TEXPLORER

TEXTILE RESEARCH MAGAZINE

Exploring Innovators In Textiles

Kumaraguru College of Technology
Coimbatore

Vol. 2- April 2022

ABOUT KUMARAGURU COLLEGE OF TECHNOLOGY (KCT)

Kumaraguru College of Technology (KCT), Coimbatore is a private Engineering College started in 1984 under the auspices of Ramanandha Adigalar Foundation, a charitable educational trust of Sakthi Group. Situated in a sprawling 156-acre campus in the IT corridor of Coimbatore, KCT is an autonomous institution affiliated to the Anna University, Chennai and approved by All India Council for Technical Education (AICTE). KCT has been accredited by National Assessment and Accreditation Council (NAAC) with Grade 'A' and all the eligible UG programs have also been accredited by National Board of Accreditation (NBA). Under the able guidance and adept administration of Dr. B. K. Krishnaraj Vanavarayar, Chairman, Sri. M.Balasubramaniam, Correspondent and Sri. Shankar Vanavarayar, Joint Correspondent, the college has developed excellent facilities and resources such as spacious classrooms, seminar halls, well-equipped laboratories, excellent sporting facilities, dedicated high speed internet connectivity (broadband) and well qualified faculty. Five academic Blocks house the different departments. The administrative building "Dr.Mahalingam Vigyan Bhavan" is an architectural beauty and a land mark in Coimbatore. Currently the college, as an autonomous institution affiliated to the Anna University, offers 15 undergraduate (B.E., B.Tech.) and 14 post-graduate (M.E., M.Tech., MCA, MBA) programs of studyThe College has 15 academic departments and 9 research centers, each headed by a competent and experienced professor. Altogether, the college has over 391 well qualified teaching faculty and 156 supporting technical staff, in addition to 199 administrative staff. The combined student intake during the current year is 2000 and the total number of students on roll is 6200.

ABOUT DEPARTMENT

Department of Textile Technology was started in the year 1995 with the Objective of imparting comprehensive knowledge in all the faces of Textile Manufacture to students through UG & PG programmes. Professionally well qualified, highly experienced faculty members and well equipped laboratory with modern facilities provide ample opportunity to the students to pursue their education with excellence. Students are provided with good industrial exposure taking full advantage of college location in the Textile City, Coimbatore. The accreditation status has been awarded to the B.Tech Textile Technology undergraduate programme by National Board of Accreditation, AICTE, New Delhi for Three Years with effect from September 2019

EDITORIAL MESSAGE

Dr.V.Ramesh Babu, Head & Professor

April,2022

On behalf of the editorial staff and students, it is my pleasure to introduce the issue of TEXPLORER, yearly magazine of Department of Textile Technology that showcases technical papers of students and faculty in textile domain and its allied field This new magazine is envisioned and found to represent the technical as well as cultural skill of the students. Its mission is to become a voice of the textile student's community, addressing faculty, industry persons and alumni from various fields of Textile Technology. This volume comprises of technical papers from fibre, yarn, fabric, fashion technical textiles and few new innovations in machinery and textile products. It is our hope that this fine collection of articles will be a valuable resource for Textile Technology. I would also like to thank the faculty members who worked with the students. Students from various colleges submitted their papers and presented the projects using the platform provided exchanged ideas which will enhance further advancement in thrust areas of research. Much appreciation is also due to all the faculty members and students of the editorial team. Finally, I would like to express my appreciation to the students who contributed their writing and to the students who have done a great job in putting this research magazine together. I hope you will enjoy reading these papers, and if you are textile/fashion technology student or faculty or industry expert consider submitting your own writing to be published in next year's K-TEX Research magazine

TABLE OF CONTENT

SALT-FREE DYEING OF COTTON FABRIC USING REACTIVE DYES- A NOVEL APPROACH FOR GREEN CHEMISTRY

Varsha Patil, Department of Textile Chemistry, DKTE's Textile and Engineering Institute, Ichalkaranji, Maharashtra, India.

Sanket Kuge, Department of Textile Chemistry, DKTE's Textile and Engineering Institute, Ichalkaranji, Maharashtra, India.

ABSTRACT

Today, Textile industries are using common salt as an exhausting agent during dyeing. Common salt is preferred because it is cheap and is good exhausting agent. But when dye bath liquor is drained to the river or to the effluent treatment plant, The Total Dissolved Salt (TDS) of that liquor is exceptionally high. When we try to recover that water, due to its high TDS value, the recovery becomes difficult. During recovery, when water is evaporated the solid content of this salt will act as a sludge. Hence it becomes difficult to remove that sludge. Hence, next time when we try to evaporate the water from the bath or tank containing the sludge we will require more energy for the water evaporation. Hence, it will increase the energy cost which will not be profitable for the local textile industries. Sal will contaminate the water and will create water pollution and or environmental pollution. Hence, if it is possible to replace the common salt from the dyeing recipe then, it will be profitable to both local and big textile industries. Because energy cost can be minimised significantly, which will help in reducing environmental problems as well. Use of salt in the dyeing recipe may increase the hardness of water which will affect the process conditions. If the concentration of salt in dye bath is more than it may corrode the equipment if the equipment has not been washed frequently. There may be formation of scales onto the equipment. So, to avoid all these problems various salt free dyeing techniques must be introduced.

Keywords- : Salt free dyeing.

1. INTRODUCTION

In conventional dyeing techniques, common salt is used as an exhausting agent. This exhausting agent creates problem in effluent treatment. The salt which is dissolved in water becomes unfit for drinking. As the effluent is sent to the river it becomes problematic for the environment. It creates water pollution. For reactive dyeing, very large amount of salt and alkali are used. Due to the hydrolysis of reactive dye, the effluent contains large amount of hydrolysed dye, which may create problem for both aquatic and human life. Hence to overcome these problems, various salt-free dyeing techniques are introduced.

2. DIFFERENT SALT FREE DYEING TECHNIQUES

2.1. Salt-free dyeing of cotton fabric using chitosan (polyacrylamide)

In this method, cationic acrylic copolymer is treated with cotton fabric for increasing the both substantivity and reactivity of fiber towards reactive dye. The chitosan may form crosslink within the fiber for better dye uptake. When cotton fabric is treated with chitosan (polyacrylamide), amino groups are formed which increases the substantivity of cotton towards reactive dye. The increased dye uptake is attributed to the amide linkage formed due to the introduction of chitosan into the cotton fabric. The improvement in crease recovery has also been detected [1, 2].The dyeing of modified cotton can be carried out at 90-1000C for better fixation and fastness properties. The dyeing can be carried out at neutral pH [1, 3].

2.2. Using chemically cationized cotton.

Chemically cationized cotton is produced by etherifying reaction of cotton with tertiary amine 2, 3-epoxy-propyl-trimethylammonium chloride. This compound can be formed in situ from the reaction of caustic soda with 3-chloro-2-hydroxy-propyl-trimethyl ammonium chloride (CHPTMAC) .

The pre-treatment of cotton can be carried out by using 35 gpl CHPTMAC and 15 gpl caustic soda at 100% wet pickup. The fabric is stored for 24 hrs. First CHPTMAC is reacted with alkali to form EPTMAC. This EPTMAC will react with alcohol to form cationized cotton.

Dyeing of cationized cotton is done as conventional method. This method gives very high exhaustion rates without using any salt. Thanks to the cationic sites for their valuable contribution.

2.3. Through graft polymerisation

To modify the fibre, graft polymerization of cationic monomer, methacrylol amino-propyl-trimethyl ammonium chloride (MAPTAC) is done. After that dyeing is done as conventional methods without using salt. The MAPTAC increases the affinity of fibre due to the formation of cationic groups. Cotton fabric is treated with different concentrations of MAPTAC from 0 to 50 gpl using redox initiator using MLR 1:20 for 45 minutes at 750C. Hydrogen peroxide and caustic soda are also added. The temperature is finally raised to 950C.

But by using this technique it gives the problem of ring dyeing which means that the grafted compound remain on a yarn surface which gives undesirable effects. Light fastness may get impaired when excess amount of MAPTAC is used.

2.4. Dendrimer polymers.

Cotton samples are treated with dendrimer at 900C at different pH values from 4 to 9 at four different concentrations from 0.25% to 1%. Then, the dyeing is carried out as a conventional method

2.5. Using organic salts

Sodiumedetate seems to be a good option as a replacement for sodium chloride (common salt). By using different concentration of sodiumedetate (SE) good exhaustion and fixation can be achieved. The dyeing is carried out at 80 to 900C without using any salt .

2.6. Using liposomes as a dyeing promoter.

The optimum and level dyeing effects can be achieved at 850C. When liposomes are used as dyeing promoters.

Neutral nano-liposomes (NL) and Cationic nano-liposomes (CL) are used during dyeing. The concentration used for NL and CL may be as high as 84 mmol per litre. Dyeing is done at 800C as conventional method. This gives good color fastness and high exhaustion properties .

3. RESULTS AND CHARACTERISATION

For characterisation Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), X-ray Diffraction Method (XRD), Fourier Transform Infra-red Spectroscopy (FTIR), K/S values, Exhaustion (%) can be carried out.

4. CONCLUSIONS

From above discussions, it is clear that various dyeing techniques can be introduced without using salt which will help in reducing the energy cost and environmental problems as well.

5. ACKNOWLEDGEMENT

I would like to thank Professor R.H. Deshpande sir for their expert advice and encouragement throughout this project. I would like to thank my colleagues for their wonderful collaboration. I would also like to thank the organizers of K- Tex Challenge 2022 (Kumaraguru College of Technology, Coimbatore) for giving wonderful opportunity to students who want to explore their ideas and research work.

6. REFERENCES

[1] Kunal singha, Subhankar maity, "The Salt-Free Dyeing on Cotton: An Approach to Effluent Free Mechanism; Can Chitosan be a Potential Option?" International Journal of Textile Science, 2012, pp. 69-77

[2] D.P. Chattopadhyay, R.B.Chavan, J.K.Sharma "Salt-Free dyeing of Reactive dyes", International Journal of Clothing Science and Technology, 2007, volume 19, issue 2

https://www.emerald.com/insight/publication/issn/0955-6222/vol/19/iss/2

[3] "A Salt-Free Dyeing of Cotton Fibre- A critical Review"

http://article.sapub.org/10.5923.j.textile.20170602.01.html

[4] "Low-Salt or Salt-Free Dyeing of Cotton Fibres with Reactive Dyes by using Liposomes as Dyeing/ Level Dyeing Promoters"

https://www.nature.com/articles/s41598-018-31501-7

[5] "Salt and Alkali Free Reactive Dyeing on Cotton"

https://www.fibre2fashion.com/industry-article/1661/salt-alkali-free-reactive-dyeing-on-cotton

[6] "Salt-free reactive Dyeing of Cotton Hosiery Fabrics by Exhaust Application of Cationic agent". https://www.sciencedirect.com/science/article/pii/S0144861716307627

[7] "Salt-free Dyeing - A New Method of Dyeing on Lyocell/Cotton Blended Fabrics with Reactive Dyes

http://www.autexrj.com/cms/zalaczone_pliki/3_01_11.pdf

DEVELOPMENT OF PPY COATED TEXTILES FOR SOLAR EVAPORATION

Madhu Yadav, Textile chemistry, Uttar Pradesh Textile Technology Institute Kanpur, Uttar Pradesh India

ABSTRACT

In this era, energy and the environment have become delicate issue for representative and sustainability for earth. Solar evaporation is a primitive technique that has regained tremendous attention because of the sufficiency of solar energy and water sources on earth. Textile materials are suitable for solar steam generation because of their wicking property, porous and hydrophilic structure, low heat conductivity and high heat absorption. However, heat absorption and solar evaporation performance of textile materials can be improved by functional coating.
Coating with Polypyrrole (PPy) can improve solar evaporation performance of textiles in the presence of sunlight. In the present research Polypyrrole was coated onto spunlace nonwoven fabrics to prepare solar radiation absorber materials that can heat-up quickly in presence of sunlight and evaporate water that is present in the textiles. The spunlace nonwoven has good wicking property and can transport the water molecules from the water source to evaporation site effectively. The PPy coated spunlace nonwoven fabrics can be used for quick drying of wastewater tanks and saline water lagoon and separate drinkable water out of that. In the same time solid waste and salt can be separated in a much quicker way.

1. INTRODUCTION

Clean fresh water all over the world is in short supply, which has become a severe problem that needs to be urgently solved. Seawater desalination and sewage reusage are regarded as promising approaches to address this issue, because the ocean covers more than 70% of the Earth's area and sewage is largely produced from various industries and our daily lives every year. During the past few years, numerous means have been extensively developed to improve access to clean water, such as membrane filtration or distillation process and reverse osmosis techniques, and so on. However, adopting these technologies has resulted in massive energy consumption and greenhouse gas emissions during water treatment, which causes tremendous pressure on energy and the environment. Solar-driven vapor generation, which utilizes sunlight as the energy source to accelerate vapor production from the sea, is a promising approach to alleviate the severe situation of water scarcity with minimal environmental impacts. Over the past decade, the strategy of solar vapor generation has undergone a rapid evolution from a volumetric configuration, in which the photothermal agents are suspended or dispersed in water to thermalize the bulk water, to an interfacial configuration, in which solar evaporators oat at the air-water interface to achieve localized heating, with increasing understanding of thermal utilization. Compared with volumetric heating, interfacial heating actively connes thermal energy at the water surface and reduces the heat loss to the bulk water, resulting in an enhanced water evaporation rate. Solar energy is the origin of life and the most important source of renewable energy and has been widely used in hydrogen production, power generation, photovoltaic cells, photocatalysis, seawater desalination, contaminated water purification.

Due to the unmatched resource potential of solar energy, the utilization efficiency of solar energy presents the main challenge. Since water shortage has become one of the most emergent global threats to human society, intensive efforts have been devoted to seawater desalination technologies for producing clean water.

1. SOLAR RADIATION

Solar evaporation is an attractive technology that combines the two most abundant resources on Earth: solar energy and water. It has enabled an array of emerging applications, including contaminated water purification, seawater desalination, electric generation, steam sterilisation, and fuel production. Nonetheless, traditional solar evaporation approaches generally heat the entire amount of water in the system reservoir, leading to a low thermal efficiency of just 40%. The recent development of interfacial solar evaporation has enabled just the air-liquid interface to be heated rather than the bulk water, resulting in a much higher thermal efficiency of up to 90% at reduced solar concentration, mainly enabled by the rapid development of new photo-thermal materials and photo-thermal structural engineering.

2. EVAPORATION

Solar radiation often called the solar resource or just sunlight is a general term for the electromagnetic radiation emitted by the sun. Solar radiation can be captured and turned into useful forms of energy, such as heat and electricity, using a variety of technologies. However, the technical feasibility and economical operation of these technologies at a specific location depending on the available solar resource. Solar radiation is the electromagnetic radiation emitted by the sun. By using various technologies we convert sunlight into heat and electricity. There is various type of solar radiation, Infrared rays (IR): it provides heat and represents 49%of solar radiation.Visible range (VR): represent 43%of solar radiation and provide light. Ultraviolet rays (UV radiation): it represents 7%heat.

Other types of rays: represent about 1% of the total.

1.3 SOLAR ABSORBER MATERIAL

There are several solar absorbing materials, such as Polypyrrole, Carbon nanotubes, and Graphene, and we discovered that graphene powder is not easily soluble and does not give solid and even results on textile material, and other solar absorbing materials do not give good affinity for a durable finish on textile, but Polypyrrole does, which is why we use Polyupyrrole for our textile substrate.

2. RESEARCH GAP-

Earlier works are related to wood, which is also a natural, environment-friendly material, and their properties are microchannels, porous structures, hydrophilic properties, woodblocks are coated with pyrrole and used as a wood-based solar steam generation. In this current project spunless nonwoven textile material is used, which is also coated with pyrrole and its wicking properties are high as like wood and give good water transport and evaporation. It could be an good alternative than wood substrate hence we chosen spunless non-woven textile in our current research work.

3 EXPERIMENTAL PROCESS

3.1 MATERIAL

Pyrrole and ferric chloride were provided for forming the PPy coating. I am using pyrrole 0.1 M and ferric chloride 0.2 M (purchased by Sisco Research Laboratories).

3.2 TEXTILE SUBSTRATE

Here we use textile material coated with pyrrole and ferric chloride, there are four types of spunless non-woven textile materials used here named as –

1-100% woven fabric
2-100% spunless viscose fabric
3-100% spunless polyester fabric
4-50-50% spunless poly /viscose blend

Herein, four varieties of spunless non-woven textile materials that have been treated with Polypyrrole and begin the experiment by placing nine pots in the sunshine, each filled with 500 ml of water. 4 pots are pyrrole coated, the fronts are uncoated textile material, and one pot is blankand only filled with regular water after 1 and 3 hours. I'll double-check the water label and pot temperature before attempting to compute each pot's evaporation rate.

3.3 METHOD OF COATING

To begin, weigh the textile sample and begin preparing the pyrrole solution using 1000 ml of water. Next, take 0.1 M pyrrole and prepare the solution, then dip the textile sample for 10 minutes in the pyrrole bath. Finally, take ferric chloride 0.2 M and prepare the solution, then remove the sample from the pyrrole bath and place it directly in the ferric chloride bath.

4. CHARACTERIZATION

The micro-topography image of the textile surface,(SEM), functional groups, and chemical composition of textile surface (pyrrole coated and non-pyrrole coated), we are checking pore size by PORE SIZE ANALYSER, and use TGA for temperature.

5. CONCLUSIONS After the use of all four types of material here we are able to see that the 50-50%poly/viscose blend is a more evaporated material in comparison to other materials, because of its vertical wicking is high and breathable, it is also working as a semi-natural or semi-synthetic, very good draping capacity, tensile strength is good, with high lustre, thermal conductive wet strength increase, etc.

REFERENCES

1. Chen, C., Kuang, Y., & Hu, L. (2019). Challenges and opportunities for solar evapora- tion. *Joule*, *3*(3), 683-718.

2. Wang, Z., Yan, Y., Shen, X., Jin, C., Sun, Q., & Li, H. (2019). A wood–polypyrrole composite as a photothermal conversion device for solar evaporation enhancement. *Journal of Materials Chemistry A*, *7*(36), 20706-20712.

3. Yang, T., Lin, H., Lin, K. T., & Jia, B. (2020). Carbon-based absorbers for solar evaporation: Steam generation and beyond. *Sustainable Materials and Technologies*, *25*, e00182.

4. Bartram, J., Brocklehurst, C., Fisher, M. B., Luyendijk, R., Hossain, R., Wardlaw, T., & Gordon, B. (2014). Global monitoring of water supply and sanitation: history, methods and future challenges. *International journal of environmental research and public health*, *11*(8), 8137-8165.

5. Xu, Z., Li, Z., Jiang, Y., Xu, G., Zhu, M., Law, W. C., ... & Xing, F. (2020). Recent advances in solar-driven evaporation systems. *Journal of Materials Chemistry A*, *8*(48), 25571-25600.

6. Chen, X., Wu, Z., Lai, D., Zheng, M., Xu, L., Huo, J., ... & Fu, M. L. (2020). Resilient biomass-derived hydrogel with tailored topography for highly efficient and long-term solar evaporation of high-salinity brine. *Journal of Materials Chemistry A*, *8*(43), 22645-22656.

NON MATELLIC POLYMERIC ELECTRO CONDUCTIVE TEXTILES FOR THERAPEUTIC USE

SHIVANGI PANDEY Uttar Pradesh Textile Technology Institute, Kanpur, Uttar Pradesh, India
SUBHANKAR MAITY Uttar Pradesh Textile Technology Institute, Kanpur, Uttar Pradesh, India

ABSTRACT

This study uses Polyester needlepunched nonwoven fabrics to prepare and characterise electrically conductive textiles for heat generation.Pyrrole was polymerized in situ with $FeCl_3$(Oxidant) and ptoluene sulfonic acid (dopant)to make this fabric electrically conductive .To achieve better polypyrrole fixation on the polyester surface, the polyester needle punched fabrics were scoured and hydrolyzed before insitu chemical polymerization.Pyrrole was chemically polymerized in situ using a two stage double bath process.

Nonwoven fabrics were soaked in monomer (0.25 M) in the first stage, and in situ polymerization was carried out in an oxidant bath made by dissolving $FeCl_3$ and PTSA at concentrations of 0.5 and 0.05 M, respectively.

The lowest surface resistivity of PPy coated sample no was found to be 9.32 KΩ/□with a 47.93 %PPyaddon .The Joules effect of heat generation was observed in this fabric with good electrical conductivity. The fabric's surface temperature rose to 55 °C after being exposed to a 30 V DC supply. UV protection was investigated using PPy coated cotton woven (200gsm) and needle punched polyester fabrics (200gsm). Optical microscopy images of PPy coated polyester fabrics revealed that PPy polymer was coated uniformly on individual fiber surface. A granular morphology of PPy was found. FTIR spectra of PPy coated fibers proved the chemical interaction of PPy with polyester surface and due to that a good fixation of PPy polymer was achieved. These coated fabric easily be made electrically conductive and they were practically useful for fabrication of heating pads for therapeutic use and as protector from UV radiation.

***Keywords**- Polyester, Needle Punched Nonwoven, Polypyrrole, Surface Resistivity, Ultra Violet Protection, Electro-conductive textiles, Heat generation*

1. INTRODUCTION

The use of metal wires or metal coating is a common practice for imparting electrical conductivity to textiles. Also, metal fibers were used during staple spinning to manufacture electro-conductive yarns [4–5]. Those yarns were used in weaving or knitting to produce electro-conductive fabrics. However, the processing of those yarns was difficult and they lose their textile properties. Many such limitations associated with processability, low mechanical strength and poor flexibility could be successfully overcome by coating/applying conducting polymers on textile substrates. PPy has been used primarily as a conductive polymer due to its high conductivity, low toxicity, commercial availability and high stability in the air relative to other conducting polymers [1-2].The heating effect of PPy-coated polyethylene terephthalate-lycra woven fabrics was studied by Kaynak &Håkansson [3]. Those coated fabrics exhibited reasonable electrical conductivity and effective heat generation. At an applied voltage of 24 V, the maximum temperature achieved was 40.55 °C. In another study, PPy was incorporated into cotton woven fabrics and various properties such as anti-static, anti-microbial, heat generations were investigated. A conducting textile composite was prepared by embedding PPy in natural and manmade cellulosic fibers, such as cotton, viscose, cupro and lyocell, using in situ vapor phase polymerization. Their various electrical properties such as voltage-current characteristics, voltage-temperature characteristics, etc., were also studied [4]. It was suggested by Sparavigna et al.and Macasaquit & Binag that 100% polyester fabrics could easily be made electrically conductive using a PPy coating, while they were practically useful for many applications, including flexible, portable surface-heating elements for medical or other applications [4-5]. Most of the studies available in literature concern woven and knitted fabric composites that are relatively thin compared with needle-punched non-woven composites. There are limited works available regarding PPy-coated needle-punched structures and the evaluation of the same in terms of Joule’s effect of heat generation. Thus the aim of the present work was characterization of PPy coated needle punched nonwovens of Joule’s effect of heat generation for therapeutic use. Polyester needle-punched non-woven composites are currently used in many applications, such as home furnishing, upholstery, filtration, filler materials for winter garments, geotextiles, etc., while this functional modification of the same may open up new dimensions of its application.

2. Materials and method

2.1 Preparation of polyester needle-punched non-woven composites using a 3^3 Box Behnken design

Polyester fibers were used as the raw material in the preparation of needle-punched non-woven composites on a “Dilo” needle-punching machine. The 3^3 Box-Behnken designs have only 17 experimental runs in comparison to 27 runs for the full factorial design. In this Box-Behnken design, the treatment combinations are at the midpoints of the edges of the process space and at the centre, and thus do not consider extreme treatment conditions that result in the increased consumption of energy and chemicals and may also have a harsh effect on the substrate of non-woven composites.

Table1Process parameters and their levels

Level	Punch Density	Depth of penetration	Fiber Denier
-1	150	6	3
0	200	9	6
1	250	12	9

2.2 Chemicals

The chemicals used were Ferric Chloride ($FeCl_3$) as oxidant, Pyrrole as monomer and p- Toluens sulfonic Acid(PTSA) as dopant . All the chemicals used were of laboratory grade and procured from Sigma Aldrich, China'

2.3 Method of preparation of PPy-coated non-woven composites

Polyester needle-punched, non-woven samples were hydrolyzed for the better fixation of PPy on a polyester surface. It was reported that the hydrolysis of polyester fabrics with 10% sodium hydroxide (NaOH) solution for 20 minutes at boiling (95 °C) at a 1:40 material to liquor ratio was the optimum condition of hydrolysis for achieving maximum add-on without significant loss of fabric strength . Therefore, all polyester non-woven composites were hydrolyzed employing the same process conditions. After hydrolysis, the non-woven composites were neutralized with 0.1 N acetic acid solutions. A two- stage double-bath process was then employed for the in situ chemical polymerization of pyrrole. In the first stage, the non-woven fabric was soaked with the monomer in a monomer bath. In the second stage, the in situ polymerization of pyrrole was conducted in an oxidant bath. A monomer bath was prepared by dissolving pyrrole in 0.5 M concentration in de-ionized water. Material to liquor ratio of monomer bath was 1:40. An oxidant bath was prepared by dissolving $FeCl_3$ and PTSA in de-ionized water. The amount of $FeCl_3$ and PTSA used were 0.5 M and 0.05 M, respectively. Material to liquor ratio was 1:40. Hydrolyzed samples were first allowed to soak in a monomer bath for 15 minutes at room temperature. The oxidant bath was cooled to 5 °C in a cryostat and pyrrole socked non-woven samples were taken from monomer bath and dipped into the oxidant bath for in situ polymerization. The time of the in situ polymerization was 1 hour. Polymerized samples were then taken out from the oxidant bath, thoroughly rinsed with cold water and dried in an oven at 80 °C for 4 hours before measurement.

