Bengal of India. The jute is considered as commercial, economical and industrial vital sector in the respective producing nations. It is also called as golden fibre. As the world is facing lots of pollution due to non-degradable things, Jute is a bio degradable fibre. So it is an environmentally friendly product. So at present there are more researches going on this fibre. These fibres are mainly composed of cellulose and lignin. The fibres are made from off – white color to brown color. Their length will be around 1 – 4 metres or 3 – 14 feet. These fibres have good mechanical, structural and thermal characterization. For the jute fibre, the strength property is excellent. And also, their compatibility with polymer is also excellent. Jute epoxy composites, jute polyester composites, jute phenol formaldehyde composites, jute polypropylene composites and more composites can be produced. These composites can be produced with low cost. To the jute fibres, surface treatment is done to increase the properties of jute reinforced polymer composites [7].

Jutes are used for decoration for wall, framed products, tapestries, framed photography, key holders, and wall hanging, hacking pockets storage, wall decals, framed mirrors and aesthetic purposes. Jute handbags for shopping bags, beach bags, sacking bags, Christmas bags, bottle bags, hydrocarbon free bags, food grade bags, sling bags and hessian cloth bogs are used. Craftwork products like pen keeper, sketch book, frame for a picture, gift container, table mats, hammocks and lampshades are produced [8].

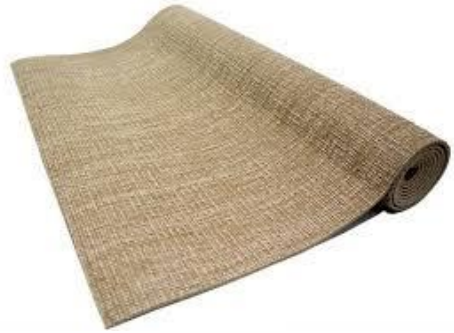

Fig. 4. Jute

1) Physical Properties of Jute Fibre [9]

- They have good dimensional stability.
- Their fibre length must of 5 to 12 ft.
- Their abrasion resistance of jute fibre is average.
- They have a very bad resiliency.
- They have a good effect of microorganisms which is even better than cotton.
- They have a good tenacity of 3-4 gm/den.

2) Chemical Properties of Jute Fiber

- They are easily damaged from the hot diluted acids and concentrated cold acids.
- The jute fibre is damaged by a strong alkali and also fibre loses its weight when it is heated with caustic soda.
- They give a strong resistance towards the bleaching agents.
- The colour of the fibre is getting changed when it is kept in the presence of the sunlight.
- It has a good prevention ability which is much better than cotton and linen.
- It is very easy in order to dye the jute fibre and even basic dye is used to colour the jute fibre.

3) Morphology of Jute Fibre

The jute fibre can be split into 3 portions as top, middle, and bottom. There lies slight variation in the surface morphology of the top, middle, and bottom portion based on the thickness of the fibre. And this variation is due to the maturity level of the fibre. The top fibre is immature, middle fibre is properly mature and bottom portion is over matured. In top portion, there will less voids and pores compared to the other surfaces. Physically the portion in the top is soft and in light colour. The portion in the middle is beautiful in glassy and colour. The cutting portion is rough and usually the colour is dark as compared with top portion and middle portion. The diameter also various according to the maturity, the diameter of the top portion is less compare to other portion (ie: 40 mm) where the middle portion and cutting portion have required diameter due to the content is cellulose. The diameters are 60mm and 75mm respectively [10].

4. Coir

Coir is also called as coconut fibre, which is also a natural fibre. These fibres are removed from the coconut shells outerpart. The end uses of these fibres are mattresses, brushes, door mats and floor mats. This fibre is present between the internal shell of the coconut and the outer husk of the coconut. With the ripe coir, sacking, horticulture and upholstery padding are done. The ripe coir will be in brown in colour. The unripe coir will be in white in colour and they are extracted from unripe coconut. The main advantage of unripe cotton is that they won't submerge in water (i.e.) they float in the water. So, they are used in the production of the down boats and the buoys. Rather than the above applications, other ones are fishing nets, brushes, string and rope. These fibres are finer when compared with ripe coir [11].