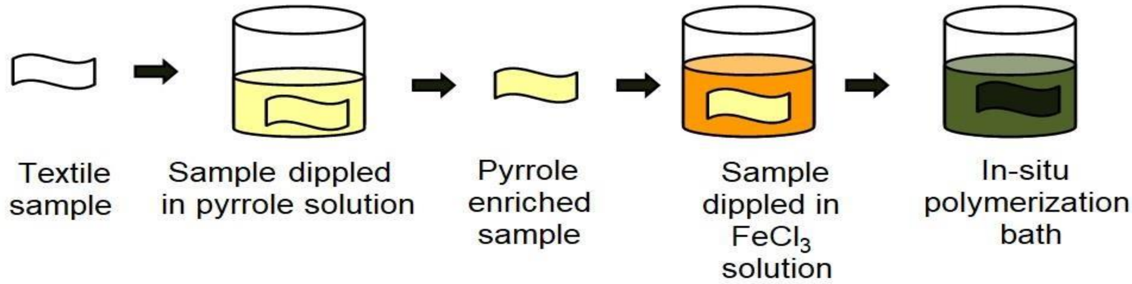


Figure -In situ chemical polymerization of pyrrole onto polyester non-woven composites using the double- bath process

3.1 Voltage-Current Characteristics of Electro- Conductive Non-Woven Composites

Ohmic conductors show liner V-I characteristics. To verify the nature of the PPy-coated needle-punched non-woven composites, current flow through the samples due to the application of voltage was measured using an ammeter connected to the circuit. The results obtained for sample are shown in Figure 1.

3.2 Time-Temperature Characteristics of the Electro-Conductive Non-Woven Composites

The time duration of the application of voltage may affect the heat generation behavior of the electro conductive non-woven composites. To investigate this, fixed DC voltage (20 V) was supplied to the samples and allowed to heat up for an extended period. The results for sample n are shown in Figure 2. It is evident that temperature increased with time up to six minutes and then leveled off at a temperature of 49 °C. It can thus be concluded that these conductive non-woven composites heated up quickly due to the application of a fixed voltage and then levelled off at a particular temperature. Such behavior of the non-woven composites is suitable for the fabrication of a heating pad or garment.

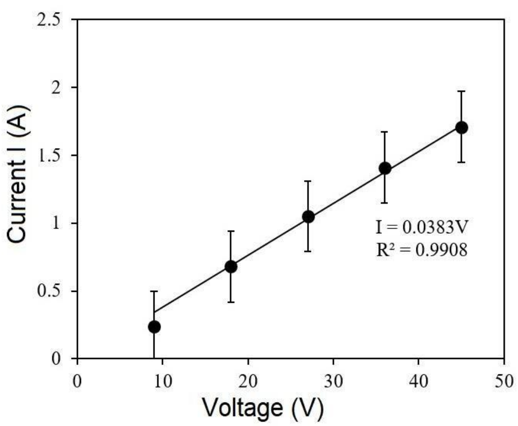


Figure1: Voltage-current (V-I) characteristics of PPy- coated polyester needle-punched non-woven composite (200 g/m2, 200 punch/cm2, punching depth of 6 mm, 3.33 dtex fibre)

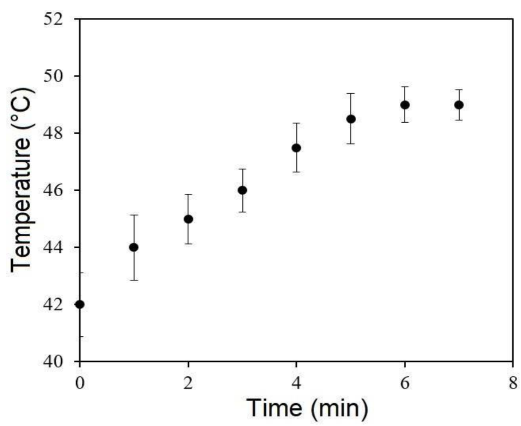


Figure 2: Effect of time on heat generation behavior of PPy-coated polyester needle-punched non-woven composite (200 g/m2, 200 punch/cm2, punching depth of 6 mm, 3.33 dtex fiber

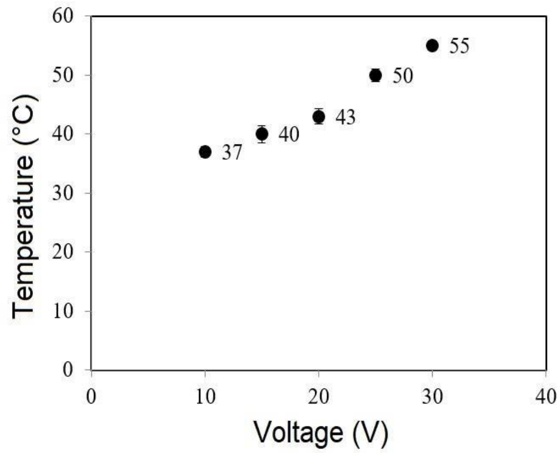


Figure3: Voltage-temperature characteristics (V-T) of PPy-coated polyester needle-punched non-woven composite (200 g/m2, 200 punch/cm2, punching depth of 6mm, 3.33 dtex fibre)

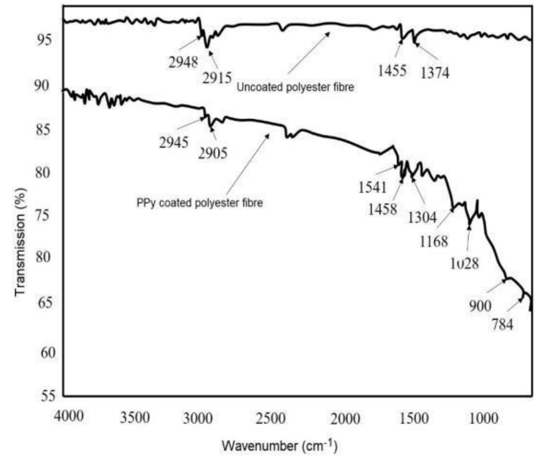


Fig4: FTIR spectra of untreated and PPy-coated polyester fibre

3.3 Voltage-Temperature (V-T) Characteristics

The electro-conductive composites were tested for their voltage-temperature characteristics by applying a different range of direct current (DC). The surface temperature of the composites was measured using a non-contact type infra-red thermometer after an interval of three minutes of voltage application. The results obtained for 200 g/m^2 sample are shown in Figure 3. It is evident that as the applied voltage was gradually in- creased, the surface temperature increased due to Joule's effect.

3.4 Fourier Transform Infrared (FTIR) Spectroscopy Analysis

The FTIR spectra of polyester fiber and PPy-coated polyester fibers are shown in Figure 4. The FTIR spectra reveal various functional groups and chemical bonds that are present in polyester fiber and PPy polymers to identify chemical modifications and intermolecular interaction between them. In the case of uncoated polyester, observed peaks at wave numbers of 2,948 cm^{-1} and 2,915 cm^{-1} are attributed to aliphatic C-H stretching vibration, while the band at 1,455 cm^{-1} is attributed to CH_2 deformation and the band at 1,374 cm^{-1} is attributed to the -COO- stretching of the ester group. In the case of PPy coated polyester, the band at 1,541 cm^{-1} is attributed to the -C=C ring stretching vibration of PPy, while the band at 1,458 cm^{-1} is attributed to CH_2 deformation and the band at 1,304 cm^{-1} is attributed to the -CN stretching of PPy. The bands at 1,168 cm^{-1}, 1,028 cm^{-1}, 900 cm^{-1}, and 784 cm^{-1} are attributed to the characteristics of bending (C-H) vibration of PPy. The band at 1,374 cm^{-1} due to the -COO- stretching of ester group in uncoated polyester vanishedafter PPy coating. These observations reveal significant intermolecular interaction between PPy and polyester fibers. This intermolecular interaction confirms the affinity of PPy molecules to polyester surface to achieve a durable coating.

4. CONCLUSIONS

PPy was successfully coated over polyester needle punched nonwoven samples evidenced by optical microscopy images and FTIR spectroscopy results. The highest PPy add-on of about 47.93% was achieved in the case of 200 g/m2 non-woven fabric prepared with 200 punch/cm^2, a punching depth of 6 mm and 3.33 dtex fibers. The surface resistivity of this composite sample was found to be 9.32 kΩ/ square. Voltage- temperature characteristic followed an exponential trend and the surface temperature of the PPy-coated composite was raised by 18 °C from room temperature by applying 30 V. Voltage-current characteristic followed a linear trend such as ohmic conductors with a linear resistance of 26 Ω. The composites heated up quickly within six minutes and reached a stable temperature of 49 °C when a contact supply of 20 V was applied. Such PPy-coated needle-punched non-woven composites can be a potential material for the fabrication of a non-metallic, light-weight, flexible heating pad for therapeutic use and for heating garments for cold weather.

5. REFERENCES

1. MAITY, S., CHATTERJEE, A. Polypyrrole functionalized polyester needle punched nonwoven fabrics for electro-magnetic interference shielding. Polymer Composites, 2018, 39(10), 3696–3704, doi: 10.1002/pc.24399.
2. MAITY, S., CHATTERJEE, A. Conductive polymer-based electro-conductive textile composites for electromagnetic interference shielding: a review. Journal of Industrial Textiles, 2018, 47(8), 2228–2252, doi: 10.1177/1528083716670310.
3. KAYNAK, A., HÅKANSSON, E. Short-term heating tests on doped polypyrrole-coated polyester fabrics. Synthetic Metals, 2008, 158(8–9), 350–354, doi: 10.1016/j.synthmet.2008.02.004.
4. SPARAVIGNA, A.C., FLORIO, L., AVLONI, J., HENN, A. Polypyrrole coated PET fabrics for thermal applications. Materials Sciences and Applications, 2010, 1(4), 253–259, doi: 10.4236/ msa.2010.14037.
5. MACASAQUIT, A.C., BINAG, C.A. Preparation of conducting polyester textile by in situ polymerization of pyrrole. Philippine Journal of Science, 2010, 139(2), 189–196.

DEVELOPMENT OF FIBRE REINFORCED CONCRETE USING WASTE CEMENT BAGS

Narwaria Janmjay DKTE Textile & Engineering Institute, Ichalkaranji 416115, India.
Karwa Shashikant DKTE Textile & Engineering Institute, Ichalkaranji 416115, India.

Abstract

Fiber Reinforced Concrete (FRC) is a composite material mixture of cement matrix with an ordered or random distribution of fiber which can be steel, nylon, polythene, Polypropylene (PP) etc. The addition of fibres improves the properties of concrete, viz., flexural strength, impact strength and shrinkage properties. Various papers have been already presented on the use of fibres in concrete and a considerable amount of research has been directed towards studying the various properties of concrete as well as reinforced concrete due to the addition of PP fibres. Hence, an attempt has been made in the present investigations to study the influence of addition of PP fibers-Shredded fibres from used cement bags at a proportion of 0.5% and 1% by weight of the concrete. The properties studied include compressive strength and cracking behaviour under different curing condition. The studies were conducted on a M20 mix and tests have been carried out as per recommended ASTM standards. The results are compared and conclusions were made. The findings in this paper suggested that PP fibres deriving from these cement bags are a feasible fiber option for fiber-reinforced concrete productions. A notable increase in the compressive strength with controllable cracking behaviour is seen. The usefulness of fibre reinforced concrete (FRC) in various civil engineering application is indisputable. Fibre reinforced concrete has so far been successfully used in slab on grade, architectural panels, precast structure, offshore structure and many other applications.

***Keyword:* -** Polypropylene fiber, FRC, compressive strength, curing conditions.

1. Introduction

Polypropylene fibers are hydrophobic, that is they do not absorb water. Therefore, when placed in a concrete matrix they need only be mixed long enough to insure dispersion in the concrete mixture [2]. Plastics consumption now days have become an integral part of our lives. The amounts of plastics consumed annually have been increasing steadily. There are several factors that contribute to the rapidly growth of plastics consumption such as low density, fabrication capabilities, long life, lightweight, and low cost of production[6] Concrete is a composite material consisting of a binder, which is typically cement, rough and fine aggregates, which are usually stone and sand, and water. These comprise the constituent materials of concrete.

In simple terms:

- Cement + Water = Cement paste;
- Cement Paste + sand = Mortar; and
- Mortar + Stone = Concrete.

The proportion of different ingredients used varies with purpose to which concrete is used. Water is the key ingredient, which when mixed with cement, forms a paste that binds the aggregate together. The water causes the hardening of concrete through a process called hydration. The purpose of Sand and gravel in concrete act as a filler, they also add more volume to the concrete. More volume means less air and a stronger product. The size of the gravel also helps to determine the concrete's strength. Monofilament fibers, according to fiber manufacturers, only provide control of cracking caused by shrinkage and thermal stresses occurring at early ages. These fibers provide no post-crack benefit and are used only for shrinkage cracking and not to provide improvements to other engineering properties. [2] Application of this concrete are concrete road, canal lining, metro concrete structure, Tunnel, Basement, Dams, Plaster, Roof Slabs, Industrial Flooring.[5]

Why cement sacks polypropylene fibre is used?

Because of its low density, polypropylene sinks in water. Turtles and other aquatic animals often mistake plastic bags and other plastics for jellyfish and eat them, causing them to starve and suffocate to death. For production of polypropylene of one kg it produce 1.95 kg of co2 and for one tonne production of PP it emit 3.456 metric tonne. Exposer to co2 can produce variety of human health effect.

2. Material & Method

2.1 Material

HDPE/PP cement sacks :

Cement sacks are generally made up of Woven HDPE/PP yarn having dimensions width 50cm and length 80cm. Cement sacks weight is about 80-90 grams depends upon the manufacturers.

Cement :

Ordinary Portland cement of 53 Grade conforming to IS: 12269-1987 will be used in this Study with a specific gravity 3.15. Initial and final setting time of the cement were 40 min and 190 min, respectively.[3]

Sand & Aggregates :

The size of coarse aggregate depends upon the nature of work. The coarse aggregate used in this experimental investigation are of 20mm size crushed angular in shape. Crust sand to be used as a fine aggregate.

Water :

Water is an important ingredient of concrete as it actively participates in chemical reactionwith cement.

Table 1 (Raw Material properties)

Material	Density	Specific gravity	Water Absorption
Cement	1440 kg/m^3	3.15	-
Coarse Aggregate	1890 kg/m^3	2.87	1.44 %
Fine Aggregate	2181 kg/m^3	2.97	1%
Fibre	0.91 g/cc	-	0.03%

2.2 Methodology
Mixing and preparation of Moulds

Mixing of fibers :

Fibers will be dispersed in water by continuous stirring. This water in which fibres are dispersed will be used for forming the concrete. The proportion of fibres in concrete will be 0%, 0.5%, 1%.

Preparation of Moulds:

As per ASTM and BIS (Bureau of Indian Standard) Standard methodology for each property, three blocks of standard size will be prepared. The proportion of cement, fine aggregate and coarse aggregate will be in the ratio of 1:1.5:3. To test the mechanical properties cubes of 15x15x15 cm is prepared.

2.3 Testing of fiber reinforced cement concrete composites
Compressive strength:

As per TS EN 12390-3 Standard compressive strength test will be performed. Formed cube will kept for the curing days of 7 days and 28 days after which the specimens will be placed between the bearing blocks on the machine and loaded at a uniform rate of 2 kg/cm^2/sec until failure. The maximum load carried by the specimen will be recorded from the machine. The compressive strength of each individual specimen will be calculated by dividing the maximum load at failure by the cross-sectional area of the specimen. The average of three specimens will be accepted as the compressive strength of that batch of concrete.

3. Result and Discussion

3.1. Effect of fiber proportion on cracking

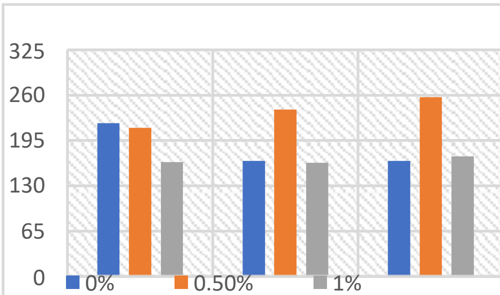
Visual appearance test is done for crack behaviour. It is well know that concrete is very strong in compression but poor in tension and crack behaviour. Cracks are mainly because of difference in outer and inner temperature of hydration. Fiber plays a major role in arresting these cracks, polypropylene fibrillated fiber uniformly hold the concrete and do not allow the cracks to form at inner matrix and outer surface. Our fiber impart ductility and thus increase the life of the concrete on a long term basis. In other words the life of the structure increase many times. 0.5 % fibre mixture shows better results than the 1.0%.

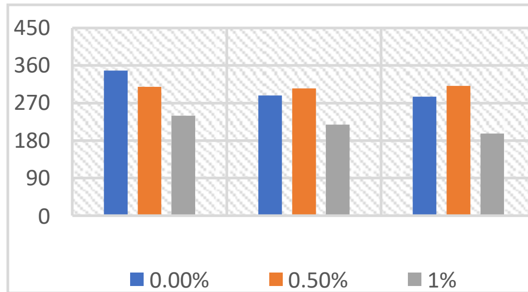
3.2. Effect of fiber proportion on compressive strength

The most important property of concrete is the compressive strength which will be determine by loading the properly molded and cured specimens. For the result it is concluded that concrete without fiber and concrete reinforced 1% with polypropylene fibers has low compressive strength. 0.5% polypropylene fibers reinforced shows comparatively better results. Also as the proportion of fiber reinforcing increases the compression strength decreases. Difference between reading of concrete without fiber and with fiber is not significant at 1%. In all it can be concluded that 0.5% reinforcement fibers gives better compression strength.

Table 2 (Compressive Strength test result)KN

Fiber %	7 days curing			Avg.	28 days curing			Avg.
0%	220	166	166	184	384	288	285	307
0.5%	213	239	257	236.3	309	305	311	308.3
1%	164	163	172	166.3	240	218	197	218.3





7. days curing

28 days curing

(Figure 1. Effect of fiber Proportion on compressive strength)

3.3.Effect on manufacturing cost

Table 3. (Effect of manufacturing cost)

Sr. No.	**Material**	**Price Rs/Kg**
1	Cement	Rs. 6.8
2	Coarse aggregate	Rs. 2
3	Fine aggregate	Rs. 2
4	Recycled PP	Rs. 30
5	Virgin PP	Rs. 300 Approx.

Table 4. (Effect of manufacturing cost)

Criteria	0.5%	1%
Without fibers	Rs. 2.86	
With recycled fibers	Rs. 2.98	Rs. 3.10
With virgin PP	Rs. 4.32	Rs. 5.66

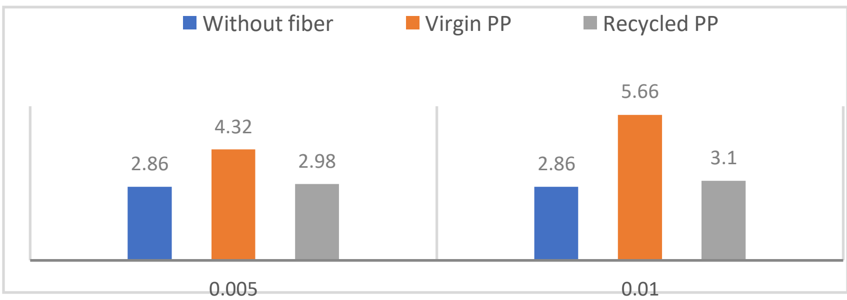


Figure 3. Effect of fiber proportion on concrete costing

Conclusion

1) Cracking :- It has been seen that 0.5 % of the fiber proportion show better cracking condition than 1 % of the fiber
2) Compressive strength: - the maximum load carried by the specimen gives idea about compressive strength of concrete and it is better with 0.5% reinforcement fiber than others.
3) Moisture test: - Moisture absorbed by fresh concrete is better with 0.5% reinforcement fiber that other.

References

1. S. Ragvendra[1] ,I. Praveen Reddy, Dr. Archana Dongre , Research gate, 20(12) (2017)
2. Millind V. Mohod in IOSR journal of mechanical and civil engineering e-ISSN: 2278-1684, p-ISSN: 2320-334X, Volume 12, Issue 1 ver. I (Jan-feb.2015), PP 28-36
3. Rasheed Abdulwahab, Monsur Akinleye, material and Engineering structure,e-ISSN: 2170-127X, Volume 1, issued on January 2018
4. Bajaj Reinforced LLP, Fiber Tuft Brochure.
5. Bajaj Reinforced LLP, Fiber Gaurd Brochure.
6. HADJ MOSTEFA Adda , MERDACI Slimane, International Journal of Engineering Research in Africa, ISSN: 1663-4144, Vol. 42
7. Dhananjay Raj, Pooja Uttam Raut, M. MIdhuna Harindra, 2012

THE EFFECT OF BACKREST ON AIR PERMEABILITY OF BANDAGE FABRIC

Aditya kestikar ,textile department, DKTE, Maharashtra, India.

Prashant yadav ,textile department, DKTE, Maharashtra, India.

Tahir jamadar ,textile department, DKTE, Maharashtra, India.

Saniya mujawar ,textile department, DKTE, Maharashtra, India.

Abstract

A bandage is a piece of material used to support a medical device such as a dressing or split or on its own to provide support to the body. They can also be use to restrict a part of the body. They can also be use to restrict a part of the body. During heavy bleeding or following a poisonous bite it is important to slow the flow of blood, tight bandages accomplish this task very well. in this study, the effect of backrest on fabric air permeability along with other parameters like cover factor, tensile strength, elongation at break, we have produced three fabrics with different positions of backrest and measured air permeability, cover factor, tensile strength, elongation at break, and obtained conclusions.

Keyword:- *backrest, air permeability, bandage.*

Methodology

First of all keeping the normal position at backrest the fabric was produced on the loom for two full pirns Then after weaving the normal fabric . The position of backrest is raised by about 1" from the normal position and in this position also about 2 full pirns of fabric is woven. After wearing the fabric raised backrest position the backrest is lowered by 1" from the normal position and in this lowered position of backrest 2 full Pirns of fabric is woven. After Completing the procedure of weaving the fabric is raised & lowered position, set the backrest to the normal passion and weave about 2 full pirns of fabric at the normal backrest position. After this when required length of fabric is woven the fabric is removed from the loom.

Method of fabric production:

The fabric is produced on plain power loom with cotton yarn of warp count 60 and weft count 92. With a width of 52 inches having epi of 77 and ppi of 70. This fabric is produced with a plain weave.

Sample produced	Epi	Ppi	Position of backrest	Fabric width	Warp count	Weft count
S1	79	71	32”	52	60	92
S2	79	70	31”	52	60	92
S3	79	69	30”	52	60	92

Testing

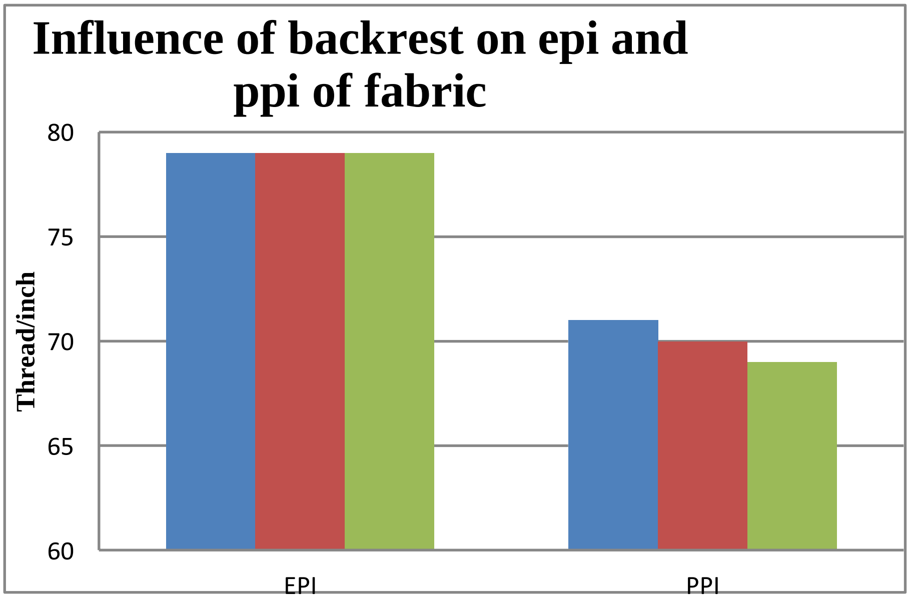
The testing of fabric is an important step to determine the effect of a machine parameter of physical properties of fabric. While testing precaution is done that the sample is used for testing which is not about 10 cm close to the selvedge. The testing of fabric sample is done in 65% RH and 27 degree C.