Fig. 5. Coir fiber

In the open air, the coconut shell should be dried. The shells are powdered with the help of the pulverizing machine. The powder should be in the BS 1377: 1990 standards. The coconut shell's analysis of chemical is found with Absorption Spectrometer (AAS) Peckinhelma 2006 model. Size of the particle is hundred microns. In the sun light, the pelletized polyethylene is dried. And they are crushed in the plastic crusher machine. The polyethylene and the coir powders are mixed with the help of 2 roll rheo mixer. The rotor speed is of 60 rpm and temperature is set to 50°C. The mixture is made to dry for 72 hours at 23±2°C. The composite can be made with different compositions according to the requirement of strength and thickness [12].

1) Chemical Properties of Coir Fibre

- The water solubility of coir fibre is 5.25%.
- It contains 43.44% of cellulose.
- It contains 45.84% of lignin.
- It contains 0.25% hemicelluloses.
- It contains 2.22% ash.
- It has pectin of about 3.30%.

2) Physical Properties of Coir Fibre

- The diameter is 16 micron.
- The length is 6 – 8 inches.
- Its density is 1.4 g \ cc.
- Its tenacity is 10 g \ Tex.
- The breaking elongation is about 30%.
- The moisture regain at 65% RH is 10.5%.
- The swelling of fibre in water is 5% in diameter.

5. Banana Fibre

The banana fibres are got from the banana plants stem which are in outer surface. The fibres are removed by a manual method called hand scraping and chemically by retting and by using raspadors. By boiling the leaf sheaths with NaOH solution, the fibre can also be extracted. The fibre which is extracted by manual method has good quality than the chemical methods. In the rainy season, the yield of the banana fibre is high. The fibres are cut around 30 cm to 40 com by a 15 cm blade [13].

The pith present in the long fibres is removed till the clean fibres are seen. The fresh stems gives 1.5% more weight to the fibres. This extraction method is done by the workers who work in the cottage industry sector. The fibre which is extracted by the machine are not in good in quality. After harvesting the fruits from the banana plant, the fibre produced in it is stronger. When the fibre extracted before the harvest of fruits, it is weaker. Two to three layers of outer layers are not used for

producing banana fibre because of its thick nature [14].

Fig. 6. Banana fibre

The last two to three layers (i.e.) the innermost layer are removed because of it is pulpy which makes the extraction process of good quality fibre more hard. After it, the fibre is washed continuously. Then the fibres are dried up in the sunlight. The drying time is directly proportional to the pulpy content present in the stem which affects adhering the strips. Normally, it requires around 5 hours for drying after cleaning the fibre. After drying, the fibres will be white in color and bright in luster. When the cleaning and washing processes are not done properly, while drying, there will be fibre degradation. The fibre fibre degradation takes place because of chemical actions and biological actions. The degraded fibre will loosen its original luster and strength. During the rainy reason, there will be lots of banana stem available. But it is not possible to do the process for all the stem at a time. Doing the processes lately also affects the fibre quality [15].

Countries like India, Ecuador and Brazil contributes more in the banana production. In Brazil, Musa Cavendishi is the commonly cultivated species. Usually the banana plant will be around three to nine metres long and the diameter of this plant will be around 20 -37 cm. the stem contains different layers which have fibres in longitudinal way. The stem has twenty four percentages of fibres in it. The stem is disposed after harvesting and then it is sold mulched. Then the fibres are manually extracted from the solid mulched stem. Manual extraction is a low cost process. On a dry weight basis, the average yield of fibres is from one to two percentages. While the fibres are extracted in a machine, known as Caraua, can give 1.75 kgs of fibre in one hour at dry weight basis of banana fibre [16].