Tests to carried out on the fabrics are

Test	Testing machine	Astm standard
Air permeability	Air permeability tester	ASTM D737
Tensile strength	Tensile strength tester	ASTM D638
Fabric thickness	Fabric thickness tester	ASTM D1777
Elongation at break	Elongation at break tester	ASTM D5034

Results :

:


Influence of backrest on epi and ppi of fabric
80
75
70
65
60
Thread/inch
EPI
PPI

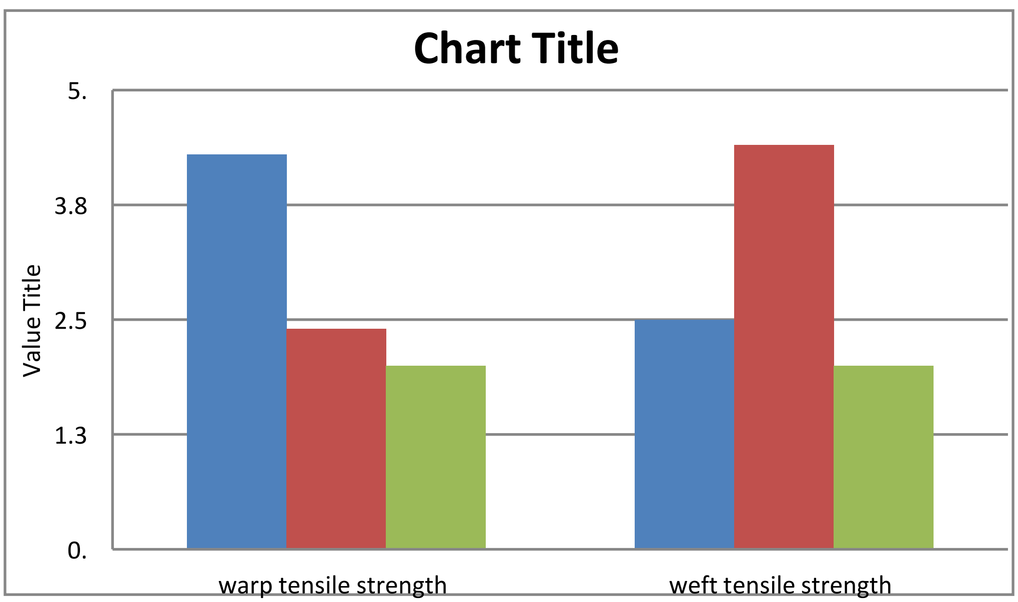


Chart Title
5.
3.8
2.5
1.3
0.
Value Title
warp tensile strength
weft tensile strength

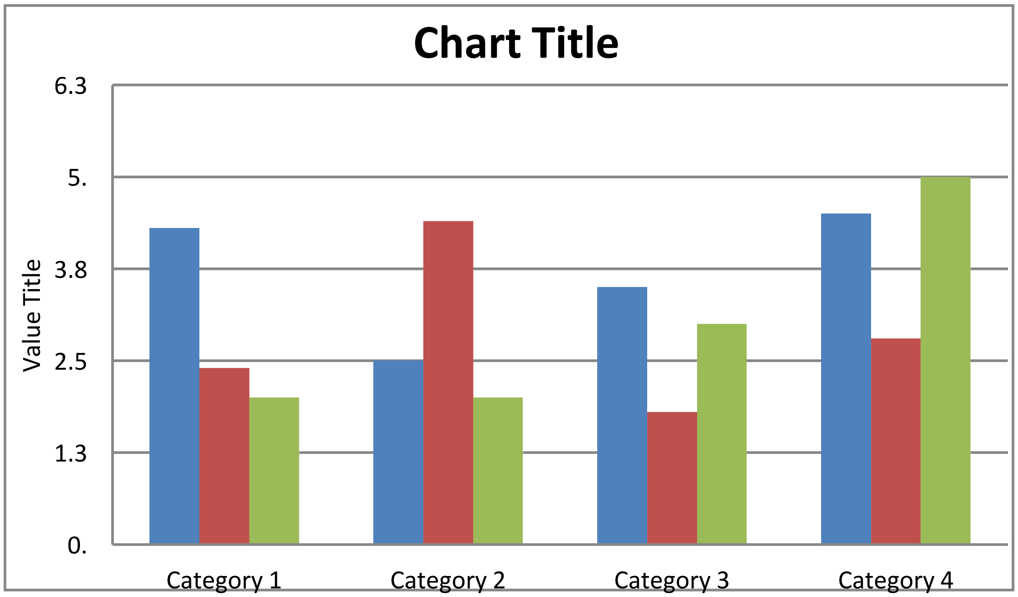
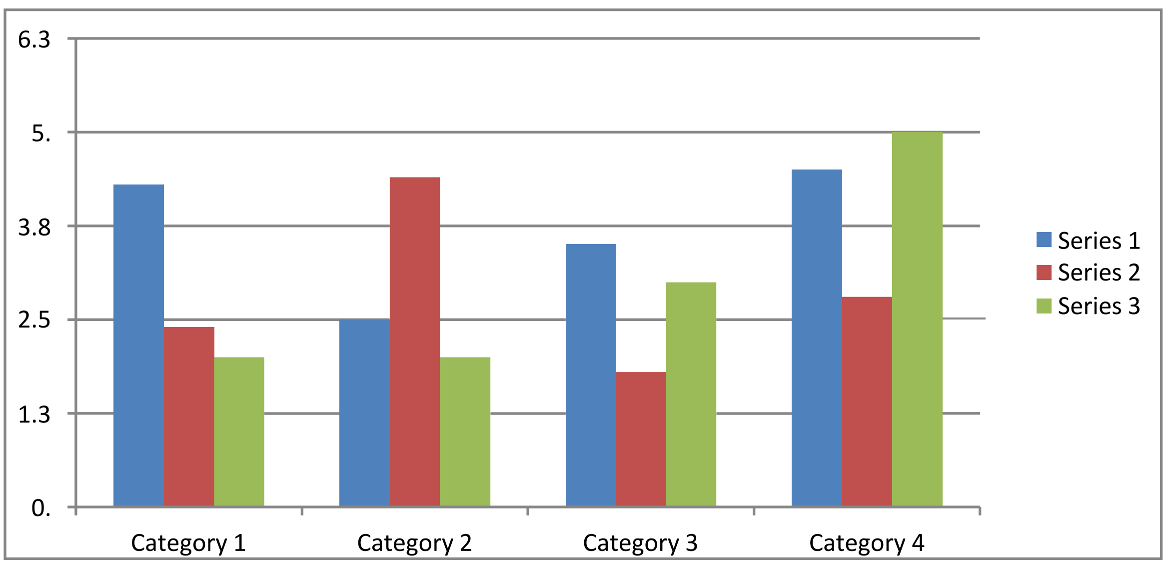


Chart Title
6.3
5.
3.8
2.5
1.3
0.
Value Title
Category 1
Category 2
Category 3
Category 4


6.3
5.
3.8
2.5
1.3
0.
Category 1
Category 2
Category 3
Category 4
Series 1
Series 2
Series 3

MULTILAYER STAIN FREE PANTIES

Samaranjana R, Textile Technology , Kumaraguru College Of Technology, Coimbatore , Tamilnadu .
Deepika T, Textile Technology , Kumaraguru College Of Technology, Coimbatore , Tamilnadu , India.
Manonmani M, Textile Technology , Kumaraguru College Of Technology, Coimbatore , Tamilnadu , India.

ABSTRACT

In modern era clothing initiates the dignity of a person . The most significant benefit of whiteness is that it allows you entrance into God's holy presence. There are many Strain free fabrics in markets but those were not affordable by all . But till date menstrual days are being magnificent task for women were they always worried on their dressing , most of all neglect to wear dull colors and go on with bright colors which include me too. Napkins are in existence but leakage joins in hand with it . There is lots of work in progress but here we come up with solution which tries to end up the problem , a inner wear that keep under control the flow of leakage of stain in the dresses. this inner wear is made up of three layer of fabric which is comfortable and easily washable and also restrict the strain leakage. A inner-wear first layer is made up of cotton , secondlayer is made up of viscose and third layer is made up of polypropylene with ends are sewed withcotton lining for comfort.

KEYWORD: - *Stain resist , Inner-wear , Repellent fabric, and Sustainable underwear .*

---

1. INTRODUCTION

In North America alone, close to 20 billion sanitary napkins, tampons and applicators are sent to landfills every year. we can use our skill and talent as textile technologists to make small changes towards more sustainable living that have the potential to make a big impact. Many of us have vowed to cut back on our paper towel use, opted for fabric produce bags instead of plastic ones, and wrapped up our leftovers with DIY reusable food wraps. It sounds a little different. You spend every day of your period trying to make sure you don’t get your menstrual flow in your underwear, but these underwear are actually designed to hold it. It seems like the opposite of what you’re used to, but once you try them, there’s seriously no going back. Multilayered strain free underwear is a natural and holistic way of caring for your period and your body while prioritising your comfort and the environment.

2. MULTI LAYER

A multilayer fabric consists of several layers woven above each other with a maximum of 12 woven layers or 22 warp yarn layers and 23 weft yarn layers (unidirectional layers). Theconnection can be realised by connection yarns in the third dimension or by interlocking. As a result, the delimitation resistance of the fabric increases and the manual labor of stacking differentlayers on top of each other could be decreased. All types of yarns can be used and combined. This combination could be different layers with different types of yarns but also in one-layer different types of yarns can be used.

Multi-layer fabric

Figure 1 : Multilayer fabric

3. METHODOLOGY

3.1 Construction

Our panties consists of 3 layers as follows:
First layer is of cotton which will help as absorb the flow. Next will be viscose , it is light weight and absorbable which absorb the excess of first layer.
Next followed by a repellent polypropylene , here it resists the strain to reach out. But repellent will cause unease while it comes in contact with skin.
So sewing the edges with cotton tape which will be in contact with skin.
Finally the layers were laminated or can ne electro plate to customize the wearability.

4. FIRST LAYER

Cotton fibers are natural hollow fibers; they are soft, cool, known as breathable fibers and absorbent. Cotton fibers can hold water 24–27 times their own weight. They are strong, dye absorbent and can stand up against abrasion wear and high temperature. In one word, cotton is comfortable. Since cotton wrinkles, mixing it with polyester or applying some permanent finish gives the proper properties to cotton garments. Cotton fibers are often blended with other fibers such as nylon, linen, wool, and polyester, to achieve the best properties of each fiber.

4.1 Fiber Orientation

Cotton fiber molecular orientation is commonly examined using the birefringence index,$\Delta n = n\Pi - n\perp$, in which $n\Pi$ is the refractive index with the polarised light oscillating in a plane parallel to the fiber axis, and $n\pm$ is the refractive index with the light oscillating in a plane perpendicular to the fiber axis. A typical birefringence index of cotton may range from 0.04 to 0.09 [10]. Within a given fiber, this index increases from the tip (0–0.008) to the root of the fiber (above 0.04).

In relation to fiber friction, studies on synthetic fibers reveal that the higher the orientation, the more intimate the contact between fibers, and the higher the friction [11–13]. With cotton fibers, such analysis will be difficult to replicate since orientation will be directly associated with the growth rate of fibers (a difficult factor to control). In addition, cotton fibers of different levels of orientation will likely be different in many other surface-related physical characteristics. Nevertheless, the assumption that higher cotton fiber orientation will result in higher interfiber friction seems to be reasonable.

4.2 Processing of cotton

Cotton production is a very involved process, from planting cotton seeds to picking the cotton crop to the processing it in a cotton gin.

- While cotton was picked and separated by hand in the early days, today, most cotton production starts with a cotton picker (which picks the entire plant) or a cotton stripper, with strips the boll off the plant.
- After the cotton is picked, it baled and stored in the fields before it is sent to the gins.
- At the gins, the cotton bales are cleaned and fluffed to separate the material from dirt, seeds, and lint.
- After the cotton has gone through the gins and is completely separated from the seeds, the raw cotton is compressed and stored, ready to ship off to textile mills for further production.
- The cleaned and fluffed cotton is put through a carding machine, which further cleans the material and forms the short fibers into a long untwisted rope that is then ready for spinning and weaving.

4.3 Characteristics

Cotton has a number of distinguishing characteristics that make it such a popular fiber in the textile industry.

- **Softness**. The cotton plant is soft and fluffy and results in a fabric often retains that soft feel.
- **Durability**. The cotton plant’s cellular structure is strong, creating a tough and wear-and-tear resistant fabric.
- **Absorbency**. Cotton fabric is very absorbent fabric because there is a lot of space between the cotton fibers.

- **Holds dye well.** Due to its absorbent nature, cotton takes dye very easily and can be made into a wide variety of colors.
- **Breathability**. The fiber structure of cotton makes it more breathable than synthetic fibers.
- **No static cling**. Cotton does not conduct electricity, therefore static is not an issue with cotton.

5. SECOND LAYER

Viscose is a semi-synthetic type of rayon fabric made from wood pulp that is used as a silk substitute, as it has a similar drape and smooth feel to the luxury material. The term “viscose” refers specifically to the solution of wood pulp that is turned into the fabric. Viscose was first produced in 1883 as a cheaper, artificial silk.

5.1 Preparation

Viscose is made from tree wood pulp, like beech, pine, and eucalyptus, but can also be made from bamboo. Viscose is semi-synthetic due to the many chemicals involved in the viscose process, like sodium hydroxide and carbon disulphide.

- The viscose manufacturing process is summed up in five steps:
- The plant is chipped into a wood pulp and dissolved chemicals like sodium hydroxide, forming a brown wood pulp solution.
- This brown wood pulp is then washed, cleaned, and bleached.
- To create the filers, the pulp is treated with carbon disulphide and then dissolved in sodium hydroxide to create the solution referred to as “viscose.”
- The viscose solution is forced through a spinneret, which is a machine that creates filaments, called regenerated cellulose.
- This regenerated cellulose is spun into yarn, which can then be woven or knit into viscose rayon fabric.

5.2 Characteristics

Viscose is a great option if you’re looking for a lightweight material with a nice drape, a lustrous finish, and a soft feel. It is relatively inexpensive and can convey luxury for a much lower price point. It also blends well with other fibers like cotton, polyester, and spandex.

Absorbent. Viscose rayon does not trap heat, but it also absorbs water and sweat nicely, making it great for t-shirts and athletic wear.

Lightweight. Viscose is extremely airy, which makes it nice for blouses and summer dresses.

Breathable. It's a very light fabric that doesn't stick to the body, so it's optimal for warm weather clothing.

Soft. While the material looks like silk, it feels like cotton.

Maintains Shape. The fabric is not elastic but can be blended with other textiles, such as spandex, to add stretch.

Dye fast. Viscose can hold dye without fading, even after long-term use and washes.

6. THIRD LAYER

Polypropylene is a material that is frequently compared to PVC (polyvinyl chloride). While not as frequently used as PVC, polypropylene is still a useful material for coating custom wire baskets. A rigid, crystalline thermoplastic, polypropylene is produced from propene or propylene monomer. It's one of the cheapest plastics available today and is used in applications both as a plastic and a fiber in industries such as automotive manufacturing, furniture assembly, and the aerospace sector

Figure 2 : Polypropylene fabric

6.1 Preparation

PPF can be obtained in two ways: by the technique of melt spinning and creating monofilaments or from a sheet of polypropylene film producing fibrillated fibers [17]. Depending on the production method, fibers have different mechanical properties

6.2 Benefits

Polypropylene, or PP, is a type of fibre used in concrete because it is resistant to drying shrinkage and plastic shrinkage. This fibre helps reduce water bleeding in concrete and reduces the concrete's permeability significantly**.**

6.3 Properties

Some of the polypropylene structure and material properties that you should know when choosing a coating for your custom wire basket include:

Chemical Resistance. Polypropylene is generally noted as having a high resistance to chemicals compared to polyethylene (“regular” plastic). Polypropylene will resist many organic solvents, acids, and alkalines. However, the material is susceptible to attack from oxidizing acids, chlorinated hydrocarbons, and aromatics.

Tensile Strength. Compared to many materials, polypropylene’s structure has a good tensile strength—somewhere around 4,800 psi. This allows the material to withstand fairly heavy loads, despite being lightweight.

Impact Tolerance. While polypropylene has a good tensile strength, its impact resistance leaves something to be desired when compared to polyethylene.

Water Absorption. Polypropylene is highly impermeable to water. In a 24-hour soak test, the material absorbs less than 0.01% of its weight in water. This makes polypropylene ideal for total immersion applications where the basket material underneath has to be protected from exposure to various chemicals.

Surface Hardness. The hardness of polypropylene is measured on the Rockwell R scale as 92—placing it on the high end of the softer materials measured on that scale. This means the material is semi-rigid. This makes it more likely to bend and flex with an impact.

Operating Temperature. The maximum recommended operating temperature for polypropylene is 180°F (82.2°C). Beyond this temperature, the performance values of the material may be compromised.

Melting Temperature. At 327°F (163.8°C), polypropylene will melt. This makes polypropylene unsuited to high-temperature applications of any kind.

7. CONCLUSION

Considering the problems and swings during menstrual time , This paper presents a innovative idea for this trending market. Stain free panties it is a fusion of cotton , viscose and polypropylene fabrics with end sewed with cotton lining and constructed as a multilayer garment. It provides comfortnes ensures hygiene and also affordable. It is durable and it withstand high wash fastness. Industrial of women's underwear can successfully predict their consumed amount and design requirements , thereby it will be ease to bring into market as product.

8. REFERENCES

1. Martin, A., Tabary, N., Leclercq, L., Junthip, J., Degoutin, S., Aubert-Viard, F., ... & Martel, B. (2013). Multilayered textile coating based on a β-cyclodextrin polyelectrolyte for the controlled release of drugs. Carbohydrate polymers, 93(2), 718-730.
2. Matusiak, M. (2006). Investigation of the thermal insulation properties of multilayer textiles. Fibres & Textiles in Eastern Europe, 14(5), 98-102.
3. Chauhan, P., Kumar, A., & Bhushan, B. (2019). Self-cleaning, stain-resistant and anti-bacterial superhydrophobic cotton fabric prepared by simple immersion technique. Journal of colloid and interface science, 535, 66-74.
4. Kanokrungsee, S., & Vachiramon, V. Panties mass.

UPCYCLE AND RECYCLE OF FASHION GOODS TO MINIMISE THE LANDFILL AND INCINERATION

D N PRADEEP, Textile department, Kumaruguru College Of Technology, Tamilnadu, India.

C M SUDHIKSHAN, Textile department, Kumaruguru College Of Technology, Tamilnadu, India.

G S SUGANTH VAIBAV, Textile department, Kumaruguru College Of Technology, Tamilnadu, India.

ABSTARCT

It is hard to imagine living in the world without textile. Fashion industry has a huge environmental impact, with increasing consequence all around the world. When cloth ends up in landfill they create green house gases. So reusing the fabric in old garment means less resource both monetary and environmental are wasted in growing fibre for new ones.

Up cycled garments can have that independent appeal? No matter whom the designer is or what styling options designers choose, these up cycled or recycled fashion garments and accessories are by nature one-of-a kind. Finishing of textile fabric is carried out to increase attractiveness and serviceability of the fabric. This paper is not just about recycled clothes but about fashion, recycling, up cycling, adding value and uniqueness by the resulting one-of-a-kind design available for consumers to purchase in any retail store. And this paper also says about the process flow of recycle and up cycle and advantage of recycling and up cycling.

The process of redesigning is one of the important steps in upcycling, which Originality/value – The process of redesigning is one of the important steps in upcycling, which Originality/value – The process of redesigning is one of the important steps in upcycling, whichThe process of redesigning is one of the important step in upcycling, which comprises ideation, reconstruction and fitting. The limitation of redesigning is variability in size and pattern.This can be overcome through various techniques such as craftsmanship, time, innovation, provenance ,desire and narrative.

INTRODUCTION

All clothing has a useful second life. This might pose a threat to the environment because discarded garments will ultimately go to landfill or incineration. However, environmental degradation can be controlled by avoiding the entry of virgin (new) raw materials by closing the loop based on any of the three principles: reduce, reuse and recycle. This will also indirectly help in providing employment by increasing job opportunities in reverse logistics field. The reverse side of the value chain consists of mainly three processes: collection, sorting and processing. The collection is the process of getting back discarded products from the consumer. Sorting is responsible for inspection and categorisation of the product according to its quality/type. Processing involves different activities such as repair, washing, redesigning etc. to restore functionality and enhance the utility. Each process of reverse logistics in detail is explained in the next section. Despite the growing importance in practice, the academic literature on up cycling still appears fragmented. Surprisingly, the extant literature revealed that no study so far has captured a literature review in the area of up cycling. Therefore, this paper is an attempt to understand the up cycling or recycling process.

The collected garments are sorted and graded as natural, synthetic and blended fabrics. Good quality clothing is sent to charity institutions and is used as second hand clothing. Unwearable textiles are considered as damaged textiles, and are processed in the factory as rags. Rags are collected and sent to the wiping and flocking industry. Other materials will be sent for fibre reclamation and stuffing. Fibres from the old fabrics are reclaimed and are used for making new garments. Threads from the fabric is pulled out and used for re-weaving new garments or blankets. Both natural and synthetic fibres can be recycled this way. Incoming textiles are graded into type and colour. Initially the material is shredded into fibres called shoddy. Later based on the end use, other fibres are blended with shoddy. The blended mixture is carded, and spun for weaving or knitting.
Textile and clothing industries involve different processes right from spinning to the finishing of final garments. Each process tries to add some value to the product. This is ahighly labour-intensive industry and a huge source of employment.
In fact, after food industries, the textile industry has been considered the second largest industry in the world, with consumption of nearly 10 per cent energy. Unfortunately, many hazardous chemicals are used and emitted in the garment manufacturing processes.
Many firms have taken initiatives to reduce the harmful effect of toxic chemicals. But, significant minimisation seems difficult to achieve. In addition, the estimated consumption of textile-based goods is approximately 30 million tons per year. The situation is alarming because the disposal rate has also subsequently increased.

COLLECTION

People who are involved in these kinds of work are from marginalised and poor families. In many regions, government authorities have also taken responsibility of collecting disposed clothes. Clothes collection percentage, however, is much lower as compared to other products such as paper, plastic and glass. If the collection of products is not done in a right manner and at the right time, then it cannot become a part of a closed loop chain. Hence, there should be more locations to collect used fashion goods.

Collection of waste and used products is not something new. Consumer's habitually throw away products after usage. Traditionally, collection of these products was done by scavengers and rag pickers. Recently, formal models have been built by firms to recover waste and used products. This can be attributed to the increasing awareness about their harmful effects on the environment.In developed countries, it is mainly done by charity organisations, whereas in developing countriesit is still done by local vendors who exchange the used clothes with utensils. People who are involved in these kinds of work are from marginalised and poor families. In many regions, government authorities have also taken responsibility of collecting disposed clothes. Clothes collection percentage, however, is much lower as compared to other products such as paper, plastic and glass. If the collection of products is not done in a right manner and at the right time, then it cannot become a part of a closed loop chain. Hence, there should be more locations to collect used products. It has been highlighted that manufacturer-driven collection is better than third party collection. Participation of voluntary or charity organisations in collection depend on the amount of value they get back from the collection. Value of returns from old product depends upon the con-dition of products donated by consumers. In addition, an incentive-based system can make the collection more efficient. It has been found that collection can be done effectively during promo-tional offers or through third parties. The former ones are better and cost effective. It has been observed that collection through retailers is not profitable, and they were not able to collect a highquantity as compared to third parties. In most of the cases, third parties include charity organisa- tions or non-government agencies that do this on a voluntarily basis. It has been found that collec-tion point near consumers can help the consumer travel less distance to return the product, which makes their task easier. Most of the time consumers prefer to return products near their home or atother convince centres such as gas stations and 24-hour convenience shop. The product can be easily and efficiently collected if there is a system for consumers to return the product. There are many structured collection practices for commercial products as compared to consumer goods. For example, a collection of metal products is more established than that of glass.

SORTING

Sorting is a very complex process and sorting should be done as soon as possible, so that maximum value can be extracted out of the waste. The process of sorting can be combined with processing or even with pre-processing stages. Sorting is a very complex process and sorting should be done as soon as possible, so that maximum value can be extracted out of the waste. The process of sorting can be combined with processing or even with pre-processing stages. Sorting of clothes is a very subjective process and requires a lot of standardisation. This can be done in two stages; at the first stage, waste and valuable should be differentiated. At the second stage, usable clothing products can be sorted as per type or style. The waste can be decomposed into the fibre through recycling process. Owing to subjective nature, the destination of the collected products totally depends upon the skill of persons involved in sorting process. On the basis of the sorters judgement of the waste can be used as second-hand products or converted into rags or wipers for cleaning purpose. In most of the cases, sorting is done manually. Higher quality products are sold in the local second-hand shops, while inferior quality products are shipped to East Europe, Asia and Africa. The products which cannot be reused are moved to the energy generation units for incineration. Efforts taken during initial stage such as elementary sorting at collection point can reduce waste. Proper indication on the collection bin can further help the customer to rightfully drop used product.

UPCYCLE OR RECYCLE

UPCYCLE

Up cycling of clothes creates interest in consumers along with increasing the life of the product. Fashion trends for clothes are fast changing, where particular design or style become outdated after a certain time. Hence, it is important to develop an interest for old clothing products. This can be done by redesigning outdated fashion products
et al., 2015). The redesigning will reduce dependence on natural resources and enhance reuseof items by increasing their aesthetic value. Different used products such ashospital textiles,work wear, defence uniforms and vintage items can be used to redesign new products.
Up cycling is an effort to achieve better or same functionality of the product by minimal consumption of raw material and energy. Up cycling is also a way to give new life to the product that is on the verge of discard

RECYCLE

Textile recycling is the process of recovering fiber, yarn or fabric and reprocessing the textile material into useful products. Textile waste products are gathered from different sources and are then sorted and processed depending on their condition, composition, and resale value. The end result of this processing can vary, from the production of energy and chemicals to new articles of clothing. Fibres from the old fabrics are reclaimed and are used for making new garments. Threads from the fabric is pulled out and used for re-weaving new garments or blankets. Both natural and synthetic fibres can be recycled this way. Incoming textiles are graded into type and colour. Initially the material is shredded into fibres called shoddy. Later based on the end use, other fibres are blended with shoddy. The blended mixture is carded, and spun for weaving or knitting.

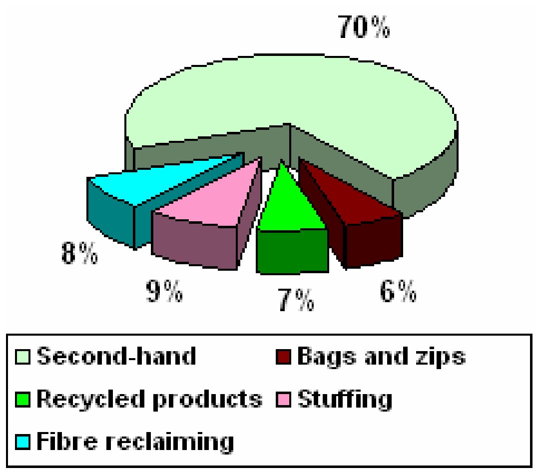
METHADOLOGY

The fabric is first collected from charity, scavengers and rag pickers. Then it is sorted. Sorting is done by is any process of arranging items systematically, and has two common, yet distinct meanings: ordering: arranging sorting items in a sequence ordered by some criterion; categorising: grouping items with similar properties. Then the fabric is crushed and it is turn into fibre. After that the fibre is into yarn. Then the yarn is weaved or knitted into fabric. Thus the process is done.

Waste fabric collect
↓
Identify of size waste
↓
Identify the woven or knit wastes
↓
Big size used for kids T-shirt, Small size for jeans T-shirt
↓
Waste fabric strength test
↓
Prepare fresh T-shirt for stitching
↓
Stitch small size of woven
↓
Stitch in front part of jeans T-shirt
↓
Side part, Pocket stitching with waste in T-shirt woven fabric
↓
Inspection
↓
Ironing
↓
Final product
↓
Packing

ADVANTAGE OF UPCYCLE AND UPCYCLE

Textile recycling and up cycling helps in the protection of environment as well. Recycled clothes reduce the landfill space. Landfill sites pose a threat to the environment and water supplies. When it rains, water drains through the discarded clothes and picks up hazardous chemicals and bleaches. This water turns out to be toxic. Textile made from synthetic fibres will not decompose quickly whereas fabrics like wool releases methane, during decomposition and both fibres ultimately cause global warming. When these fabrics are recycled, this hazard will be reduced to a considerable extent. It saves on consumption of energy, as recycled clothes need not be re-dyed or sourced. Reduced usage of dyes and chemicals minimises their manufacture and ultimately the adverse effects of their manufacture. Of all the old clothing, 70 % is used as second hand clothing, 6 % is waste bags and zips, 8 % is used for reclaiming fibres and making recycled products, 7 % is used as wiping material and the remaining 9 % is shredded and used as stuffing. It is a surprising fact that over 70 percent of the world population uses second hand clothing. Raw materials acquired out of recycled fabrics cost less; making it an attractive feature for manufacturers.



BENIFITS

Pre owned cloth are cleaned by chemicals and washed.
A number of jobs such as dealer, trader, mending, washing, and ironing are generated.
Product life is longer.
Creates interest among consumers.
Less energy and raw material is used.
Avoid landfill.
Generates income.

- pre-owned clothes are cleaner as chemicals are washed away;
- a number of jobs such as dealer, trader, tailor, mending, washing, ironing etc.
- product life is longer;
- creates interest among consumers;

- pre-owned clothes are cleaner as chemicals are washed away;
- a number of jobs such as dealer, trader, tailor, mending, washing, ironing etc.
- pre-owned clothes are cleaner as chemicals are washed away;
- a number of jobs such as dealer, trader, tailor, mending, washing, ironing etc.
- product life is longer;
- creates interest among consumers;

CONCLUTION

It is an amazing fact to know, that clothes that are considered as useless can be creatively used to make something new.

Old clothes can be reused for making cushions, handbags, quilts etc.
Damaged clothing can be used as rags and dusters.
Bright colour fabrics can be used for borders in a lampshade.
Head and wrist bands can be made with fabrics with electrifying colours.
Old garments can be transformed into works of art; like sewing patches, buttons and beads into old garments, ironing graphics, etc.

From the early age of industrial revolution, textile industry is being identified as a major polluter of rivers. Attempts to minimise wastage are now on focus due to increased environmental awareness. Currently, there is an increasing awareness among people regarding waste collection and recycling. Developing a potential market for recycled textiles by buying such recycled products will reduce the wastage going to landfill.

REFERENCE

1. K Caulfield, Discussion paper Sources of Textile waste in Australia, August 13, 2009,
2. Parliament, E. U., & Parliament, U. K. (2008). From Wikipedia, Population, 20, 1.
3. Md Abdur Rahman, personal communication, over telephone, September 8, 2015.
4. Alkaya, E. and Demirer, G.N. (2014), “Sustainable textile production: a case study from a woven fabric manufacturing mill in Turkey”, Journal of Cleaner Production, Vol. 65, pp. 595-603.
5. Braungart, M. (2006), “Cradle to cradle”, Textiles Magazine, Vol. 33 No. 1, pp. 8-11.
6. Chen, H.L. and Burns, L.D. (2006), “Environmental analysis of textile products”, Clothing and Textiles
7. Research Journal, Vol. 24 No. 3, pp. 248-261.
8. Das, D. and Dutta, P. (2015), “Design and analysis of a closed-loop supply chain in presence of promotional offer”, International Journal of Production Research, Vol. 53No. 1, pp. 141-165.
9. Hawley, J.M. (2006), “Digging for diamonds: a conceptual framework for understanding reclaimed textile products”, Clothing and Textiles Research Journal, Vol. 24 No. 3, pp. 262-275.
10. Jayaraman, V., Ross, A.D. and Agarwal, A. (2008), “Role of information technology and collaboration in reverse logistics supply chains”, International Journal of Logistics Research and Applications,Vol. 11 No. 6, pp. 409-425.
11. Syfur Rahman, personal communication, over telephone, September 8. 2015.

REUSE OF SALTS RELEASED FROM TEXTILE EFFLUENTS

Sharinaa Juhee K, Textile Technology, Bannari Amman Institute of technology, Tamilnadu, India. Dharani M, Textile Technology, Bannari Amman Institute of technology, Tamilnadu, India. Vishnupriya S, Textile Technology, Bannari Amman Institute of technology, Tamilnadu, India.

ABSTRACT

The dye manufacturing industry represents a relatively small part of the overall chemical industries. The world- wide production of dyes is nearly 800,000 tons per year. Synthetic dyes are valuable in numerous industries such as textile, paper printing, food, pharmaceutical, leather and cosmetics. It is classified into acid, reactive, direct, basic, vat, disperse, metal complex, mordant and sulphur dyes. There are more than 10,000 dyes used in textile Manufacturing alone nearly 70% being azo dyes which is complex in structure and synthetic in nature. Textile industries produce large amounts of liquid wastes. These textile effluents contain organic and inorganic compounds. During the dyeing processes, not all dyes that are applied to the fabrics are fixed on them and there is always a portion of these dyes that remains unfixed to the fabrics and gets washed out. These unfixed dyes are found to be in high concentrations in textile effluents. The amount of water consumed and released also varies depending on the type of fabrics produced. Almost 0.08 – 0.15 m3 of water is used to produce 1 kg of fabrics. It is estimated that about 1,000 – 3,000 m3 of water is let out after processing about 12 – 20 tons of textiles per day. These effluents are rich in dyes and chemicals, some of which are non-biodegradable and carcinogenic and pose a major threat to health and the environment.

Keyword: *Dye, Process, Unfixed, Salts.*

1. INTRODUCTION

Industrial wastewater treatment is any process that separates and removes contaminants from industrial process waters, or effluent. These contaminants include oils, dissolved heavy metals, suspended solids and organic compounds.

2. TEXTILE EFFLUENTS

As textile industry is one of the largest industries in the world and different fibres such as cotton, silk, wool as well as synthetic fibres are all pre-treated, processed, coloured and after treated using large amounts of water and a variety of chemicals, there is a need to understand the chemistry of the textile effluents very well. Major pollutants in textile waste-waters are high suspended solids, chemical oxygen demand, heat, colour, acidity, and other soluble substances.

2.1 List of harmful Chemicals used in Textile Industry

- Detergents mainly nonyl-phenol ethylates-generates toxic metabolites which is poisonous to fish

- Stain remover: Carry solvents like CCl_4can cause ozone depletion

- Oxalic acid used for rust stain removal: are toxic to aquatic organisms and also boots COD

- Sequestering agents: Polyphosphates like Trisodium polyphosphate and sodium hexametaphosphate: are
banned chemicals

- Printing gums: preservatives like pentachlorophenol can cause dermatitis, liver and kidney damage are all
banned chemicals

- Fixing agent: Formaldehyde and Benzidine are banned internationally

- Bleaching: Chlorine bleaching caused itching and is harmful

- Dyeing: Azodyes which release amines are banned because they are known carcinogens

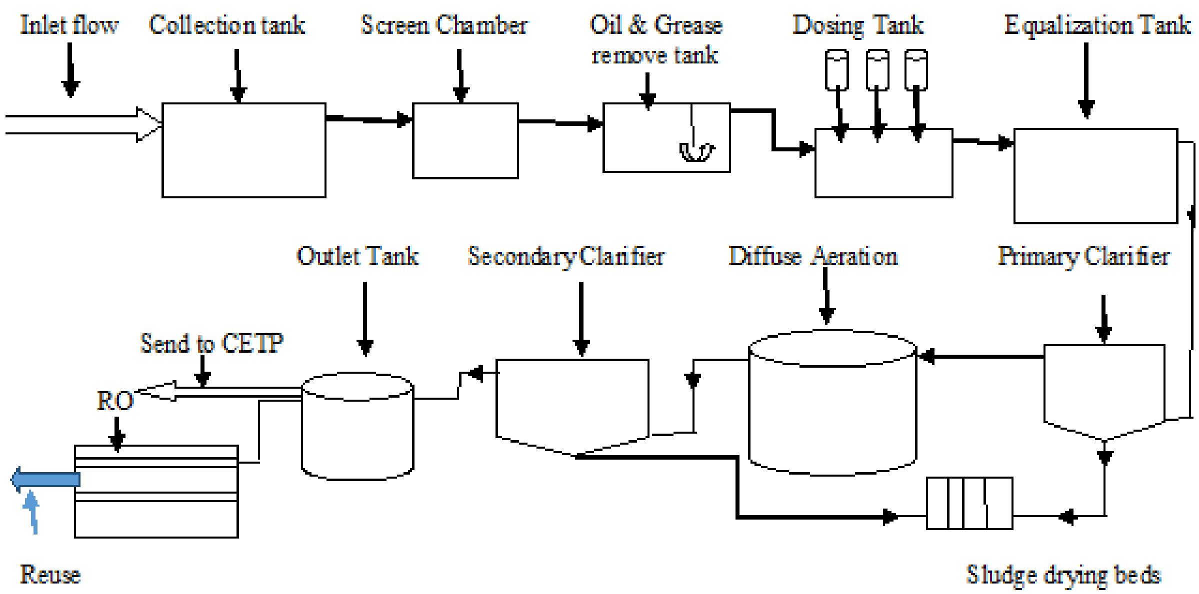


Fig 1., Textile Effluent plan

2.2 Standard and allowed for aqueous effluent discharge

Parameters	**Standard/Allowed**
Temperature	Below 42°C at point of discharge
pH	Between 6-9 at the point of discharge
BOD	30mg/litre to surface water
COD	50mg/litre to surface water consented to sewer
Suspended solids	20mg/litre to surface water consented to sewer
Colour	Below 1 ppm consented
Toxic substances	Restricted by legislation
Volume and flow	Basis for the charging consented

3. TECHNOLOGIES APPLICABLE TO WASTE WATER TREATMENT

3.1 Physical

- Filtration
- Sedimentation
- Gravity separation
- Centrifugation
- Floatation
- Equalisation
- Precipitation
- Adsorption

3.2 Chemical

- Neutralisation
- Oxidation
- Reduction
- Hydrolysis
- Ozonolysis
- Ionization

3.3 Biological

- Aerobic digestion
- Anaerobic digestion
- Percolating filters
- Bioscrubbers
- Biofiltration

4. OBJECTIVES OF THE TREATMENT PLANTS

- Designed to run with minimal of intervention
- Color removal achieved using Dissolved Air Floatation (DAF)
- Final polishing of discharge water with sand filter
- Changes in future BOD limits may be possible
- Allow operations to continue in the event of break down
- Prevent effluent from polluting the local river and meets consents for discharge to sewage.

Fig 2., ETP process

4.1 Process flow of a dyeing unit

4.1.1. Grey Fabric reverse machine

The inward grey circular knit fabrics are reversing for convenient processing qualities

- i) levelness from patchy dyeing
- ii) Free from handling stains

4.1.2. Textile dyeing soft flow machines

The prepared grey cloth from the reversing unit undergoes: loading into the loading flow machines for wet processing

(1) Ready for dyeing by peroxide bleaching thereby to improve the absorbency which is most important role for wet processing also called as Pre-treatment process or scouring.

(2) After completion of pre-treatment process then to start dyeing process with the predicted colour recipe from lab along with appropriate pH and temperature control with the catalyst or electrolyte like NaCl or Na_2SO_4.

After that, the fabric undergoes the chemical cleaning like souring, soaping and finally finished with Dye fuming agent and textile softener for improving colour fastness and feeling of fabric.

5. PADDER/SQUEEZER:

To Squeeze the wet-out fabric by using the mangling pressure of the padder for drying purpose.

6. RELAX DRIER MACHINE:

The circular knit fabric with thoroughly squeezed then move to mechanical drier for driving in relaxed manner, otherwise we have to choose the drying by naturally in drying shed. This may be elected by the quality or vendor choice.

Finally, the dried goods move outside for Compaction for shrinkage Control and then hand over to garment unit for Hosiery Garments.

Fig 3., Effluent treatment plant

7. EFFLUENT TREATEMENT:

The effluent produced during this process are pumped into an effluent treatment plant

This solution is used for the Textile dyeing soft flow machines as electrolyte.

8. CONCLUSION

Chemical recovery system is an integral part of textile industry and the efficiency of chemical recovery plays and important role in economics. The continued increase in the cost of chemicals, energy and water makes their recovery more important today than it was 35 years ago when ultrafiltration and hyper filtration were first introduced to the textile industry. While the filtration techniques have been used at only a few installations, these plants have been able to save enough to pay for the recovery process in one to two years. One key to having a successful recovery operation is to have good automatic control of the process. This can drastically improve the economics of the textile process as well as minimising the cost of the recovery system.

9. REFERENCES :

1. https://www.sciencedirect.com/science/article/abs/pii/S0376738805004709

2. https://www.sciencedirect.com/science/article/abs/pii/S0011916410002146

3. https://sci-hub.hkvisa.net/10.1016/s0273-1223(99)00285-1

4. https://sci-hub.hkvisa.net/10.1016/j.jece.2018.04.008

BANANA FIBRE

AMRIT S Bannari Amman Institute of Technology,Tamilnadu,India
GOKULNATHAN R V Bannari Amman Institute of Technology ,Tamilnadu,India
SAMYUKTHA R P Bannari Amman Institute of Technology,Tamilnadu,India
THARANI R Bannari Amman Institute of Technology ,Tamilnadu,India
VIJAYARAM E Bannari Amman Institute of Technology .Tamilnadu,India

ABSTRACT

The world that is advancing at an extremely high speed, the uneasiness of the climate contaminations expanding has tip the need for new eco-accommodating materials, analysts have begun to foster feasible materials that are sustainable as well as biodegradable in nature. The normal filaments enjoy specific benefits above engineered fiber materials, they are lower in cost and thickness with practically identical strength. In the current review, banana fiber is built up in the epoxy lattice and a composite material is ready and effect strength of these composites are assessed. This composite examples are ready by Wet lay-up technique with fluctuating banana strands volume rates by (10%, 20%, 30%, 40%) and by changing the filaments direction in the epoxy framework by (00 ,900 , woven Bi- directional). The outcomes shows that there is slow expansion in the effect strength of the epoxy for 900 banana fiber direction, the ideal outcomes were found for 40% banana fiber and 60% epoxy pitch, with respect to woven BD there was an expansion in the effect strength up to 20% banana fiber support, concerning 00 direction the strength builds up to 10% fiber support over this there was an uncommon decrease in the effect strength. Watchwords: Banana Fiber, Epoxy Resin, Volume percent, Fiber Orientation, Impact Strength. It additionally manages the attributes of the banana pseudo-stem fiber, for example, morphological, physical and mechanical, toughness, degradability, warm, compound, and antibacterial properties. A few possible utilizations of this fiber are additionally referenced, for example, the utilization of this fiber to manufacture rope, place mats, paper cardboard, string, tea packs, great material materials, retentive, polymer/fiber composites, and so forth..

Keyword : - Biocomposite, Banana fibre, Mechanical properties, Biodegradable plastics, pseudo-stem.

1. INTRODUCTION

In India, banana is plentifully developed. Banana fiber can be effortlessly acquired from the pseudo stem after the leafy foods are used. Clearly natural materials fulfil basic necessities like contamination counteraction and cost minimisation. The utilisation of agrarian side-effects, which are earth companions, for example, rice husk, coconut strands, sisal and banana limiting energy utilisation, monitoring non-sustainable normal assets, decreasing contamination and keeping a solid climate . Banana is the centre of these materials that satisfies these benefits. Normal strands have become well known support material for fiber built up polymer composite turns of events. These support can supplant the ordinary fiber, like glass as an elective material. Other than these regular filaments, banana is one more fascinating material considered as plant fiber and has an incredible potential to be utilised in polymer composite industry, usability.

1.1 As a ecological material

Banana is one of the ecological materials for which it has many distinct characteristics such as:

- Unbreakable, upkeep free, sturdy
- Fire retardant and water safe
- UV, corrosive and salt safe
- Less rough
- Less expensive
- Biodegradable
- Renewable
- Eco-accommodating

This study utilize the banana blended in with polymer in which to work on the holding among fiber and grid. In particular, the explanation of the review to utilize banana fiber is because of theyhave low thickness and high mechanical strength as well as unrefined substance cost makes it monetarily suitable. The creation and property assessment of Banana-Hemp-Glass fiber built up composites. Ductile, flexural and Impact Testing of created examples were completed. Banana with Glass fiber composite has most noteworthy rigidity of 39.5MPa followed by Hemp with Glassfiber composite with 37.5MPa and (Banana + Hemp + Glass fiber) composite has 28 MPa. Flexural load for everything is close to 0.5 KN. Sway strength of (Banana + Glass Fiber) composite was 5.5 J then again (Banana + Hemp + Glass fiber) composite has 8.3 J [1].

The exploratory investigation of bamboo utilizing banana and material fiber built up polymeric composites. Bamboo composites, (Bamboo + Banana) mixture composite and (Bamboo + Linen) Hybrid composite were manufactured. Sway Test (Izod/Charpy), FTIR test, Rockwell Hardness Test were completed. Bamboo composite has Impact strength of 2J yet (Bamboo + Banana) composite has 4J of Impact Strength. (Bamboo + Linen) composite has Impact strength of 3J. Hardness of Bamboo composite, (Bamboo + Banana) composite and (Bamboo + Linen) composites were 20RHN, 35RHN and 40RHN respectively.

2. EXTRACTION OF BANANA FIBRE

The completely developed plant is utilized to separate the strands. Banana fiber is separated from Banana plant. Brown-green skin is discarded holding the white piece which will be handled into tied strands. The filaments are removed utilizing fiber extraction machine. The strip is braced between the wood board and blade and hand-got through, to eliminate resinous material. When dried, the filaments are prepared for tying. A lot of filaments are mounted or clasped on a stick to work with isolation. Every fiber is isolated by sizes and assembled likewise. To hitch the fiber, every fiber is isolated and tied to the furthest limit of another fiber physically. The detachment and hitching is rehashed until lots of unknotted filaments are done to frame a long persistent strand. The filaments were washed with sodium hydroxide before any treatment. The sodium hydroxide opens up the cellulose structure permitting the hydroxyl gatherings to prepare for the responses. During washing with sodium hydroxide, the wax, fingernail skin layer and part of lignin and hemicellulose were eliminated. The significant response happens between the hydroxyl gatherings of cellulose and the compound utilized for the surface treatment. The fiber treatment brought about the diminishing of the properties of the fiber, yet expansion in the strength of the example all in all.

Figure -1: BANANA FIBRE

2.1. CHEMICAL AND MECHANICAL PROPERTIES OF BANANA FIBRE

A. Chemical Composition of Banana fiber –

- 1) Cellulose – 60 to 65%
- 2) Hemicellulose – 5 to 19 %
- 3) Lignin – 5 to 10%
- 4) Pectin–2to3%

B. Mechanical Properties of Banana Fiber –

- 1) Ultimate Tensile Strength – 54 MPa
- 2) % of Elongation – 4 to 6
- 3) Young's Modulus – 3.48 GPa.

3. SAMPLE PREPARATION

Our various examples of standard aspects according to ASTM are ready. Two for elastic testing and two for pressure testing. Banana textures were set in a form estimating 300 mm × 300 mm × 4 mm. The gas pedal was blended in with pitch and the air bubbles were taken out by degassing. Impetus was added and filled the form. The form was shut and, an extra weight of 45 Kg was set previously. The composites was permitted remedy for 24 hrs. Followed by starting relieving, the examples were post restored in a stove at 50°C for 60 minutes. Composites with fiber content of 30 wt % were manufactured. The composites were created by hand lay-up.

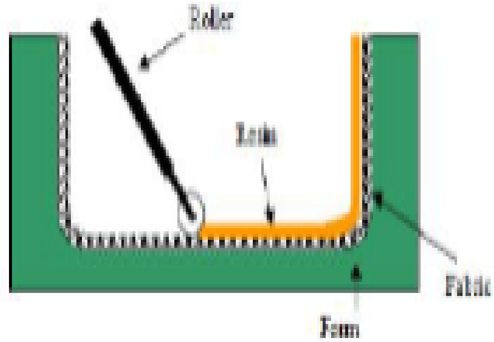


Figure -2:Hand lay up process

3.1 Testing

A. Tensile Test i

Tensile test is used to measure the force required to break a material and the extent to which the specimen elongates to breaking point. Tensile test produces a stress-strain diagram which is used to specify a material or design parts to withstand applications of force and quality control check. Tensile test is used to determine the tensile strength of a material with unit as N/mm2 or MPa.

The testing is done using UTM to measure the force required to break a polymer composite specimen and the extent to which the specimen stretches or elongates to that breaking point. Testing is done in accordance with the ASTM D638 procedure at a cross head speed of 5mm/min.

B. Flexural Test

Flexural strength is defined as a materials ability to resist deformation under load. It is a 3-point bend test, which generally promotes failure by inter-laminar shear. This test is conducted as per ASTM D790 standard using UTM with the cross head speed of 5mm/min. Flexural MR is about 10 to 20 precent of compressive strength depending on the, size, volume and type of coarse aggregate used. Anyway the best correlation for specific materials is obtained by laboratory tests for given materials and mix design. The maximum fiber stress at failure on the tension side of a flexural specimen is considered the flexural strength of the material.

4. RESULT

- Tensile Test

- Tensile Test

TABLE I. TENSILE TEST :

No.	Parameter	Value
1	Maximum Load (N)	872.82
2	Displacement (mm)	3.5
3	Strain	0.07
4	Tensile Strength (MPa)	22.38

No.	Parameter	Value
1	Breaking Load (N)	60
2	Max. Displacement (mm)	1.3
3	Ultimate Strength (MPa)	10

5. CONCLUSION

- Tensile and Flexural behaviour of Banana fiber reinforced composite is studied.
- Alkali Treated Banana fiber has improved properties.
- For 30% by weight of banana fiber epoxy resin composite, we can get material of tensile strength of 22.38 MPa.
- D. Such biocomposite are Eco-Friendly and can be used as a replacement of harmful plastics in interior parts of Passenger Car, Decorative Parts and for furniture purpose.

6. REFERENCES

1. R. Bhoopathia, M. Ramesha, C. Deepa, 'Fabrication and Property Evaluation of Banana-Hemp-Glass Fiber Reinforced Composites', Procedia Engineering, 2014, p.2032 – 2041.
2. Ramachandran M, Sahas Bansal, Pramod Raichurkar, 'Experimental study of bamboo using banana and linen fibre reinforced polymeric composites', Perspectives in Science ,2016.
   Nongman, Baharin, Abu Bakar, 'The Effect of Banana Leaves Lamination on the Mechanical Properties of Particle Board Panel', Procedia Chemistry, 19 2016 ,p.943 – 948.
3. K. Senthil Kumar, I. Siva, N. Rajini, J.T. Winowlin Jappes , S.C. Amico, 'Layering pattern effects on vibrational behavior of coconut sheath/ banana fiber hybrid composites', Materials and Design 90 (2016) 795–803, p. 109.
4. Toshihiko HOJO, Zhilan XU, Yuqiu YANG, Hiroyuki HAMADA, 'Tensile Properties of Bamboo, Jute and Kenaf Mat-Reinforced Composite', Energy Procedia ,56 ,2014 , p.72 – 79.

UPCYCLING OF PLASTIC TRASH INTO FASHION PRODUCTS

Srinidhi.J, Fashion Technology, PSG College of technology, Tamil nadu, India

ABSTRACT

Plastic pollution is most visible in developing Asian and African nations, where garbage collection systems are often inefficient or nonexistent. But the developed world, especially in countries with low recycling rates, also has trouble properly collecting discarded plastics. The amount of plastic waste produced increased during COVID-19 due to increased demand for protective equipment and packaging materials. Higher amounts of plastic ended up in the ocean, especially plastic from medical waste and masks. Recycling involves the destruction of waste in order to create something new, whereas upcycling takes waste and creates something new from it in its current state. While recycling is practical, upcycling is highly creative and can involve a wide variety of techniques and materials to create the finished product. Turning plastic waste into an art form by upcycling non- biodegradable and non-recyclable plastic into fabric.

Keyword: Plastic pollution, COVID-19, Recycling, Upcycling

1. INTRODUCTION :

disposable plastic products overwhelms the world's ability to deal with them. Plastic pollution is most visible in developing Asian and African nations, where garbage collection systems are often inefficient or nonexistent. But

treaty negotiated by the United Nations. The mass of plastic detritus present in the oceans is so enormous that it is called the "7th continent". At this rate, there will be more plastic than fish in the oceans by 2050.

Plastic pollution can afflict land, waterways and oceans. It is estimated that 1.1 to 8.8 million tons of plastic waste enters the ocean from coastal communities each year. It is estimated that there is a stock of 86 million tons of plastic marine debris in the worldwide ocean as of the end of 2013, with an assumption that 1.4% of global plastics produced from 1950 to 2013 has entered the ocean and has accumulated there. Some researchers suggest that by 2050 there could be more plastic than fish in the oceans by weight.

Living organisms, particularly marine animals, can be harmed either by mechanical effects such as entanglement in plastic objects, problems related to ingestion of plastic waste, or through exposure to chemicals within plastics that interfere with their physiology . Degraded plastic waste can directly affect humans through both direct consumption (i.e. in tap water), indirect consumption (by eating animals), and disruption of various hormonal mechanisms.

As of 2019, 368 million tons of plastic is produced each year; 51% in Asia, where China is the world's largest producer. From the 1950s up to 2018, an estimated 6.3 billion tons of plastic has been produced worldwide, of which an estimated 9% has been recycled and another 12% has been incinerated. This large amount of plastic waste enters the environment and causes problems throughout the ecosystem; for example studies suggest that the bodies of 90% of seabirds contain plastic debris. In some areas there have been significant efforts to reduce the prominence of free range plastic pollution, through reducing plastic consumption, litter cleanup, and promoting plastic recycling As of 2020, the global mass of produced plastic exceeds the biomass of all land and marine animals combined. A May 2019 amendment to the Basel Convention regulates the exportation/importation of plastic waste, largely intended to prevent the shipping of plastic waste from developed countries to developing countries. Nearly all countries have joined this agreement. On 2 March 2022 in Nairobi, 175 countries pledged to create a legally binding agreement by the end of the year 2024 with a goal to end plastic pollution.

The amount of plastic waste produced increased during COVID-19due to increased demand for protective equipment and packaging materials. Higher amounts of plastic ended up in the ocean, especially plastic from medical waste and masks. Several news reports point to a plastic industry trying to take advantage of the health concerns and desire for disposable masks and packaging to increase production of single use plastic. So the only way to reduce plastic pollution by means of ‘recycling ’and ‘upcycling’. Both are sometimes used interchangeably but the two processes are actually unrelated and very different from each other.