1) Physical Properties of Banana Fibre

- The tex of the fibre and diameter of the fibre, determines the fineness of the fibre.
- Fine fibres were derived from the psuedostem.
- Tenacity is high in this type of fibre.
- Breaking load, breaking extensions and tenacity are deciding the strength of the banana fibre.

2) Chemical Properties of Banana Fibre

- Cellulose is playing a vital role in deciding the fibre's quality.
- The maximum hemi-cellulose component is observed in Grand Naine Pseudostem fibre.
- As the lignin content started to decrease, then the tenacity starts to decrease.
- Highest lignin is observed in Pseudo stem.

6. Dried Gourd Fibre

These fibres are extracted from gourd fruits outer layer. It can also be said as fruit of Luffa. These fibres are used in the whole world. This plant is a climbing crop which is harvested throughout the year. This fruit has fibrous vascular system. From the past results, the plant is a commercial cultivated crop. Its economic importance is increasing worldwide. The loofa comes from the cucumber family. It can be called as sponge gourds, vegetable sponges, bath sponges, and dish cloth gourds [17]. The gourd mainly contains lignocellulosic material which is made up of lignin, hemicelluloses, and cellulose. The crop is also a cross pollinated crop. The crop contains 60%, 30% and 10% of cellulose, hemicelluloses and lignin respectively. The fruits are smooth in nature and their shape is cylindrical. The matured fruit will have approximately thirty seeds in it. The outside of the fruit will have vertical lines in it. The reticulate will develop 12 cm long in the outer layer. The stem will be green in color and it grows only with the help of other hard sticks. It is a low cost resource and also a sustainable resource. India, Burma, is the centre for the sponge gourd. Countries like china, India, Korea, Japan are the commercial production countries of sponge gourd. It has pH around 6 – 6.8. These plants grow well in green house and sandy drained soil are recommended for the plant to grow well [18].

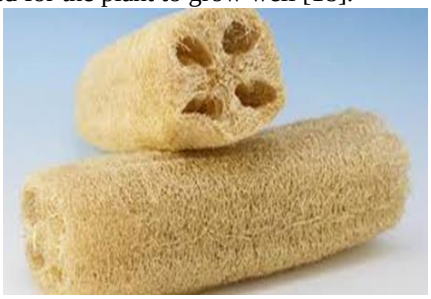

Fig. 7. Dried gourd fibre

1) Physical Properties of Dried Gourd Fibre

- The tex and diameter determines the fineness of the fibre.
- Fine fibres were derived from the psuedostem.
- Tenacity is high in this type of fibre.
- Breaking load, breaking extensions and tenacity are deciding the strength of the banana fibre.

2) Chemical Properties of Dried Gourd Fibre

- Cellulose is playing a vital role in deciding the fibre's quality.
- The maximum hemi-cellulose component is observed in Grand Naine Pseudostem fibre.
- As the lignin content started to decrease, then the tenacity starts to decrease.
- Highest lignin is observed in Pseudo stem.

7. Conclusion

As we already know that, the usage of the natural scrubber gives the good results. Both in cost and eco-friendly manner so mostly people prefer this type. When we use natural scrubbers, our daily expenses will be saved quite easily. This can bring a

different experience in their daily life like living with the support of an eco-friendly nature. The charcoal and ash are being used for many generations to till date. But, due to the invention of the new products in the market, people quite prefer these kinds of products. This problem mostly arises in the situation where people could not find any natural form of natural scrubbers. Mostly, people who are in the stage of using the natural products they try to purchase them in a bulk manner. So that, they can use same set of months. Also, while comparing with them, they find it is the better way to follow. These natural scrubbers are having the property of giving the perfect result which are eco-friendly in nature. And, the coir fibers are used to clean all over the dishes. This method is followed for the goodness of the next generation people, where they could minimize the risk of getting affected by bacteria with the dishes they are using.

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