1.1 RECYCLING:

Recycling is an industrial process whereby objects are transformed into new materials and then used to make either the same product again (such as a can for drinks) or another product (such as something madefrom plastic). Recyclables are collected either from homes, commercial properties, industrial properties, or council-run recycling centers and taken to a recycling plant. Here, the recyclables are sorted into typesand then broken down and used to create new materials. Some recyclables are 100 per cent recyclable (i.e. aluminum and glass) and some recyclables can be recycled but not 100 per cent because they becomeweaker through the recycling process (i.e. plastic and paper). In the case of plastic and paper, recycled materials are mixed with fresh materials in order to create new products Sometimes referred to as ‘creative recycling’, upcycling is entirely different from recycling The activity of making new furniture, objects, etc. out of old or used things or waste material”So, upcycling has nothing to do with the industrial process of recycling. Instead, upcycling involves taking an item that would otherwise be waste and improving it in some way to makeit useful again. A commonly up-cycled item is old and unfashionable furniture. A cabinet or chest of drawers can be quickly and successfully transformed through a process of sanding, painting and the addition of new handles. Likewise, a lamp can be improved with a new lampshade perhaps from another lamp. However, up-cycling isn’t just transforming objects into better versions of themselves; often, objects get repurposed to offer a different function entirely.

1.2 UPCYCLING

Recycling is an industrial process whereby objects are transformed into new materials and then used to make either the same product again (such as a can for drinks) or another product (such as something made from plastic). Recyclables are collected either from homes, commercial properties, industrial properties, or council-run recycling centers and taken to a recycling plant. Here, the recyclables are sorted into types and then broken down and used to create new materials. Some recyclables are 100 per cent recyclable (i.e. aluminum and glass) and some recyclables can be recycled but not 100 per cent because they become weaker through the recycling process (i.e. plastic and paper). In the case of plastic and paper, recycled materials are mixed with fresh materials in order to create new products

2. UPCYCLING OF PLASTIC COVERS

Upcycling takes waste and creates something new from it in its current state. When upcycling, the original form is retained and the object is recognizable. In this sense, the upcycled object is a kind of tribute to the object it used to be. While recycling is practical, upcycling is highly creative and can involve a wide variety of techniques and materials to create the finished product. These single use plastic products are everywhere. For many of us, they have become an integral part of our daily life.

We need to slow the flow of plastic at its source, but we also need to improve the waywe our plastic waste. Right now, a lot of it ends up in the environment.

The problem is with smaller plastics - thin carry bags and wrappers - often left to accumulate on roadsides, in landfills and garbage dumps, as they are perceived as notworth the effort. So turning plastic waste into an art form by upcycling non-biode- gradable and non-recyclable plastic into fabric. The plastic covers are collected and segregated according to the colors the cut into thin straps (Fig.1) and can be achievedby spinning the plastic covers using handlooms (Fig.2) and traditional spinning wheelfor that make handbags, accessories, and home decor products.

Fig 1.Plastic straps

Fig 2. Weaving plastic straps as weft

4. CONCLUSIONS

Today, we produce about 300 million tons of plastic waste every year. That's nearly equivalent to the weight of the entire human population. Plastics also put a big chemical burden on the environment. The Oakland Recycling Association commissioned an analysis of the toxic chemical burden that relied heavily on information from EPA data, especially the Toxics Release Inventory. The information available showed that most toxic releases went into the air, and the plastics industry contributed 14% of the national total. Of the top ten manufacturers ranked by total releases, seven made plastic foam products. Significant releases of toxic chemicals included: Trichloroethane, acetone, methylene chloride, methyl ethyl ketone, styrene, toluene, benzene, 1, 1, 1 trichloroethane. Other major emissions from plastic production processes include sulfur oxides, nitrous oxides, methanol, ethylene oxide, and volatile organic compounds. As ethylene is polymerized, the reactive mixture is scrubbed with dilute aqueous caustic solutions that become high-volume pollutants. The refining process uses waste-minimization methods, but point-source air emissions are still high because of inherent difficulties in handling large flows of pressurized gases. Manufacturing PET resin generates more toxic emissions (nickel, ethylbenzene, ethylene oxide, benzene) than manufacturing glass. Producing a 16 oz. PET bottle generates more than 100 times the toxic emissions to air and water than making the same size bottle out of glass.

A plastic bottle, for example, can be transformed into all manner of different things a face visor, a plant pot, a watering can, fairy lights, and a bird feeder are just a few ideas. The only limits to upcycling are your imagination and your skills. However, if you need to do something that's not in your skillset, you can either give it a go and learn a new skill or ask someone else to do it for you. Recycling involves the destruction of waste in order to create something new.

5. REFERENCES

1. https://ecologycenter.org/plastics/ptf/report3/
2. https://www.unep.org/interactives/beat-plastic-pollution/
3. https://www.forgerecycling.co.uk/blog/what-is-the-difference-between-recycling-and-upcycling/#:~:text=The%20differences%20between%20recycling%20and%20upcycling&text=Recycling%20involv es%20the%20destruction%20of,it%20in%20its%20current%20state
4. https://yourstory.com/socialstory/2019/06/upcycling-plastic-waste-india-aarohana-ecosocial/amp

MAKING OF COTTON BAGS USING STENCIL PRINTING WITH ACRYLIC PAINTS

VARSHANI S, Department of textile technology, Bannari Amman Institute of technology, Sathyamangalam, Erode, Tamilnadu, India.
KANISHKA K, Department of textile technology, Bannari Amman Institute of technology, Sathyamangalam, Erode, Tamilnadu, India.
VISHNU PRIYA R, Department of textile technology, Bannari Amman Institute of technology, Sathyamangalam, Erode, Tamilnadu, India.

ABSTRACT

Stencil printing functionality is turning into greater vital because the variety of element sizes assembled on a single board increases. Coupled with increased compound density, solder paste sticking to the aperture sidewalls and backside of the stencil can cause inadequate solder paste deposits and solder bridging. Yield development calls for multiplied attention on stencil technology, printer functionality, and solders paste functionally and under stencil cleaning. An approach of moving a sample via way of means of brushing, spraying, or squeeging ink or paint thru the open regions of a stencil reduces from skinny steel or cardboard. Fabric paint to apply for stenciling, acrylic paint additionally may be implemented to cloth and is regularly much less costly and is derived in greater hues than cloth paint. As for the stencil, the sorts who have a mild adhesive best are perfect to create a stencil with easy lines. This paper explains about the making of cotton bags using stencil printing with acrylic paints.

Key words: Stencil Printing, Acrylic paint, cotton bags etc.,

1. INTRODUCTION:

It is one of the oldest approaches of printing. In it colour is implemented to the cloth through brushing or spraying the interstices of a pattern cut out from a flat sheet of metallic or water resistant paper or plastic sheet or laminated sheet. A stencil is ready through reducing out a layout from a flat sheet of paper, metallic, or plastic. In stencil printing, the layout components now no longer meant to take colour are blanketed with paper, woven cloth, or metallic even as the dye is handed over the surface. Separate sample reduce for every colour, colour is implemented in thick paste or sprayed on with an air gun.

Stenciling is a brand-new fashion withinside the painting. Stencils are styles or reduce-outs which might be getting used to offer the layout to partitions or surfaces. Use stencils again and again i.e. in a series so one can create larger designs from one stencil. Make out a stencil with the assist of freezer paper and craft knives. It is one of the resist types of fabric printing methods; the face up to being the stencil itself which prevents the paint from spreading beyond the margin of the cutout sample. Stencils may be made from heavy waxed paper, cardboard or metallic.There are essentially forms of stenciling done; positive and negative. In case of poor stenciling, the paint is implemented across the out of doors of a sample and in nice stenciling, the dye is implemented to the internal of the reduce out openings.

1.1 TIPS FOR STENCILLING:.

- When stencilling on a textured surface, use a stencil with a extra natural appearance as opposed to crisper traces. 3. Use a stencil brush to get crisper traces and to make certain much less bleeding a blotting to your design.

- If stencilling on glass, ensure to scrub the floor with warm, soapy water earlier than starting.

2. STEPS CARRIED OUT IN STENCIL PRINTING :

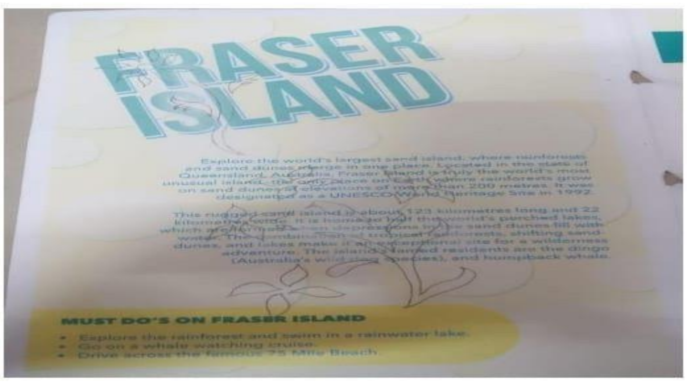
- Find or create a design before starting, we would suggest that you find a design that you love. Whether you’re making a homemade Card, intricate patterns for your wall, or designing your own furniture, it is very important to move forward with something you like. And transfer your design.

- Cut out your stencil design. Use a precision knife or a vinyl cutter to cut out your design. Make sure the knife is sharp to prevent accidentally ripping the stencil material.

1. Use much less paint rather than extra, this can purpose much less bleeding and make certain a crisper stencil. Many thin layers will provide tons purifier effects than thick layers.

2. Using a transient spray adhesive will assist maintain your stencil in place. Be certain to now no longer use an excessive amount of so it doesn't get caught to the floor and paint you're stenciling with.

5. When stencilling on wood, sand the surface with a great grit after which use a dampened paper towel to eliminate sawdust



- Below are some sure-fire tips to help you achieve the best results when stenciling. Use thicker paint. Thick paint is less likely to flow under the stencil creating bleed through (i.e., paint creeping under the design or letters in your stencil).

- Adhere your stencil to the stencil to the surface before painting so it does not move while you're in the process of painting for best results apply a spray adhesive on the bottom of your stencil and then press it in place. The spray adhesive will securely hold the stencil in place while also preventing bleed through. When finished painting, the stencil held in place with spray adhesive can easily be removed.

- Use a stencil brush or a sponge rather than a paint brush, a stencil brush is firmly packed with short bristles. Lightly dab the paint onto the stencil. Go up and down with your brush or sponge. If rubbing back and forth like painting, it will likely go under the stencil making a mess

- Apply multiple light coats of paint. If using excessive paint, the paint might flow under the stencil. Let each layer of paint dry before you paint another one on top of it. Easy strokes are the way to go.

- Clean your stencil after you're done so that you can use it again whenever you want to.

- Keep your stencil on a completely flat surface when painting. Test your stencil and paint on a practice piece
before attempting on the real material.

2.1 PRE-WASH THE FABRIC OR NOT?

This is a hot debate in the sewing circles. There is no absolute answer because everybody has a different opinion. Fabric shrinks, especially cotton. Depends on the quality of the fabric. Fabric can shrink unevenly. Removes any manufacturing chemicals and protective agents.

2.1.1 REASONS TO SKIP PRE-WASHING THE FABRIC:

- Fabric shrinkage won't impact the finished project.

- Unwashed fabrics are easier to work with.

- It takes too much time.

REASONS TO PRE-WASH FABRIC:

- The decision is up to you, but we're on team pre-wash.
  The advantages of stencil printing are:

(i) Wet-on dry prints effect possible.

(ii) Better penetration of colour than roller prints due to heavier lay-on of color.

(iii) Acceptable to all woven & knitted fabrics.

(iv)(Rapid preparation of screens and rapid pattern changes are possible.

3. ACRYLIC AND LATEX PAINTS:
The brands which are suitable for acrylic and latex paints are:

- Plaid FolkArt Acrylic Paint

- Martha Stewart Craft Paint

- DecoArt Crafter’s Acrylic

- Delta Ceramcoat Acrylic

Acrylic and Latex paints have a consistency that facilitates to make sure your paint will now no longer run below the stencil. Acrylic paint dries speedy in comparison to different paints. It takes much less time to your paint to seep beneathneath the stencil. Acrylic paint – such paint dries up faster, permitting you to feature many layers or observe crisp lines; acrylic paint is higher for smaller canvas surfaces (inclusive of tote bags), however shadeation mixing is harder. Acrylic paint additionally seems darker while it dries on canvas, so that you must use shadeation carefully. for stencilling, acrylic paint additionally may be implemented to cloth and is regularly much less highly-priced and is derived in extra colorations than cloth paint. As for the stencil, the types which have a moderate adhesive first-class are best to create a stencil with smooth lines.

In addition, acrylic paint is available in an excessive viscosity and body, super for thick, Van Gogh-style paintings, or thin, liquid acrylic paint, to apply for dreamy, watery landscapes and decorations.

Oil paint – such paints take longer to dry, however assist you to combination them properly and mix/transition the colours less complicated and better. Oil portray wishes a few canvas preparation, because the oils can degrade the fabric over time. The top element is that oil paints hold their authentic colours after they dry.

Watercolours – this sort of paint isn't always extraordinarily popular, due to the fact watercolours fade in time and use up in case you wash the tote bag, however they assist you to create dreamy atmospheres and summary artwork that don't want crisp, sharp lines.

4. CONCLUSION:

Creating and the usage of stencils now no longer best demanding situations an man or woman however additionally offers them excellent pleasure after the task is completed. Besides being a splendid efficient pass time, stenciling can instill inventive features in an man or woman at a totally younger age. Stencilling produces an picture or sample via way of means of making use of pigment to a surface below an intermediate object with designed gaps in it which create the sample or picture via way of means of best permitting the pigment to attain a few elements of the surface.

5. REFERENCES:

1. https://www.textiletrick.com/2020/08/Stencil-printing-its-advantages-and-disadvantages.html?m=1

2. http://ideaflows.net/index.php?page=stencil- printing#:~:text=Definition%3A%20colour%20is%20applied%20to,is%20drawn%20on%20selected%20she et

3. https://www.colourdrive.in/diy/guide-stenciling-various-types-stencils/

4. https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.createforless.com/buying- guides/crafts/stenciling.aspx&ved=2ahUKEwiM66ei3Y33AhVPyDgGHaqtCo0QFnoECDcQAQ&usg=AOvV aw2Ysw6mKJWDHLhV8RGJdB0T

5. https://www.stencilrevolution.com

6. https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.britannica.com/art/stenciling&ved= 2ahUKEwibl-2p4I33AhX-wTgGHe2XAnYQFnoECDUQAQ&usg=AOvVaw1kKBUiuegC_Us0s9Y0rZSY

7. https://www.google.com/url?sa=t&source=web&rct=j&url=http://www.historyofpencils.com/drawing- tools/stencil/&ved=2ahUKEwibl-2p4I33AhX-wTgGHe2XAnYQFnoECBAQAQ&usg=AOvVaw1vFG6- OpAgtjA6A4pUw7GF

NATURAL DYEING – PILLOW COVER

GAYATHRI V-TEXTILE TECHNOLOGY-BANNARI AMMAN INSTITUTE OF TECHNOLOGY- TAMILNADU-INDIA
ANAND M–TEXTILE TECHNOLOGY-BANNARI AMMAN INSTITUTE OF TECHNOLOGY- TAMILNADU-INDIA

ABSTRACT

The development of natural dyes took place at the same time after the technique of weaving had been discovered in about 5000 BC. In India, the use of natural dyes for dyeing, painting and printing goes to the prehistoric periods. Ajanta paintings, dated as far as 1st century AD, were painted with natural dyes. Natural dyes are dyes or colorants derived from plants, vegetables, trees, fruits, leaves. Dependence on natural dyes went on for a long time until the 1850s.Typically, the dye material is put in a pot of water and heated to extract the dye compounds into solution with the water. Then the textiles to be dyed are added to the pot, and held at heat desired color is achieved. Some of the natural dyes used in ancient times were indigo, alizarin, Tyrian purple, yellow and Logwood. The majority of natural dyes are vegetable dyes from plant sources – roots, berries, bark, leaves, and wood – and other organic sources such as fungi and lichens. Roots, nuts and flowers are just a few common natural ways to get many colors. Yellow, orange, blue, red, green, brown and grey are available. Natural dyes are usually used with a mordant to make them "stick" to the fabric, and generally give more muted tones on plant fibers like cotton and rayon, but are brilliant on wools and silks. Natural dyes can provide the much needed alternative to the complex world of chemical dyes. These dyes are environmentally sound and can be grown by organic methods. A board range of textiles produced from these colored textile fibers is utilized in end – user industries such as home textiles, apparels, automotive textiles, and other textiles.

KEYWORD: - ECO-FRIENDLY, NATURAL DYES, PLANTS, VEGETABLES, WATER.

INTRODUCTION-

Natural dyes are dyes derived from animal or plant material without any chemical treatment. They were applied to the fiber without any pretreatment of the dye material or the textile. In the middle of the nineteenth century, introduction of synthetic dyes marked the decline in the use of natural dyes. Natural dyes are dyes or colorants derived from plants, invertebrates, or minerals. Typically, the dye material is put in a pot of water and heated to extract the dye compounds into solution with the water. Then the textiles to be dyed are added to the pot, and held at heat until the desired color is achieved.

IMPORTANCE OF NATURAL DYES:

● Dye, substance used to impart color to textiles, paper, leather, and other materials such that the coloring is not readily altered by washing, heat, light, or other factors to which the material is likely to be exposed.

● Dyes differ from pigments, which are finely ground solids dispersed in a liquid such as paint or ink or blended with other materials.

● Most dyes are organic compounds, whereas pigments may be inorganic compounds or organic compounds.

● Pigments generally give brighter colors and may be dyes that are insoluble in the medium employed.

PROCESS TO BE CARRIED OUT FOR NATURAL DYEING: STEP.NO: 01 First I have taken a 100 % cotton fabric of 1 meter.

- **STEP.NO: 02** And I have washed a fabric with water for better absorbency.

- **STEP.NO: 03** I have used an **onion peel** for preparing a **extraction of natural dye** or color.

- **STEP.NO: 04** Then take a **4 parts of water and 1 part of vinegar**. The role of vinegar is **to fix the color onto the fabric.** And then add the onion peel to the water and boil it for **1 hour.**

- **STEP.NO:05** Now tying takes place. Here I am using swirl tying method. In this method the fabric is placed on flat covered surface. Pinch up centre and twist into a spiral. Secure shape with 2 elastic bands, forming 4 sections. Follow dyeing method depending upon type of dye.

- **STEP.NO:06** Then dye a tied fabric to the dye bath for 30-45 minutes at boiling temperature and stir the fabric well. After completion of boiling the fabric with dyestuff keep aside for one full night.

- **STEP.NO:07** And **take a fabric from dye bath and wash it well**. The washing is done for **to remove the unfixed dye molecules present on the surface of the fabric and remove the tied nylon yarn from the fabric**. After washing dry it well and it is used for end uses like pillow covers, ladies dress materials, home furnishing etc.

END PRODUCT:

ADVANTAGES AND DISADVANTAGES OF NATURAL DYES: ADVANTAGES OF NATURAL DYES:

Natural dyes are having some inherent advantages:

- No health hazard;

- Easy extraction and purification
- No effluent generation;
- Very high sustainability;
- Mild dyeing conditions;
- Renewable sources.

DISADVANTAGES OF NATURAL DYES:

There are some technical issues and disadvantages related to the application of natural dyes which reduced its applications that are:

- Mostly applicable to natural fibers (cotton, linen, wool and silk)
- Poor color fastness properties;
- Poor reproducibility of shades;
- No standard color recipes and methods available;
- Use of metallic mordants, some of which are not eco friendly.

CONCLUSION:

Due to increasing awareness regarding high risk impact of synthetic dyes, the demand of natural dyes is increased. Most of natural dyes possess antimicrobial and microorganisms. They are extracted from different varieties of plants, vegetables, flowers, insects, and other materials. There is no any side effect in natural dyes because it is nature.

REFERENCES:

[1]. Ersin, M. M. Mete, S. Gunay, and H. Azeri, Natural dyestuff extraction from onion (Allium cepa) skin and utilization for leather dyeing. Journal of Textiles and Engineer 19 (2012), No. 88, p. 1-7.

[2] M. G. Silva, M. A. S. D. Barros, R.T. R. Almeida, E.J. Pilau, E. Pinto, A. J. S. Ferreira, N.T. Vila, G. Soares and J .G. Santos, Multifunctionalization of cotton with onion skin extract. 18th World Textile Conference (AUTEX 2018), Materials Science and Engineering 460, IOP Publishing, 2018.

[3] M. Seema, Dyeing of silk with onion peel extract. International Journal of Home Science 3(2017), No. 2, p. 313- 317.

[4] A. Hussein and Y. Elhassaneen, Natural Dye from Red Onion Skins and Applied In Dyeing Cotton Fabrics for the Production of Women's Headwear Resistance to Ultraviolet Radiation (UVR), Journal of American Science 2014;10(3), 129-139.

[5] M.Kumaresan, P.Balasubramaniam, E.Dhanasekaran, N.Sudha, "Preparation of Nano Natural Dyes from the Flower of Russelia Equisetiformis and Applying on Fabrics Using Mordants" SSRG International Journal of Applied Chemistry 4.1 (2017): 1-3.

DEVELOPMENT OF SMART TEXTILE SENSOR TO MEASURE BMI AND MUSCLEARTICULATION

Peer Sayed Fathima B, Fashion Technology, Sona college of technology, Tamil Nadu, India

Moushika. T, Fashion Technology, Sona college of technology, Tamil Nadu, India

ABSTRACT

The need for smart wearable devices is increasing day by day. All these wearables provide assistance to the human by the way of tracking/monitoring & data connectivity. Here we developed a smart textile sensor that can be used in wearable device or a garment for various applications such as BMI measurement, assistive device for elderly/disabled persons and limb/muscle articulations of humans. In the currently evolving lifestyle, people are more focused on their fitness, body size, shape, and weight. The textile sensor is developed and with electronics programmed for a particular application. The same was tested using prototype and tested. The sensor response to the applied stress/strain was very accurate and the same is recorded for standardization.

Keyword: *Conductive stretchable fabric, smart wearable textiles, BMI measurement, fitness, textile sensor.*

1. INTRODUCTION:

Several smart wears for monitoring body vitals have been designed and developed as it is in de- mand owing to health and fitness interest by the people. This research focuses to convey BMI information to the user by developing a textile sensor embedded to a smart garment. Strain sensorsworks on the principle of change in electrical resistance under the stress. The aim of the project was to design a textile sensor suitable for multiple wearable device applications. The textile sensorprovides numeric values during its function that is change in electrical resistance depending uponstress/ strain applied on the textile sensor.

L-length of the textile sensor, W-width of the textile sensor, R-electrical resistance, A-area of sensor Resistance Area (R increase A also increases and vice versa)

1.1 Main Features

Two conformable electrodes with a dielectric layer in between can be used to make capacitive-based soft sensors. When the two major parameters, electrode area and dielectric thickness, change shape in response to applied strain, a capacitance shift occurs. Textile-based or silicone-based techniques are currently being used to build stretchable and soft capacitive sensors. Using nano-material-based conductive elements, silicon-based sensors can be produced.

2. METHODOLOGY:

The textile senor is developed using stretchable conductive fabric. The fabric is developed using knitting process by using stretchable conductive yarn. The knitted fabric is processed using silicon powered glue and cured in hot oven. Two of silicon are made using processing materials, cured in oven and covered with another knitted fabric. The silicon layer is sandwiched between two stretch-able fabric layers, and which acts as a di-electric medium. The developed processed stretchable fabric is cut in required shape and sizes. Multiple electrically conductive yarns are twisted to single yarn to form coarse denier thickness. This twisted yarn is sewed at both ends of processed stretch-able fabric. The electrical DC voltage of 5v is passed to the conductive fabric. The battery, multi-meter, oscilloscope and probes are required for this test. When fabric is stretched the resistance along the length of the fabric is changed and this change in resistance is measured to evaluate the contraction and elongation of stretchable fabric. The developed sensor is suitable for BMI moni-toring, muscle articulation and fitness monitoring applications.

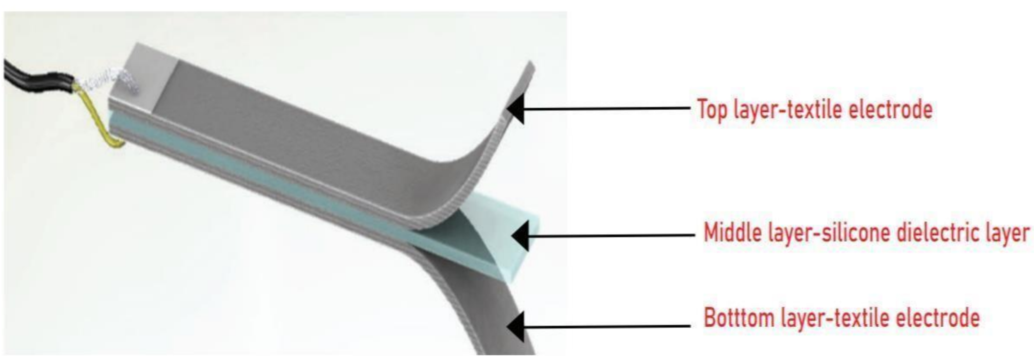


Figure-1: Illustration of textile sensor

Conductive Strain Sensor-2 Layers

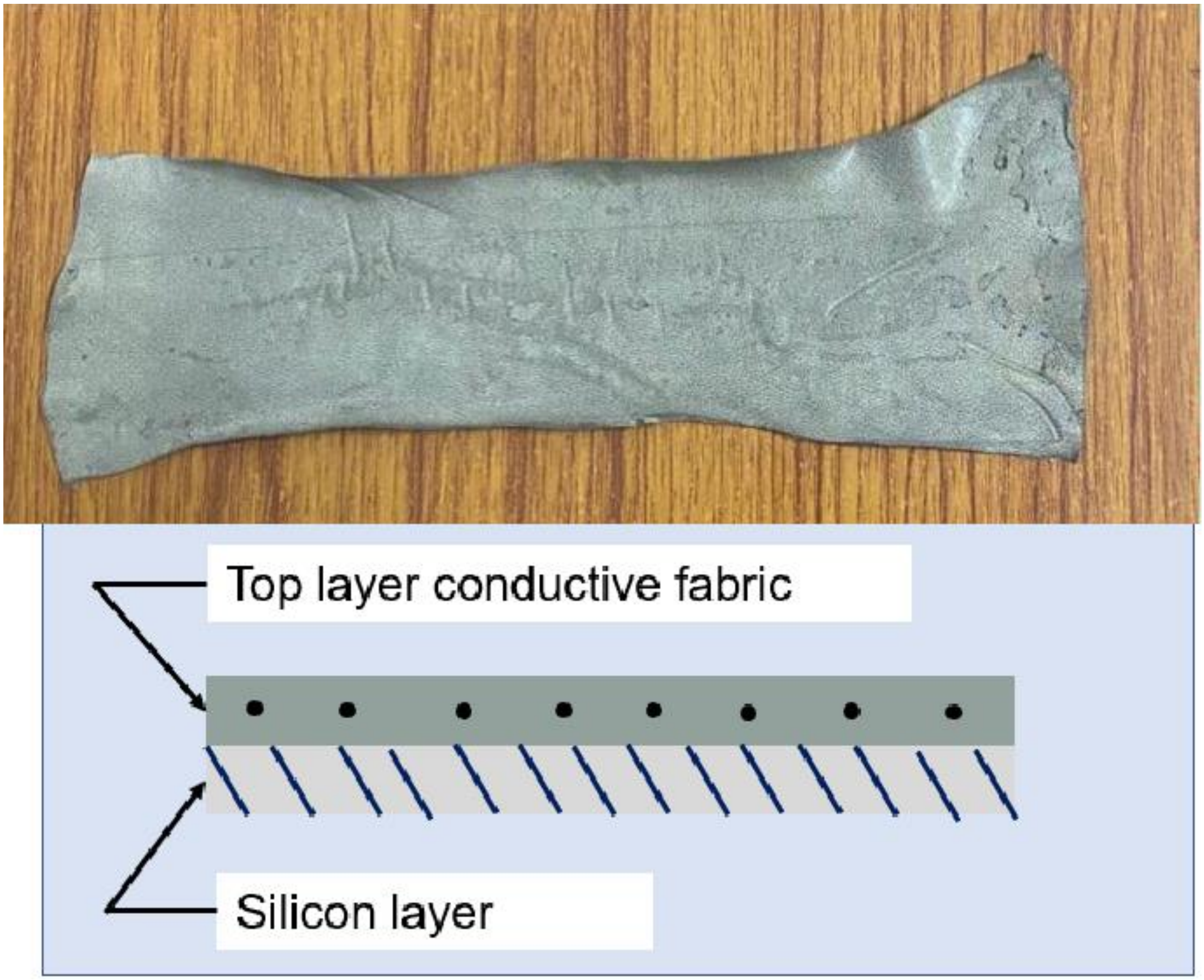


Figure-2: conductive textile sensor

❑ **2** layer composite textile sensor is developed
❑ Top layer conductive fabric fused with bottom layer silicon elastomer ❑ Developed textile sensor sample size **6 inches *1.5 inches (L * B)**
❑ Applied Voltage is **+5V to 9 VDC** for Testing

2.1 Applied Stress Vs Resistance Vs Voltage

STRETCH IN INCHES	RESISTANCE VALUE	CHANGE IN VOLTAGE
6 inches	3.0 ohms	4.2
6.5 inches	4.2 ohms	3.8
7 inches	5.2 ohms	3.5
7.5 inches	6.1 ohms	3.1
8 inches	7.1 ohms	2.8

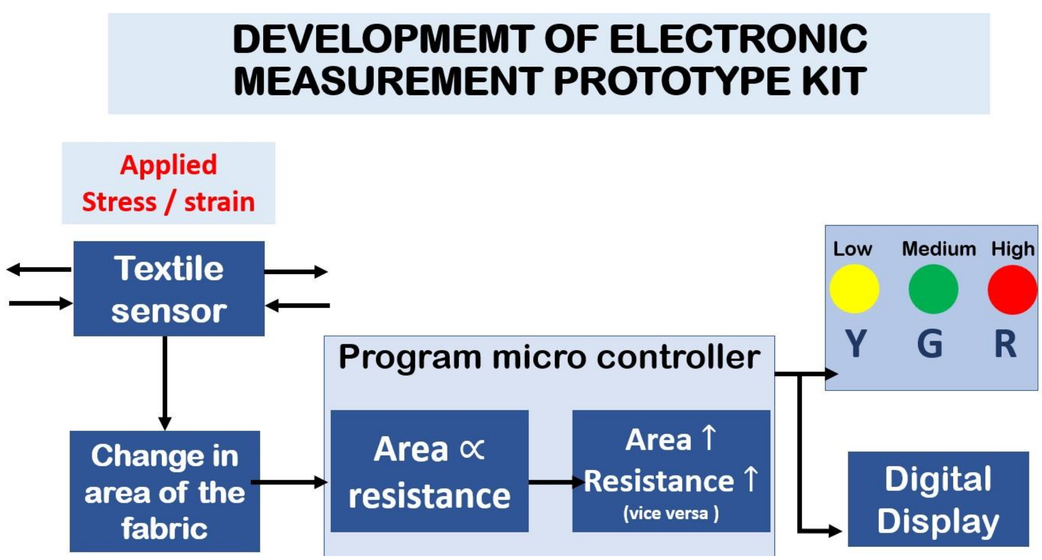


Figure-3: Electronic protype kit

2.2 Microcontroller Unit

Figure-4: microcontroller unit

- ❑ +5V DC is used for working of Microcontroller
- ❑ It is programmed to accept drive the output of textile sensor (Initial values of V & R

- ❑ The Increase in Resistance and decrease in Voltage – indicates the textile sensor stretched mode
- ❑ The resistance and voltage come back to initial values when sensor is normal state

Figure-5: Digital display to show the sensor output

2.3 Textile sensor

3.CONCLUSIONS

We can conclude from our project study, how important BMI as a statistical tool is, to calculate the Health Risk of different diseases. We developed a textile sensor and waist pant. The textile was integrated to the waist pant and sensor is connected to power supply and other electronic components. The sensor embedded for wearable BMI garment displays the circumference of human waist and change in length of the human waist. The change is waist length is proportion to a change in length of textile sensor. By measuring the change in length, the textile sensor provides the corresponding BMI value

4. REFERENCES

1. Mattmann, Corinne, Frank Clemens, and Gerhard Tröster. "Sensor for Measuring Strain in Textile." Sensors (Basel), June 2008

2. Jin, Xin, et al. "Investigations on Coating Durability and Tenso-Resistive Effect of Carbon BlackCoated Polycaprolactam Fibers." Journal of Materials Science, 2007

3. .Lorussi, Federico, et al. "Wearable, Redundant Fabric-Based Sensor Arrays for Reconstruction of Body Segment Posture." Sensors Journal, IEEE ,2004

4. Scilingo, Enzo Pasquale, et al. "Strain-Sensing Fabrics for Wearable Kinaesthetic-Like Systems." Ieee Sensors Journal, 2003

5. Gibbs, Peter, and H. Harry Asada. "Wearable Conductive Fiber Sensors for Measuring Joint Movements." Proceedings of the 2004 IEEE International Conference on Robotics & Automation, 2004

6. Chu, M., Nguyen, T., Pandey, V. et al. Respiration rate and volume measurements using wearable strain sensors. npj Digital Med 2, 8 (2019)

7. Burhan uddin Ismail, Syed Fahad Akbar Ali and Ali Asghar Ayaz.Microcontroller Based Automated Body Mass Index (BMI) Calculator with LCD Display

8. Relationship between changes in body weight and waist circumference in JapaneseNobuyuki Miyatake, Sumiko Matsumoto, [...], and Takeyuki Numat

ADOPTIVE CLOTHING FOR DISABLED PEOPLES

PRAVEEN. R, FASHION TECHNOLOGY, SONA COLLEGE OF TECHNOLOGY, TAMIL NADU, INDIA

RAMANES. S, FASHION TECHNOLOGY, SONA COLLEGE OF TECHNOLOGY, TAMIL NADU, INDIA

ABSTRACT

In this project we have done the adoptive garment, the idea was inspired while seeing an handicaped person struggling to put the clothes so suddenly the idea came and we have done this project and the main aim to do this project is to give a comfortable wear unlike other garments we normally wear. Garment is not only made for protection and coverage to the off the skin it also creates fashioned and the main concept is that what we wear is to be comfortable either it is for normal people or for disabled people.

Nowadays, textile products have found a wide range of application in apparel, domestic and industrial area. The applications include not only clothing and accessories, bedding and interior decoration, but also textile structures that are used to make cables, cords, parachutes, hot-air balloons, tents the ever-increasing application of textile products in various fields is making the design task more important and challenging. Consumers are increasingly considering the sustainability of their purchases as they gain access to an array of attractive fabrics. Is it possible to make a sustainable and high-appealing fabric.

For the current project we have taken the natural fibers and natural dye. The aloe fiber is taken as the main part of the project. It is used for the making of the fabric and the neem is used as the dyeing which a natural dye. Increasing awareness about safe products in textiles has developed the worldwide choice of natural colour based textile.

To enchance the textile designer using an eco-design approach while using natural textile with natural colour to deliver 'green' textile product, this study develop an environmentally friendly dyeing process and good fastness properties. It represents a 'green' product choice that can enchance any sustainable design.

KEYWORD: *EASY TO WEAR FOR DISABLED PEOPLES.*

1. DISABILITIES AND ITS TYPES:

A disability is any condition of the body or mind that makes it more difficult for the person with the condition to do certain activities and interact with the world around them.

1. **Disability** has been defined based on an evolving and dynamic concept,

The types of disabilities have been increased from existing 7 to 21. The 21 disabilities are given below: -

1. Blindness
2. Low-vision
3. Leprosy Cured persons
4. Hearing Impairment
5. Locomotor Disability
6. Dwarfism
7. Intellectual Disability
8. Mental Illness
9. Autism Spectrum Disorder
10. Cerebral Palsy

11. Muscular Dystrophy
12. Chronic Neurological conditions
13. Specific Learning Disabilities
14. Multiple Sclerosis
15. Speech and Language disability
16. Thalassemia
17. Hemophilia
18. Sickle Cell disease
19. Multiple Disabilities including deadline ness
20. Acid Attack victim
21. Parkinson's disease.

1. SURVEY OF DISABILITIES

As per the 2011 Census, there are 11.79 lakh differently abled persons in Tamil Nadu. This constitutes 1.63 % of the State's population and 4.4 % of the differently abled population of the country.

As of January 2020, 13.35 lakh differently abled persons have been identified.

In this 21 disabilities we selected 1 type of person who have locomotor disability

LOCOMOTOR DISABILITIES → PARAPLEGIA → LEG PARALYSIS

2. LEG PARALYSIS

Paralysis of the lower half of your body including both legs, is called paralsis**.** We can't cure for a permanent paralysis and our model is also affected by permanent leg paralysis.

We gathered the information from our model that he can't wear a clothes with help of third person, for this we have one idea for him, to wear a cloth without any help from third person.

We approach to him with our idea and he also co-operate with us to make a final garment.

We have prepared by garment of "Pyjama Night Wear" - "SHIRT AND BERMUDAS".

2.1. MODEL AND GARMENT OUTPUT IMAGE

In this garment we attach the zippers instead of side seam (Zippers starts from Arm to Waist). For nature look we have attached dummy buttons. For Shirt he can wear from “right side to left side arm”.

For Bermudas we also attach Zipper in both sides instead of side seam. For zippers we attached over-lap placket to cover the zippers. For waist button attachment we have attached “Velcro” for his convinence.

After handover the garment to the model and collected the feedback from him.

2.2. NEXT WORK PROCESS ON LEG AMPUTATION PERSON

For this disabilities, we searching for the model around our area. With the reference of google,, we have take the our own measurement to mark a basic model of garment.

With references of this we have analysis this kind of disabilities and prefer to doing process of bottom of garment with our own measurement.

Apart from regular wear we used to cover the bottom of amputated leg. In same side we attached the Velcro side seam in one side and its look good compare to regular garments.

And now we are working for this garment.

3. CONCLUSION

Garment is not only made for protection and coverage of the skin it also creates fashioned and the main concept is that what we wear is to be comfortable either it is for normal people or for disabled people.

Thus, I conclude that main objective give comfy wear to those who are disabled, In future also we like to discover discover more and more ideas to create adaptive clothing for the sake of disabled people and to give them happiness, comfortable and happiness.

4. REFERENCES

1. https://www.thehindu.com/life-and-style/fashion/adaptive-clothing-inspires-confidence-and-a-sense-of-independence-in-people-with-disabilities/article32430868.ece

2. https://www.researchgate.net/publication/264068574_Adaptive_Clothing_Designs_for_the_Individuals_with_Special_Needs

POLYPYRROLE COATED TEXTILE THERMOELECTRIC GENRATOR

Avanish, Deepika *Uttar Pradesh Textile Technology Institute, Kanpur, Uttar Pradesh, India*

, Param *Uttar Pradesh Textile Technology Institute, Kanpur, Uttar Pradesh, India*

Rachit *Uttar Pradesh Textile Technology Institute, Kanpur, Uttar Pradesh, India*

ABSTRACT

Thermoelectric materials have capability to produce electric current directly using heat which is known as thermoelectric effect. Although the traditional inorganic semiconductor materials such as PbTe (Lead Telluride), Bi2Te3 (Bismuth Telluride), SiGe (Silicon-Germanium) and SnSe (Tin Selenide) are giving high performance but they have some inherent limitations, such as toxicity, rare availability, and high cost of manufacturing. Whereas, organic conjugated polymers such as polypyrrole is one of the most studied conductive polymers because of its fairly high conductivity, better environmental stability and ease of preparation, can be explored as thermoelectric material [1]. But Polypyrrole is not a fibre forming polymers and cannot be directly converted to textiles. However, it cab be coated over textile substrates to prepare electro-conductive textiles which can be used for thermo-electric effect for scavenging of waste body heat to convert into electricity. Though the intensity of current is not more but with further improvement it can be used for light smart electronic wears. The performance of these thermoelectric materials is governed by different parameters like the nature of the material, thermal stability, electrical conductivity, Seebeck coefficient, and thermal conductivity.

In this research an organic textile thermoelectric generator is produced using polypyrrole coated spunlace nonwoven fabrics (100% polyester, 100% viscose and 50/50 polyester-viscose blend). Thermal electric performance of these polypyrrole coated fabrics are investigated in a wide range of temperatures above room temperature. The Seebeck coefficient turns out to be comparable with that of metals and semiconductors thermocouple materials. Heat generation capability due to Joul's effect is also investigated for possible heating textile devices. Polypyrrole coated textile thermoelectric (TE) materials are also explored for Peltier cooling technologies.

Keyword : *Conducting polymer, Polypyrrole, Thermoelectric material, Thermocouple*

1. Introduction

Conductive textile is one of the most promising and steadily growing fields in smart textile. Compared to the metal conductors, conductive textile has more advantages and thus make conductive textile unique in nature. In traditional method, conductive textiles are made by incorporating metallic fibers or metallic yarns in yarn or fabric structure. Though textile structures became conductive in nature by incorporation of metal fibers or yarns, it found limited application areas because of it was low flexibility, stiffness, low compatibility with other materials, increased weight, high cost involved in production. Here textiles without losing any of its natural characteristics like lightness, breathability, extensibility and flexibility, are made intrinsically conductive without incorporation of any metallic element but only with the polymer coating.
In a recent development, the wearable textile electronic devices such as smart watches, wrist bands and electronic skins etc., are the appealing research areas of wearable technology (Hu, 2018)[2]. Conductive textile is one of the most promising and growing field in smart textiles. If we compare metal conductors with textile conductors, we would find that textile conductors have more value though textile conductors are unique in nature. Intrinsically Conductive Polymers can make conductive textile without compromising it's natural properties [3]. In late 1970, MacDiarmd, Heeger and Shieakawa discovered the polymer which conduct electricity and jointly won the nobel price in Chemistry. Pyrrole is the highly effective conducting polymer among all more than 20 ICPs just because of its high conductivity, better environmental stability and ease of preparation. Though, conductive textile, made with pyrrole coating, is more conductive and thermally stable. However, while coating, the dark colour to substrates affects a little to the strength, drape, flexibility and porosity of the starting substrates. Synthesis of polypyrrole via In situ polymerization on textile substrates in the form of uniform coating was firstly performed by Kuhn et al 1995**.**

1.1 Thermoelecric effect

The thermoelectric effect can be defined as the direct conversion of thermal energy into electric energy and vice versa. This effect is governed by physical transport properties like electric, thermal conductivity, and Seebeck coefficient, and its efficiency is defined by a dimensionless unit i.e, figure of merit. The thermoelectric effects (Peltier, Thomson, Seebeck) & Joule effect are the main phenomena that occur in a thermoelectric device [4].

1.1.1 Seeback Effect

This phenomenon was discovered by Seeback in 1821, he found that if two wires of dissimilar metals are connected, so as to form a closed circuit, then an e.m.f is developed on it and hence a current flows through it, when junctions of two dissimilar metals are maintained at two different temperatures. The magnitude and direction of this current depends on the nature of the two materials used and upon the difference of temperature between the hot and cold junctions.[4]

1.1.2 Peltier Effect

Peltier effect is the phenomenon of cooling of one junction and the heating of the other junction when an electric current is maintained in a circuit of material consisting of two dissimilar conductors. Peltier coolers are not as efficient as some other types of cooling devices, they are accurate, easy to control, and easy to adjust.

1.1.3 Thompson effect

If a temperature gradient exists along either or both of the metals, then heat is released or absorbed, emf may undergo an additional modification is called as Thompson effect.[4]

1.2 Thermoelectric figure of merit

The thermoelectric material is governed by the Seebeck effect, which can be explained by Seebeck coefficient (S) and thermoelectric power (TEP) or Thermopower. The Seebeck coefficient is given in equation (1)

$$S = \frac{\Delta V}{\Delta T}$$

In equation (1), ΔV is the voltage or electric potential difference generated due to temperature gradient, ΔT. Seebeck coefficient is an inherent material property allied to the electronic properties. It appears in negative values for n-type semiconductors and positive values for p-type semiconductors .

The Thermoelectric figure of merit (ZT) is a dimensionless value used for defining the thermoelectric efficiency of any thermoelectric material. It is represented as ZT value and shown in equation (2)

$$ZT = \frac{S^2 \sigma T}{K}$$

In equation (2), ZT is a dimensionless value, S is the Seebeck coefficient, σ is electrical conductivity, T is the absolute temperature, and k is thermal conductivity.The power factor ($S^2\sigma$) is vital for materials where the thermal conductivity effect is secondary for determining the performance of the material. The power factor is very significant for materials like conjugated polymers, as their thermal conductivity is low [6]. A higher ZT value corresponds to a better performance in power conversion.

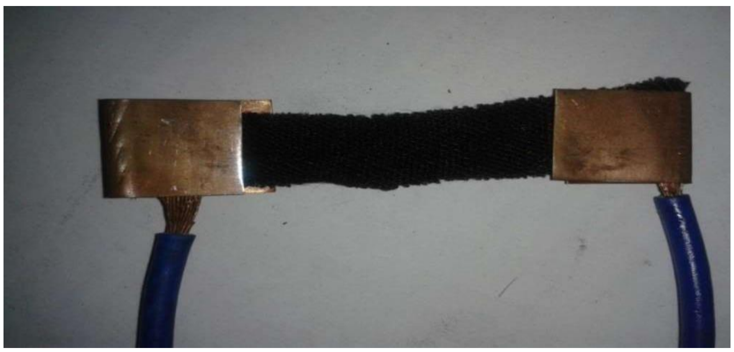
2. Materials and methodology

The materials and chemicals taken for this research are-

1) Spunlace fabrics of three different structures has been used which are scoured and undyed-

Spunlace Fabrics (10*10 cm^2)	**GSM**
100% Polyester	60
50/50 Polyester-Viscose blend	60
100% Viscose	60

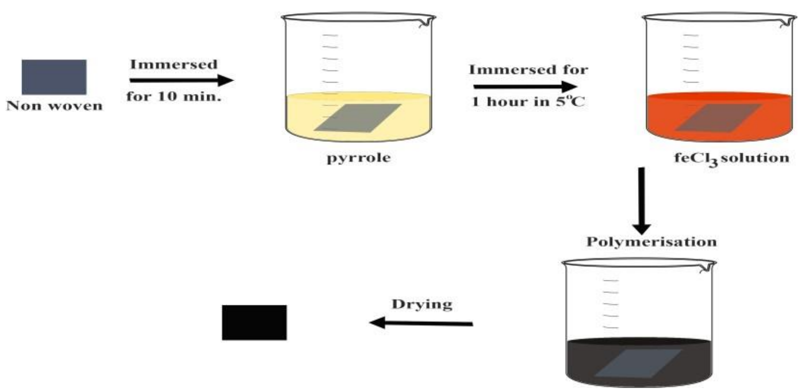
2) Pyrrole (Leonid Chemicals, India).
3) $FeCl_3$ (Qualigens Fine Chemicals, India)
4) Distilled water



2.1 Methods

2.1.1 Preparation of Polypyrrole coated textile by In situ polymerization

Polyester, viscose and polyester-viscose blend fabric samples of different weights were allowed to soak in 0.1M solution of pyrrole in water for 10 minutes at room temperature. The bath containing the fabrics was then cooled to 5°C after adding 0.2 M $FeCl_3$ solution and kept for 1 hour so as to polymerize the monomer. The M:L ratio was 1:20. The fabrics were then thoroughly washed with sufficient amount of water and allowed to dry at 27°C and RH of 65%. All the fabric samples were emerged in black colour due to polymerised pyrrole solution.



2.1.2 Preparation of textile thermocouple using the coated fabrics

Thermocouples are a combination of two dissimilar metals joined together at both ends. Joined ends are kept at two different temperatures. Depending on the temperature difference between two junctions, voltage generation in the thermocouple circuit will change.
Instead of using two dissimilar materials, one metal and one textile material which was polymerized by pyrrole was taken in the place of other metal. Requirement of one material is desired to have higher positive seeback co-efficient values whereas the other metal should posses lower positive or negative see back coefficient value. Copper metal was taken as one of the metals for to make thermocouple and it posses higher positive see back co-efficient value. On the other hand, electro conductive fabrics were taken to couple against copper metal. Because of the difference in conductivity of fabrics, generation of electromagnetic force (emf) was observed.

2.2 Measurements

2.2.1 Measurement of Add-on% of polymer on fabric

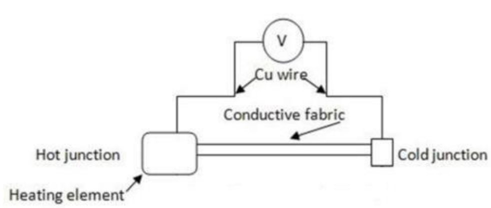
Samples were weighed before and after the In situ chemical polymerization. In order to measure the add-on % of electroconductive fabrics accurately, fabrics samples were dried in a oven to reduce the influence of moisture on add-on%. And then the weight of the fabrics were measured, also the same procedure was carried out to measure the weight of fabrics after the polymerization process. The percentage weight increase or weight add-on% (W %) was calculated by using formula

$$W\% = \frac{W_f - W_i}{W_i}$$

Where, W_i - Initial weight
W_f - Final weight

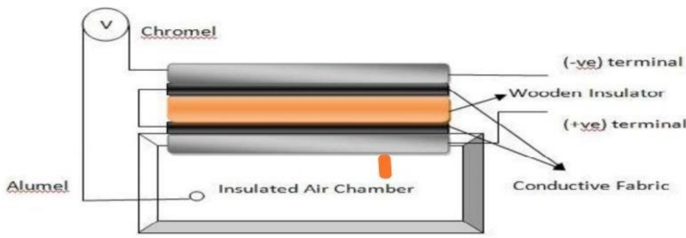
2.2.2 Measurement of seebeck effect

For measuring the seebeck effect of conductive fabric samples, one end of the textile thermoelectric was kept at room temperature and other end was kept at variable temperature with the help of heating element. A chromel-alumel thermocouple is being set across both the junctions to measure the temperature difference. A multi-voltmeter is being used for measuring the generated e.m.f



2.2.3 Measurement of Cooling Effect (Peltier effect)

As the fabric samples are very thin and thermal insulation along the thickness is not possible for some time period, so two same fabric samples are taken along with two metallic plates. One sample was placed on a lower plate and this plate is placed in an insulated air chamber. An insulating material block is placed on the fabric and then other fabric sample along with metallic plate is placed over it. Fabric samples were connected with a copper wire. An electric current (12V) was passed through the two metallic plates and slight temperature difference was observed between them and recorded with an chromel-alumel thermocouple w.r.t. time.



6. REFERENCES

1. Ansari, R. (2006). Polypyrrole conducting electroactive polymers: synthesis and stability studies. E-Journal of Chemistry, 3(4), 186-201.
2. Sparavigna, A. C., Florio, L., Avloni, J., & Henn, A. (2010). Polypyrrole coated PET fabrics for thermal applications. Materials Sciences and Applications, 1(04), 253.
3. Shirakawa, H., McDiarmid, A., & Heeger, A. (2003). Twenty-five years of conducting polymers. Chemical communications, 2003(1), 1-4.
4. Tritt, T. M. (2011). Thermoelectric phenomena, materials, and applications. Annual review of materials research, 41, 433-448.
5. Van Herwaarden, A. W., & Sarro, P. M. (1986). Thermal sensors based on the Seebeck effect. Sensors and Actuators, 10(3-4), 321-346.
6. Ma, W., Shi, K., Wu, Y., Lu, Z. Y., Liu, H. Y., Wang, J. Y., & Pei, J. (2016). Enhanced molecular packing of a conjugated polymer with high organic thermoelectric power factor. ACS Applied Materials & Interfaces, 8(37), 24737-24743.

ECO-FRIENDLY FLUOROCARBON FREE WATER REPELLENT FOR JUTE FABRIC

Neelam Chavan Institute of chemical technology, department of fibers and textile processing technology, Mumbai

Harshal Patil Institute of chemical technology, department of fibers and textile processing technology, Mumbai

Abstract

The present investigation deals with preparing C6 fluorocarbon-free water repellent for jute. Paraffin wax-based nanoemulsion was prepared with stearic acid and triethanolamine and applied on the scoured bleached jute fabric in the presence of aluminium chloride as an emulsion deactivator. Optimization is carried out to optimize the concentration of the paraffin wax emulsion and the concentration of the deactivator to provide superior water resistance with appropriate concentrations. The optimized recipe for making jute water repellent with minimal damage in tensile properties is 30 g/l wax-based nanoemulsion and 0.3 % aluminium chloride (deactivator). Application is carried out by pad–dry cure method; padding is carried out with 100 % expression, drying at 110^{0}C for 3 min and cured at 150^{0}C for 3 min. Jute fabric treated with an optimized recipe shows good water repellence after 5washes.

Keywords: *water repellent, jute, wax emulsion, finishing*

1. INTRODUCTION

Water, oil, and dirt repellency are the three most common forms of repelling textile finishes, with water-repellent materials being the first to be developed [1]. The capacity of a fabric to resist getting wet is referred to as water repellency. When the hydrostatic pressure is strong enough, the wearer will become wet in a rainstorm due to the fabric pores and air and water vapor permeability. On the other hand, waterproof fabrics have fewer pores and are entirely impervious to water entry at any hydrostatic pressure [2].

In addition to the water repellency of metallic salts and soaps, paraffin waxes were the first chemical compounds employed to manufacture water-repellent textiles. Paraffin wax is generally applied in three solvent forms, molten and emulsions, with emulsions containing aluminium or zirconium salts of fatty acids being the most well-known for constituting hydrophobic chains away from the fibre [2]. Although efficient at their inception, these treatments could not maintain their use due to their lack of longevity [3]. The researcher worked to modify them, such as using polyethylene, poly (vinyl alcohol), and methacrylic acid copolymers or stearyl acrylate-acrylic, unable to increase their use. Other downsides of paraffin wax emulsions include increased fabric flammability and low air and water vapor penetration. The researchers continue to explore the chemicals that can react with cellulose to provide long-term water repellency[4]. This was obtained by mixing formaldehyde, stearic acid, and melamine with the hydrophobic stearic acid groups repelling water and the remaining N-methylol groups interacting with cellulose or each other (crosslinking). The use of such water-repellent coating was also restricted due to disadvantages such as formaldehyde emissions and a reduction in tear strength and abrasion resistance . Pyridium compounds were introduced as well-known water-repellent coatings using a similar technique but with toxicological issues during the manufacturing process.

This research aims to make a paraffin wax emulsion with a stearic acid and triethanolamine system, which can be applied to jute cloth in the presence of aluminium chloride as an emulsion deactivator to improve water repellency. Furthermore, optimization is carried out to optimize the concentration of the paraffin wax emulsion and the concentration of the deactivator to provide superior water resistance with appropriate concentrations.

2. MATERIALS

Grey jute fabric (300 GSM) supplied by Birla Corporation Limited, Kolkata was used. Paraffin wax was procured from local market. Stearic acid (SA), triethanolamine (TEA), aluminium chloride, sodium hydroxide, were purchased from Loba Chemie Pvt ltd. hydrogen peroxide (50%) was purchased from Merck Life Science, Mumbai. Wetting agent (Kleenox WLF Liq.) and peroxide stabilizer (Zystab C Liq.) were procured from Rossari Biotech Ltd, Mumbai.

3. METHODS

3.1 Emulsion preparation

Water repellent emulsion was prepared with a recipe consisting of paraffin wax-9 % (w/w) and stearic acid- 20 % (w/w) were melted together in a 500 mL glass beaker in a heating plate with a magnetic stirrer at 65–70^{0}C. To that mixture, 70 g of an aqueous TEA – 5 % (w/w) solution at 65–70^{0}C was gradually added with stirring, using a high-speed homogenizer, within 5 minutes. Stirring is continued for 10 minutes to obtain a homogeneous emulsion.

3.2 Scouring and bleaching

Grey jute fabric was scoured and bleached combinedly with a recipe consisting 5% (w/w) hydrogen peroxide (50%), 3% (w/w) sodium hydroxide, 0.5 % (w/w) peroxide stabilizer and 0.5 % (w/w) non-ionic wetting agent for 60 min at 95^{0}C. The material to liquor ratio was maintained at 1:10. After bleaching, the jute fabric was cold rinsed, hot washed, and neutralized with 0.2 % (w/w) acetic acid. The neutralized jute fabric was washed with cold water and dried.

3.3 Application of water repellent finish

Bleached jute fabric was treated with formulated water repellent and a commercial water repellent (Rossari Biotech) at varying concentrations and aluminium chloride (0.1, 0.3, 0.5 %) by the pad-dry-cure process. The fabric was dipped in a bath containing 10 g/l, 30 g/l, and 50 g/l of the water repellent agent, respectively, and aluminium chloride at concentrations 0.1%, 0.3%, 0.5 %. The pH of the finishing bath was maintained in the range of 5 to 5.5 by the addition of acetic acid. The percentage of the chemical pick-up was maintained at about 100 %. After padding, the fabric was dried in a stenter machine at 110^{0}C for 3 minutes and cured on stenter at 150^{0}C for 3 minutes. The schematic diagram is illustrated in figure 1.

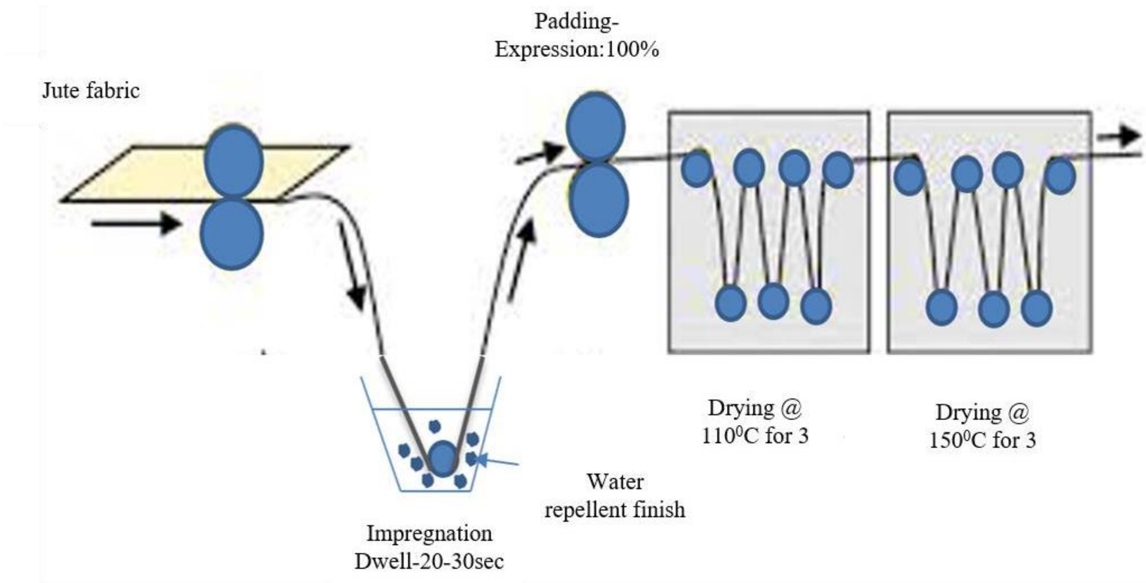


Figure 1: Application of water repellent on jute fabric

4. TESTING AND CHARACTERIZATION

4.1 Spray test

The fabric repellency was assessed using the AATCC 22 (1996) water repellency spray test method. Before analysis, the test samples were conditioned for 24 hours at 20 °C and 65% relative humidity. The finished fabrics (16 x 16 cm) were stretched taut in an embroidery hoop, held at a 45° angle in the tester, and sprayed with 250 ml of water from a height of 150 mm through a defined spray head. The wetness pattern resulted, was graded according to photograph standards. A "100" grade was given to a cloth that was fully non-wetting, while a "0" rating was given to a fabric that was completely wet.

4.2 Absorbency

Absorbency of jute fabric were evaluated as per Drop test AATCC TM 79-2014. Time required for absorbing water drop was noted. Average of 5 drop is consider for results.

4.3 Tensile strength

Tensile properties of jute fabrics were evaluated as per ISO: 1969-2009 (Strip method) in terms of tenacity (kgf), elongation at break (%).

4.4 Particle size analyser

The average particle size of the emulsion was measured using nano particle size analyser (SALD-7500 nano, Shimadzu Corporation, Japan).

4.5 Durability assessment

Durability was evaluated by ISO 3 method using Launder-O-meter for 30 minutes at 60°C with 5 g/l non-ionic soap and 2 g/l soda ash at a liquor ratio of 1:50 method [ISO105-CO6, 2006]

5. RESULT AND DISCUSSION

5.1 Emulsion properties

Table 1: Properties of emulsion

Parameter	**Results/ observations**
Particle size	30 nm
Ph	4.5-5.5
Colour	Milky white

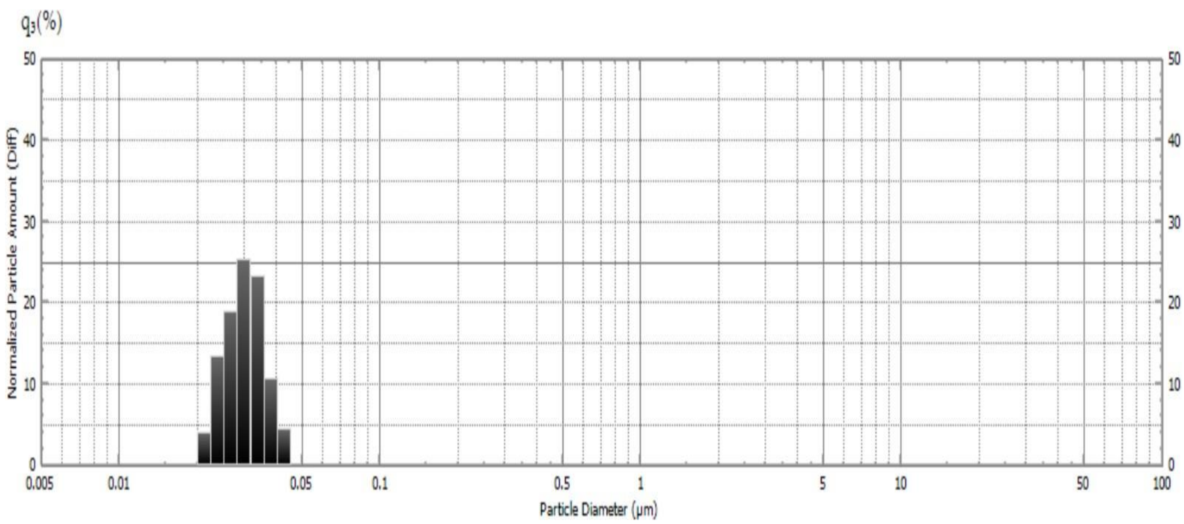


Figure 2: Particle size distribution

5.2 Effect of water repellent and deactivator concentration on water repellency

Table 2: Water repellence performance of jute fabric

Water repellent conc. (g/l)	Deactivator conc. (%)	Water repellency ratting
Control (scoured-bleached)	-	0
10	0.1	60
	0.3	80
	0.5	80
30	0.1	80
	0.3	100
	0.5	100
50	0.1	80
	0.3	100
	0.5	100

Table 3: Absorbency of jute fabric

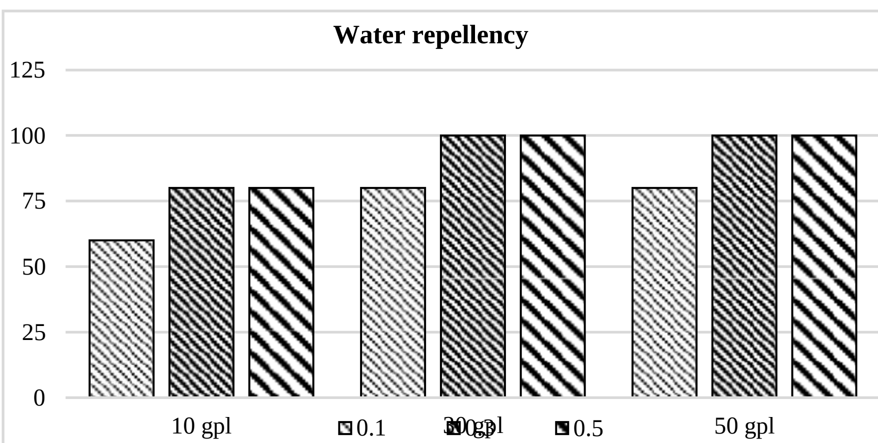


Figure 3: Water repellence performance of jute fabric

Jute is hydrophilic; therefore, it exhibits zero repellency for water. C6 fluorocarbon-based commercial water repellent (Rossari Biotech) was used as a benchmark, and treated fabric at 30 g/l dosages revealed a water repellency rating of 100. This research made efforts to formulate a fluorine-free water repellent that can make jute hydrophobic. Figure. 3 shows the water repellency performance of jute fabric treated with formulated wax-based water repellent. From Figure. 3, it is observed that as increases in the concentration of water repellent from 10 to 30 g/l, water repellency increases, but further increases in the concentration of water repellent do not show any improvement in water repellency. The concentration of deactivator is also contributing to water repellency improvement. From Figure. 3, it is noticed that jute fabric's water repellency is enhanced as deactivator concentration increases from 0.1 to 0.3 %. Still, there is no change in water repellency as further increases in deactivator concentration. Therefore, the optimized concentration to achieve more outstanding water repellency is 30 g/l water repellent with 0.3 % deactivator.

5.3 Effect of water repellent and deactivator concentration on tensile properties of jute fabric

Table 4: Tensile strength and elongation of untreated water repellent treated fabric

Water repellent conc. (gpl)	**Deactivator conc. (%)**	**Tensile strength (kgf)**	**Elongation (%)**
Control (scoured-bleached)	-	22.66	8.14
10	0.1	17.58	10.21
	0.3	10.39	7.71
	0.5	9.16	5.04
30	0.1	19.09	10.61
	0.2	15.60	8.00
	0.5	14.64	6.54
50	0.1	15.42	8.04
	0.2	12.70	6.79
	0.5	10.06	5.29

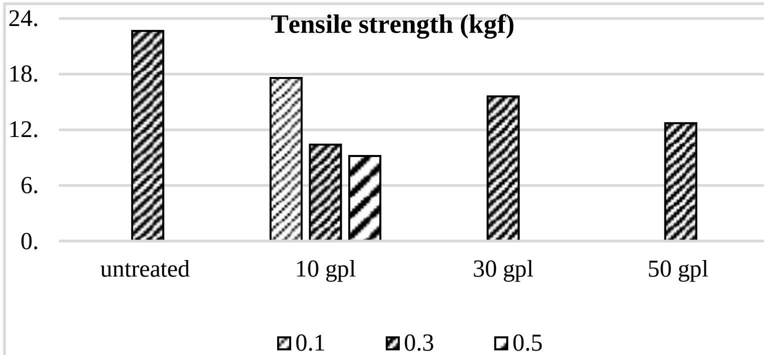


Figure 4: Tensile strength of untreated water repellent treated fabric

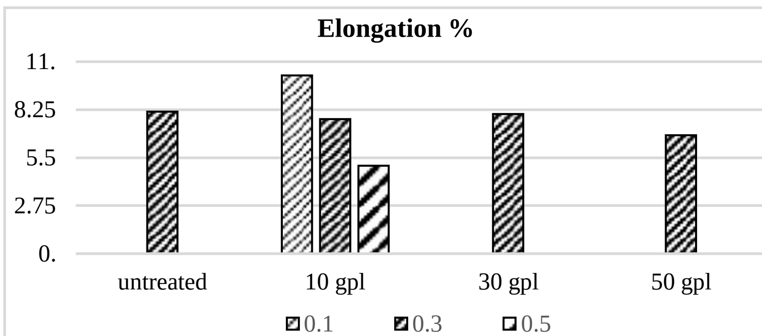


Figure 5: Elongation % of untreated water repellent treated fabric

Figures 4 and 5 show tensile strength and elongation % of jute fabric treated with formulated wax-based water repellent. From Figure 4, it is noticed that increases in the concentration of water repellent cause a loss in tensile strength. The concentration of the deactivator is an influential factor that drastically reduces tensile strength. From Figure 4, it is noticed that the tensile strength of jute fabric is dropdown as it increases in deactivator concentration from 0.1 to 0.5 %. From Figure 5, the elongation of jute fabric shows

Water repellent conc. (g/l)	Deactivator conc. (%)	Absorbency
Control (scoured-bleached)	-	7 sec
10	0.1	>20
	0.3	>20
	0.5	>20
30	0.1	>20
	0.3	>20
	0.5	>20
50	0.1	>20
	0.3	>20
	0.5	>20

an increase in all concentrations of water-repellent with 0.1 % deactivator. Still, a rise in deactivator concentration causes a reduction in the elongation percentage of treated jute fabric. Therefore, optimized concentration to achieve greater water repellency with minimum damage in tensile properties of jute fabric is 30 g/l water repellent with 0.3 % deactivator. Figure 6 shows durability performance of finished fabric, it is observed that wax-based water repellent fast to wash and hence the water repellency is reduced after wash.

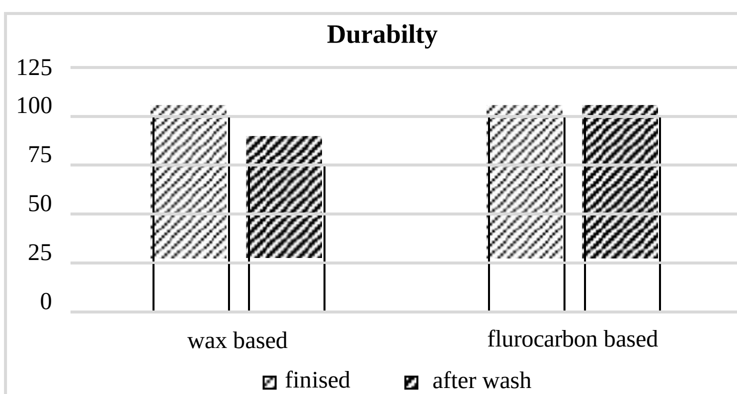


Figure 6: Durability assessment of wax based and fluorocarbon-based water repellent

		
	Untreated	
		
10 g/l (deactivator-0.1%)	10 g/l (deactivator-0.3%)	10 g/l (deactivator-0.5%)
		
30 g/l (deactivator 0.1%)	30 g/l (deactivator 0.3%)	30 g/l (deactivator 0.5%)
		
50g/l (deactivator 0.1%)	50 g/l (deactivator-0.3%)	50 g/l (deactivator-0.5%)

Figure 7: Pictures of water repellent treated and untreated jute fabric

6. CONCLUSION

The results indicate the viability and applicability of wax-based fluorocarbon free paraffin wax-based nanoemulsion prepared with stearic acid and triethanolamine can be used as an eco-friendly water repellent on jute fabric. The comparative performance of wax-based water repellent against the commercially used fluorocarbon-based water repellent for textile applications exhibits better hydrophobicity. The optimized recipe for making jute water repellent with minimal damage in tensile properties is 30 g/l wax-based nanoemulsion and 0.3 % aluminium chloride (deactivator).

7. ACKNOWLEDGEMENT

The authors are grateful to Dr. Aranya Mallick and Prof. Ashok Athalye, faculties of the department of fibres and textile processing technology, ICT, Mumbai, for their valuable guidance throughout the project.

8.REFERENCES

1. Montazer M, Harifi T. Water-repellent textile nanofinishes. In: Nanofinishing of Textile Materials.; 2018. doi:10.1016/b978-0-08-101214-7.00012-1

2. Shen H, Leonas KK. Study of Repellent Finish of Filtration Ability of Surgical Face Masks. International Nonwovens Journal. 2005;os-14(4). doi:10.1177/1558925005os-1400403

3. Chowdhury KP, Chowdhury S, Hosain MA, Mamun A al, Alahi SkN, Rahman MdS. Comparative Enactment of Fluorocarbon-free and Fluorocarbon-based Water Repellent Finishes on Cotton Single Jersey Fabrics. International Journal of Current Engineering and Technology. 2018;8(02). doi:10.14741/ijcet/v.8.2.34

4. Hunter L, Fan J. Waterproofing and breathability of fabrics and garments. In: Engineering Apparel Fabrics and Garments. ; 2009. doi:10.1533/9781845696443.283

5. A new permanent water-repellant for textiles. Nature. 1937;140(3545). doi:10.1038/140612c0

6. Jiang WC, Meng WD, Qing FL. A novel perfluorooctylated triazine pyridine quaternary ammonium salt: Synthesis and its application on cotton fabrics finishing. Journal of Applied Polymer Science. 2006;100(6). doi:10.1002/app.22547

7. Jain AK. Development of multifunctional cotton using fluorocarbon resin. International Dyer. 2018;(3). doi:10.1177/2515221118786052

PVA COATED COIR FIBER IN AUTOMOBILE

Sridhar R, Textile technology, Bannari Amman Institute of Technology, Tamil Nadu, India.

Sree Prakash A S. Textile technology, Bannari Amman Institute of Technology, Tamil Nadu, India. Abinanthan M, of textile technology, Bannari Amman Institute of Technology, Tamil Nadu, India.

ABSTRACT

Many parts of the car are present in undercarriage like engine, Steering system, Transmission system, tyres, Suspension system, front and rear axle, wheels, and brakes. During heavy rain or flood salt water will enter the car from the lower side. This water will form rust and will damage the car parts. This will reduce the life span of the car parts. Coir is a very good salt water resistant material. So coir can be used to make the under chassis of the car. Under chassis can be done by manufacturing a coir sheet which will be used as a protective sheet for the automobiles in order to prevent water entering into the engine. The coir sheet is also coated with PVA to get strength and to prevent water entering into the engine. It is tested for water penetration and sound absorption to prove an added advantage of sound absorption. Aluminum frame also used and attach with the coir sheet. The frame is made according to the automobile body. Under chassis can be tested for strength, water permeability and sound insulation.

Keyword: - *PVA, Coir fiber, PVA coating Automobile etc....*

INTRODUCTION:

The clutch, steering, and suspension are the three essential components of a vehicle's undercarriage. Clutch is a device that connects the engine to the drive shaft, allowing power to be transferred from the engine to the wheels. Finally, while driving over uneven terrain, the suspension absorbs shock. The undercarriage of a vehicle. The chassis frame is the automobile's basic framework. It supports all of the car's components that are attached to it. It's made of steel that's been drop forged. It is the only portion of an automobile that is attached to it. The chassis provides the necessary strength to sustain the various vehicle components as well as the payload, as well as keeping the vehicle rigid and stiff. As a result, the chassis is an integral part of the total safety system. Material used in car under chassis are Steel, Magnesium, Aluminium, Carbon-fiber epoxy composite, Glass-fiber composites.

1. COIR

Coir comes from coconuts. It's what makes up the fibrous husks of the inner shell of the coconut and is used for all sorts of products, including rugs, ropes, brushes, and even upholstery stuffing. You're probably most familiar with it as those stiff, scratchy doormats and the fibrous liners used in hanging baskets. Coir is very rot- resistant, making it perfect for outdoor products. It is also becoming increasingly popular as a potting mix and organic soil amendment.

For a coconut by-product, coir takes a good amount of effort to get to market. The outer husks are soaked until the fibers can be separated and then cleaned. Then they have to be sorted and graded by size. Dark brown coir is from the familiar mature coconuts, but there is also a white version. White coir is from immature, green coconuts and is finer and softer. Some manufacturers also dye the fibers. Coir goes by many names. You may find it labeled as coir-peat, coco-peat, coir fiber pith, coir dust, and other similar-sounding brand names.

2. PVA(Poly Vinyl Alcohol)

PVA is a water-soluble and biocompatible polymer that is obtained from poly (vinyl acetate) through alkaline hydrolysis. PVC was one of the first polymers to be used in food packaging applications, and it replaced many traditional materials (glass, paper, cardboard). PVC’s toughness combined with good clarity and resistance to oils and other substances makes it suitable for making blow-molded bottles. Flexible PVC film has found wide acceptance for food preservation. These materials have both ‘stretch ’and ‘cling ’properties; therefore, they are suitable for the hand wrapping of fresh produce. These materials can also be heat sealed. The very low permeability of this polymer to gases (O_2 and CO_2) makes its wide application in food packaging, such as water-soluble packaging films. However, the tendency to absorb moisture limits its use under high moisture conditions. To improve its properties, PVA could be blended with other polymers, for example, food additives such as citric acid, succinic acid, and tartaric acid

3. PVA COATING

PVA stands for polyvinyl alcohol, a water-soluble crystalline polymer with outstanding film forming, emulsifying, and adhesive capabilities. It is made by polymerizing vinyl acetate to polyvinyl acetate and then converting it to PVA via an alcoholysis reaction. The degree of hydrolysis for the PVA will be determined by the magnitude of the alcoholysis process. Vinyl alcohol and vinyl acetic acid copolymerize to form polyvinyl alcohol (PVA). Many modified PVAs with diverse functional groups and qualities have been created, with polymerization

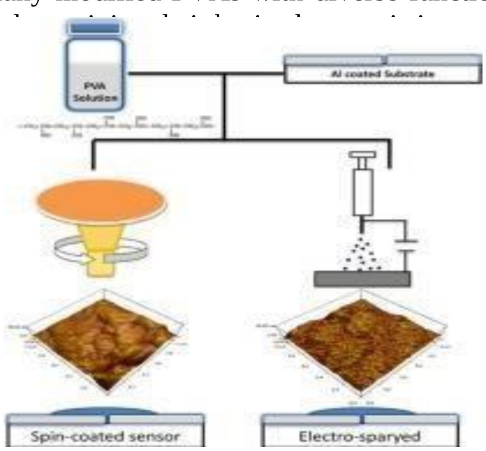


Figure -1(PVA coating):

4. ALUMINIUM FRAME:

Aluminium is a very light metal, which has specific weight of about 2.7 g/cm3, or roughly one third that of steel or copper. When aluminium is exposed to air, a protective coating of aluminium oxide develops nearly instantaneously on the surface. This layer is exceptionally resistant to corrosion from the elements, including acid rain, and will not be harmed by cleaning chemicals. Without losing its durability or fracturing or cracking, it may be twisted, pressed into shape, or pulled out into a thin wire. When it comes to metal recycling, aluminium is one of a kind. It's completely recyclable, and recycled aluminium has the same quality as virgin aluminium

5. CONCLUSION:

When salt water enters the car from beneath the car part in under carriage of the car may get rusted and damaged due to salt water penetration. This will reduce the life span and create many problems. To prevent this under chassis can be made of salt water resilience and water impermeable substance. Coir has good salt water resistance. So coir can be used to make under chassis. On the both sides of the coir sheet PVA resin can be coated to provide strength, flexibility and reduce water permeability. Aluminium frame is used to improve the strength of the under chassis.

6. REFERENCE:

1) D Verma, PC Gope, A Shandilya, A Gupta, MK Maheshwari. Coir Fiber Reinforcement and application in polymer composites: A review, J. Master. Environ. Sci 4 (2), 2013, 263-276.

2) US Bongarde, VD. Shinde. Review on natural fiber reinforcement polymer composites, IJESIT, 3(2), 2014.

3) EJ Barbero. Introduction to Composite Materials Design, Second Edition.

4) L Naidu, D Raghuveer. Studies on characterization and mechanical behavior of banana peel reinforced epoxy composites, international journal of Scientific & Research, 4(6), 2013.

5) IZ Bujang, MK Awang, AE Ismail. Study on dynamic characteristics of coconut fibre reinforced composites, Regional Conference on Engineering Mathematics, Mechanics, Manufacturing & Architecture, 2007, 185-202

DEVELOPMENT OF KAPOK BLENDED YARNS FOR THERMAL INSULATION APPLICATION

Badmanaban M, Textile Technology, Bannari Amman Institute of Technology, Tamil Nadu, India Akash Subramanian K, Textile technology, Bannari Amman Institute of Technology, Tamil Nadu, India.
Logeshbaran N, Textile Technology, Bannari Amman Institute of Technology, Tamil Nadu, India.

ABSTRACT

Kapok [Ceibapentandra (L) Gaeitn] fiber is an agricultural product fluffy, light weight, non-allergic, resistant to rot and odorless. It consists of a high proportion of air-filled humans, which acts as a good thermal insulation. However, Kapok fiber has not been used as a textile raw material for a long time since it is so short, light and possesses low cohesive force during spinning. Current world-wide kapok fiber processing technology is ongoing. Kapok fiber will be blended with other fibers like cotton and polypropylene to produce the yarn by ring and rotor spinning method. The samples to be results at the yarn properties such as U%, imperfections, hairiness and tensile properties will be tested.

Keyword: - *kapok blended yarn, Thermal Insulation application, Fibers, and Yarn Properties etc.….*

1. INTRODUCTION

Kapok fibre is obtained from the seedpod of kapok tree (Ceiba Peltandra) found in India Indonesia and in some sub-Sahara African countries including Nigeria.

Kapok fibre has relatively high non cellulose content and a very smooth surface. Nowadays kapok fibers are used in life jackets and for thermal insulation. Kapok fiber is a non-cotton, natural cellulosic fiber which has many unique properties that are relatively new to the textile industry.

Kapok is a single-cell cellulose fiber with an extremely high degree of hollowness (80–90%) (Sunmonu & Abdullah, 1981), which is by far the largest in natural fibers. kapok has a cylindrical shape with round or oval cross-sections, a thin wall with a thickness of 0.5–2 am in the middle, and closed ends. It has a smooth surface without distinct convolution, and thus possesses good gloss (Gong, 2006). However, kapok fiber has not been used as a textile raw material for a long time since it is so short, light, and thus possesses low cohesive force during spinning. Current worldwide studies on kapok processing technology are ongoing. In 1992, Sunmonu (2003) from Nigeria was the first to spin kapok-cotton blended yarn with blending ratios of 60:40 and 50:50 using rotor spinning technology. However, earlier, kapok blended yarns had good luster but limited usage because they had lower strength and worse properties than cotton yarns. In 2003, Danda (2003), also from Nigeria, did some experiments with kapok yarn blended with cotton, rayon, and other cellulosic fibers at several blending ratios using rotor and conventional spinning methods. These researchers analyzed the processibility of Nigerian kapok fiber and the mechanical properties of kapok blended yarns at different blending ratios, and found that kapok blended yarns can be used as weft yarn and that the blending ratio could reach up to 50%.

After 2003, some Japanese reports indicated that Daiwobo Co. Ltd. produced blended-spun-yarn fabric using kapok blended yarn at 10–20 Ne, but this product was difficult to find. In the new century, scholars in China researched and developed another kapok processing technology, gradually pushing forward the industrialization of kapok fiber. In 2005, Sun’s (2005) research found that if the content of kapok fibers was less than 50%, the evenness of kapok blended yarn could meet manufacturing demand. Dai (1990) pretreated the surface of kapok fibers before spinning and greatly improved their spinnability with this pretreatment technology. This pretreatment made it possible to spin with 100% kapok fibers. In 2006, Li and Xia (1936) introduced the method used to spin cotton, rayon, and other cellulosic fibers and the ring spinning technology to develop kapok blended yarn. The ring spun kapok blended yarn – Ceibor – was successfully produced which was a milestone in the industrialization of ring spun blended yarn. The development of kapok spinning technology enhanced the quality of kapok blended yarn year after year. Although, no research was found blending of kapok and cotton produce yarn using ring spinning system and analyze the yarn properties such as U%, imperfection, hariness, tensile property.

1.1 ADVANTAGES IF KAPOK FIBRES

❖Lightweight,
❖Comfortable,
❖ Thermal insulator, ❖ Biodegradable.

2. CARDING

It is still a true statement that the card is the “heart” of yarn making. The main job for the carding machine is to *separate the flocks into individual fibers*. The carding process gives cleaning, reduction of neps, aligning, blending and elimination of some short fibers. The main eliminated material is in the flat strips.

Below a summary:

- Separation of flocks into individual fibers
- Aligning of fibers
- Blending

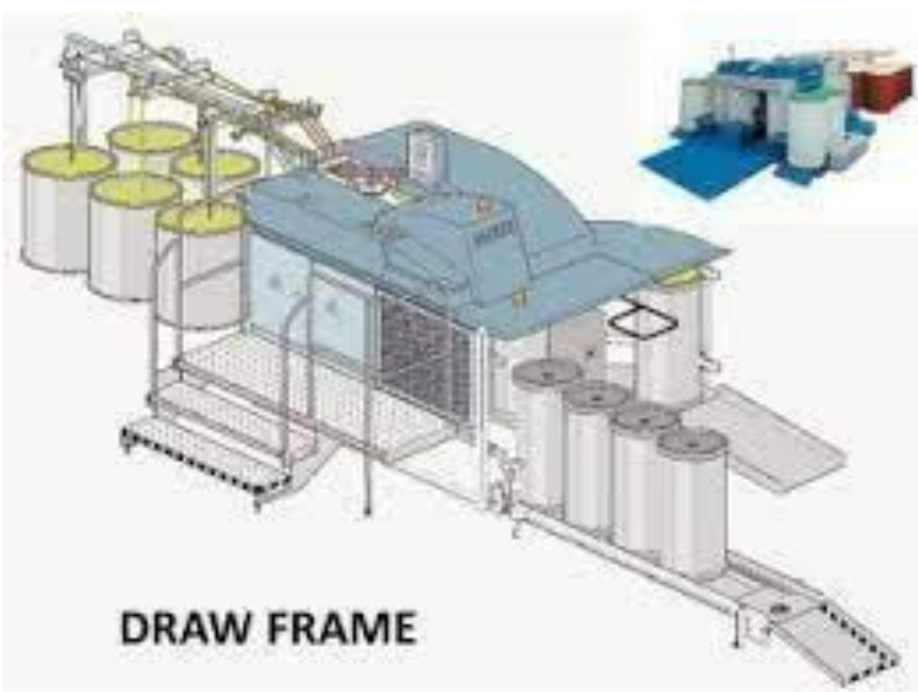
- Reduction of neps

The operation of carding is performed by using oppositely disposed sets of teeth or small wire hooks.

Figure -1 CARDING

2.1 DRAW FRAME

Draw Frame is a machine for combining and drawing slivers of a textile fiber (as of hemp for rope manufacture or cotton for spinning). Draw Frame is the operation by which slivers are blended, doubled and levelled. In short staple spinning the term is only applied to the process at a draw frame.



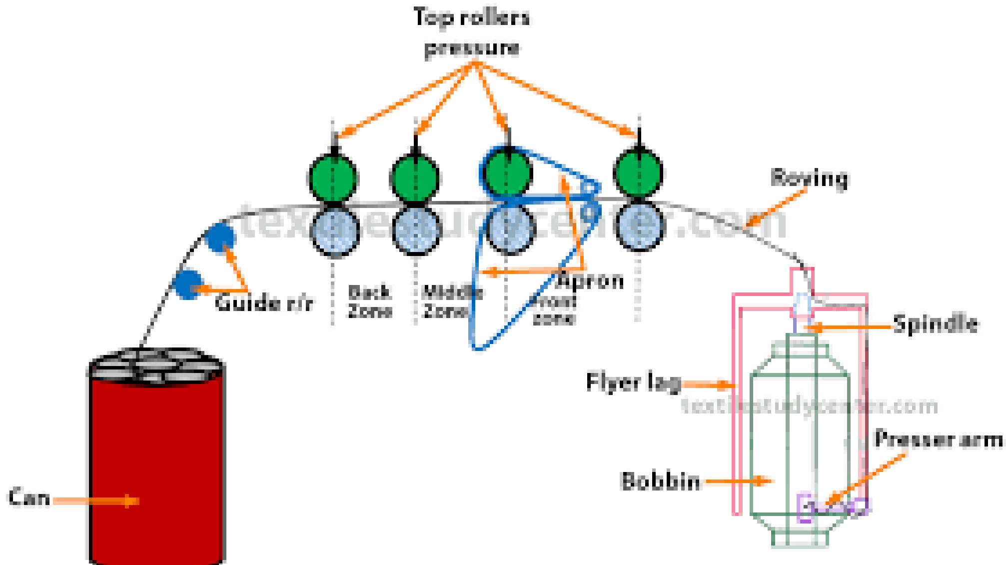


Fig: The twisted-roving system

2.2 SPEED FRAME

The first reason is related to the required draft. The draw sliver is to thick, untwist strand that tends to be hairy and to create fly. The draft needed to convert this to a yarn is in the resign of 300-500.The speed frame process minimizes the sliver weight to a suitable size for spinning into yarn and inserting twist, which maintains the integrity I the draft strands. It is impossible to feed the sliver to ring frame for yarn production due to limitation in draft in ring frame. So the fine twisted roving is better to this purpose.

The second reason is related with transportation and space limitation on ring frame. The draw frame can represent the worst conceivable mode of transport and presentation of feed material to the ring spinning frame.

Machine specifications:

- ▪SPINDLE SPEED=800 Rpm
- ▪ROVING COUNT=1.6 Ne
- ▪YARN COUNT=36 Ne
- ▪TPI=21

- ▪TM=3.5

- ▪TWIST DIRECTION= Z

- ▪BREAK DRAFT= 1.3

- ▪YARN LENGTH=20000m

3. RING FRAME

The ring frame process is the last and the most important process in the yarn manufacturing process. **"*The machine which converts the roving into desired yarn count is called ring frame*"**. It is the most commonly used method in the yarn manufacturing process. The final yarn of the required count gets spun on the ring frame machine. The roving obtained from simplex machine gets used as input material in the ring frame process. Three actions (drafting, twisting and package formation) are performed simultaneously and continuously in the ring frame process. The material is drafted so many times of its length according to yarn count to be spun. After drafting, a required amount of twist is inserted to the fibres strand to hold the fibres together strongly. Now this yarn gets wound onto the ring bobbin. These ring bobbins have very low amount of yarn on them, so that yarn from these bobbins is transferred on the large package which is called the cone, cheese or spool. This machine is suitable to spun cotton, synthetic and many other fibres efficiently. The widest range of yarn count can be spun on the ring frame. The yarn produced on the ring frame machine has very good tensile strength, elongation percentage, yarn evenness and hairiness properties. The ring-spun yarn is more expensive than the open-end yarn.

Machine parameters	Types of yarn	
	Conventional ring spun yarn	Compact yarn
Twist per inch (tpi)	28.00	27.25
Ring traveler size	4/0	4/0
Spacer (mm)	2.50	2.50
Spindle speed (r.p.m)	16000	16500
Ring diameter (mm)	38	38

Table 1 Ring Frame

4. CONCLUSIONS

The kapok/cotton blended nonwoven was produced with three different blend ratios 80:20, 70: 30, and 60:40 with three different thickness 3mm, 2 mm and 1.5 mm. the thermal conductivity of the sample was assessed for single layer, double layer, and triple layer. The single layer sample shows less thermal resistance than comparing with triple layer due to the entrapped air in between the layers and the thermal resistance increases with increase in thickness of the fabric. The air permeability and water permeability of the sample were also assessed and the air permeability and water vapor permeability is not influenced by the type of fibre. The oil sorption capacity of the kapok fibre is better than the cotton fibre. So kapok can be used as nonwoven along with cotton fibre, where the thermal insulation and oil sorption properties are necessary.

5. ACKNOWLEDGEMENT

Achieving required yarn quality at lowest possible cost, consistency in yarn quality for a long run and stability in mixing cost over a period of time are expected from a good mixing.We

6. REFERENCES

[1]. P. Taylor, N. Ali, M. El-harbawi, A. A. Jabal, and C. Yin, “Characteristics and oil sorption effectiveness of kapok fibre , sugarcane bagasse and rice husks : oil removal suitability matrix,” no. October 2014, pp. 37–41.

[2]. H. Xiang, D. Wang, H. Liu, N. Zhao, and J. Xu, “Investigation on sound absorption properties of kapok fibers,” Chinese J. Polym. Sci., vol. 31, no. 3, pp. 521– 529, 2013.

[3]. X. Huang and T. Lim, “Performance and mechanism of a hydrophobic – oleophilic kapok filter for oil / water separation,” vol. 190, pp. 295–307, 2006.

[4]. Tatjana rijavec, “Kapok in Technical Textiles,” Tekstilec, vol. 51, pp. 319–331, 2008.

PRODUCTION OF ECO-FRIENDLY VEGAN LEATHER USING BIO DEGRADABLE WASTE

1. M.Lokhitha , Fashion technology , Sona College Of Technology , Tamilnadu , India.

2. A.Shiney Pearlin , Fashion technology , Sona College Of Technology , Tamilnadu , India.

3. S.S.Sowndharya , , Fashion technology , Sona College Of Technology , Tamilnadu , India.

ABSTRACT

Leather is a strong, pliable and durable material. Every year billions of animals are slaughtered to obtain leather. In addition to this act of cruelty, minimum 160 litres of water and hazardous chemicals are being used. As a result, the environment is polluted and the workers of tanneries are often diagnosed with respiratory diseases like asthma, bronchitis, tuberculosis etc. To stop this cruelty act and save the environment, we have innovated an eco-friendly, sustainable and bio-degradable leather. Our eco-friendly vegan leather is obtained from the bacterial yeast colony by reusing the bio wastes like decayed fruits, bagasse fibre, coffee residue etc. The process involved here is fermentation and it is quite simple and easy to produce. Production of our new vegan leather will definitely stop the cruelty act of slaughtering of animals, reduces the negative environmental impact and also it is affordable. Since it is vegan and affordable it will definitely attract both value buyers and price buyers. This will have enormous scope in future.

1.INTRODUCTION

Leather can be used to make a variety of items, including clothing, footwear, handbags, furniture, tools and sports equipment, and lasts for decades. A leather alternative (or) a leather like material that isn't made from any animal skin is called vegan leather

1.1 Objectives:

- To stop the cruelty act against animals

- To save the environment from toxic chemicals (used in leather production)

- To produce a vegan leather that is affordable

- To produce a vegan leather that is strong
- To reduce the manufacturing cost

1.2Concept:

The foremost important concept is to produce vegan leather that is affordable to all and to stop the cruelty act that takes place against animals to obtain leather. The entire process is carried out in the simplest way. The by-products that directly go to waste such as coffee residue, bagasse fibre, and decayed fruits are collected, liquefied and added to the bacterial yeast colony in a container. The container is cover with a cloth and is kept in a dark room for fermentation. After 30days of time the layer formed will be taken and dried to obtain our vegan leather. The left out solution is taken as manure for the plants.

2.Problem and solution

2.1 Problem Statement

Leather is a material obtained from the skin of animals which is durable, strong, flexible and being used widely. Every year billions of animals are slaughtered cruelly to make leather. To convert a raw hide into leather numerous processes are being involved. One of the major processes is tanning. In this process of tanning hazardous chemicals are used and pollutants like sulphide, ammonia, chromium etc are released which results in negative environmental impact. To make one kilogram of leather 40-45 litres of water and even sometimes160 litres of water is consumed. The people who work in the tanning are often diagnosed with respiratory problem and lung diseases such as asthma, bronchitis, pulmonary tuberculosis etc. to get a good quality of leather we also have to spend more money on it. In short manufacturing of leather results in negative environmental impact and it is non- eco-friendly.

2.2 Solution

Our research involves in producing a cruelty free vegan leather which is totally eco-friendly and sustainable. This cruelty free vegan leather is obtained from bacterial yeast colony by means of fermentation process. This is the best alternative to the animal skin leather as this doesn’t have any wastage of water or any by- products that is formed out of it. The process of fermentation is speeded up by adding lemon as a catalyst. This results in the reduction of fermentation duration from 45 to 30 days. The durability can be increased by seaming techniques.

3 Experimental Procedure

The entire process is carried out with proper ventilation and sterilization. The process of the formation of raw leather is explained below.

STEP 1 : The sterilization of container and muslin fabric are done.

STEP 2 : Decayed fruits are collected , they are transferred into mixer to liquify and transferred to the container where we would like to grow our leather.

STEP 3 : Add coffee residue to get exact shade of the leather and mix it well.

STEP 4 : Add 1 teaspoon of activated yeast to it as catalyst and bagasse fibre is added

STEP 5 : Then add bacterial yeast colony to it and atlast half of the lemon is squeezed into it to speed the fermentation process, and mixed well.

STEP 6 : Container is closed with muslin cloth and the setup is kept in dark room with proper ventilation for 30- 45 days.

STEP 7 : Fermentation takes place.
STEP 8 : Then the layer is formed which is converted into leather by drying. STEP 9 : Then finally raw leather is converted into product as our wish.

4. CONCLUSION

We have took the most important tests for our leather, the tensile and tearing strength test. The tensile strength of our vegan leather is around 6.6N/mm2 for 0.25mm and tearing was around 5.7 N. This is not equal to leather, but still it is almost equivalent to the real leather. Hence our new innovation- our vegan leather is the best alternative for the real animal skin leather.

We have also applied for the provisional patent for our innovation.

6. REFERENCES

1. "Leather processing, its effects on environment and alternatives of chrome tanning.", Karanam Sai Bhavya,

2. Raji P, Jenifer Selvarani A, Antony V Samrot, Pazhayakath Thevarkattil Mohamed Javad, Appalaraju, V.V.S.S, DOI: 10.34218, International Journal of Advanced Research in Engineering and Technology (IJARET) Volume 10, Issue 6.

DEVELOPMENT OF UV RESISTIVE FABRIC PRODUCED BY JUTE, KAPOK AND EPOXY

Logeswar S T, Department of Textile Technology, Bannari Amman Institute of Technology, Tamil Nadu, India

Thirumaruthi D, Department of Textile Technology, Bannari Amman Institute of Technology, Tamil Nadu, India

Rishanth P, Department of Textile Technology, Bannari Amman Institute of Technology, Tamil Nadu, India

ABSTRACT

This paper deals with the development of UV resistive fabric produced by jute, kapok and epoxy The Jute fabric is coated with the epoxy resin to resist the ultraviolet radiation from the sunlight and coating of kapok fiber over epoxy resin gives good thermal resistivity and sound proofing property also. Jute fabric offers a number of distinct physical characteristics, including strong tenacity, bulkine, heat and sound insulation, low thermal conductivity, and antistatic qualities. When Jute fabric is coated with Epoxy resin it will gives good UV resistive property also. Kapok fibers are good thermal insulators owing to its hollow interior that constitutes 80% of its entire volume and their insulating power is even greater than wool. Since kapok has a large surface area and hollow structure, the fiber exhibits outstanding moisture transfer properties. Epoxy resin gives good heat resistance and adhesion to a variety of substrates and it has high tensile, compression and bend strengths. Mainly this epoxy acts as an adhesion between jute fabric and kapok fiber.

Keywords: - *Jute fabric, kapok fiber, Epoxy Resin, Thermal insulation, UV resistive, Coating*

1. INTRODUCTION:

Plant components such as cellulose and lignin make up the majority of jute fibres. The bast fibre group includes jute fibre. Jute is one of cheapest and affordable natural fibre from the plant of Corchorus belong to the family of Malvaceae and easily available in market, widely used in localized areas. It maintains good water absorbance level compared with other fibres. West Bengal place a major role in production of jute fibres. Kapok is a cellulosic fibre which looks similar to cotton having smooth, unicellular cylindrical shaped cross section mainly used for bed and pillow filling. Kapok fibre has only recently been spun into yarn, as it was formerly assumed to be non-spinnable due to its waxy coating. African and American countries are the major exporter of kapok fibre. Epoxy resins are manufactured in a factory using mostly petroleum-based basic materials. Epoxy resin is an reactive prepolymer belong to the family of epoxide group these type of resins will react themselves with each other in the presence of catalyst. LY556 is a Bisphenol-A-based epoxy resin that can be used in high-performance composite FRP applications such as filament winding, pultrusion, and pressure moulding. This epoxy act as an adhesive between jute fabric and kapok fibre. The Jute fabric is coated with the epoxy resin to resist the ultraviolet radiation from the sunlight and coating of kapok fibre over epoxy resin gives good thermal resistivity and sound proofing property also.

2. JUTE FABRIC:

Jute Fabric is a textile material coming from the jute plant. Although there are several different plant types of jute, Corchorus Olitorius is one of the most common species used to create jute cloth

(white jute). Other jute art, Corchorus Capsularis (Tossa Jute) is difficult to foster, but it is considered good.

Cotton takes the identify of maximum-produced plant-primarily based totally fiber, however jute is a near second. While jute isn’t very famous withinside the Western world, it's miles one of the number one fabric fibers of India

and neighboring countries. Jute vegetation turn out to be over 10 toes high, and the fibers derived from that vegetation are harvested in a unmarried lengthy string. Therefore, jute fibers are the various longest herbal fabric fibers withinside the world. Jute grows in comparable situations to rice, and this plant is quality suitable to heat regions which have annual monsoon seasons. This crop can't develop in tough water, and ambient humidity degree of about 80% are important for jute manufacturing. The manufacturing of jute cloth has remained in large part the identical for centuries. In maximum cases, mature jute stalks are harvested with the aid of using hand, and they're identical for centuries. In maximum cases, mature jute stalks are harvested with the aid of using hand, and they're then defoliated. Jute fibers may be derived from each the internal stem and the outer pores and skin of the stalk.

A technique called roasting is used to remove non-fibrous tissue from the stems and pores of the Hessian matrix and the skin. After the jute stem is baked, it is possible to replace longer silky fibers and comb. These flavour fibers can then be spun on yarns. Retting softens the stalks and makes it viable to split the fibrous cloth from the unusable cloth with the aid of using hand. While it's technically viable to make jute yarn with computerized machines, maximum jute-generating groups nonetheless depend on analog spinning wheels for this technique. Once jute fibers are spun into yarn, they can be subjected to many chemical processes to make them dyeable, waterproof, or fireproof. The finished rolls of jute fibers are then shipped to the textile manufacturing centre for weaving into garment or commercial fibers.

3. KAPOK FIBRE:

Kapok fiber belongs to the plant cellulose fiber produced in the Kapok factory. It has a perforated frame and a sealed tail, which are acceptable features of applicants for this type of useful textile. However, due to the low bulk weight of kapok (especially density 0.29 g / cm3), short fiber life, and light soil, the cohesive force between the fibers is reduced, and current spinning machines cannot process kapok.

Kapok is a silky fiber that covers the seeds of the Ceiba tree, a member of the family Bombacaseae. Kapok fiber is rich in oil and cannot be spun economically because it does not have excess electricity. It is traditionally used specifically for shareholders, bedding, upholstery, and padding for sound insulation and insulation. Kapok fiber is in the shape of a hole with an outer radius of about 8.25 (±4) _m, an inner diameter of about 7.25 (±4) _m, and a period of about 25 (±5) mm. Combined with an accurate cloth density of 1.3 g / cm3, a huge amount of pores at the confluence of Kapok are available for NAPL sorption. According to a typical analysis, Kapok fiber contains 64% cellulose, 13% lignin and 23% pentosan. In addition to these ingredients, the fiber base contains wax cutting, which makes it water repellent, but is mainly composed of cellulose.

Kapok fibre reveals higher overall performance in thermal homes in comparison to different herbal fibres. These fibres are used as stuffing for bedding, upholstery, existence preservers and different water-protection system due to its exceptional buoyancy, and for insulation towards sound and warmth due to its air-crammed lumen

4. EPOXY RESIN

Epoxy is the own circle of family members of essential added substances or restored surrender product of epoxy tars. Epoxy gums, furthermore called polyepoxides, are a class of receptive pre-polymers and polymers which incorporate epoxide gatherings. The epoxide helpful foundation is in like manner together alluded to as epoxy. Epoxy gum is thought for its durable cement characteristics, making it an adaptable item in loads of enterprises. It gives protection from warmth and substance applications, making it an extraordinary item for each individual needing a strong keep beneath pressure. Epoxy sap is in like manner a dependable item which might be utilized with different materials, including: wood, texture, glass, china or metal. It's essential to note, be that as it may; epoxy tar isn't thought about to be water safe. Rehashed wet or clammy circumstances can reason crumbling over the course of the years with the aim to meaningfully affect solidness.

4.1. Using Epoxy Resin as Adhesives

One of the most extreme and unusual uses of epoxies is the purpose of cement. This is due to the fixed spots of the epoxy licenses for base cement and design cement. Epoxy pitch is commonly used in the development of vehicles, snowboards, airplanes and bicycles. However, epoxy adhesives are not dedicated to the best basic applications. In fact, these can be used in any application. When you think everything, epoxy is used as a result of various options for its settings. It is dark and free of free options.

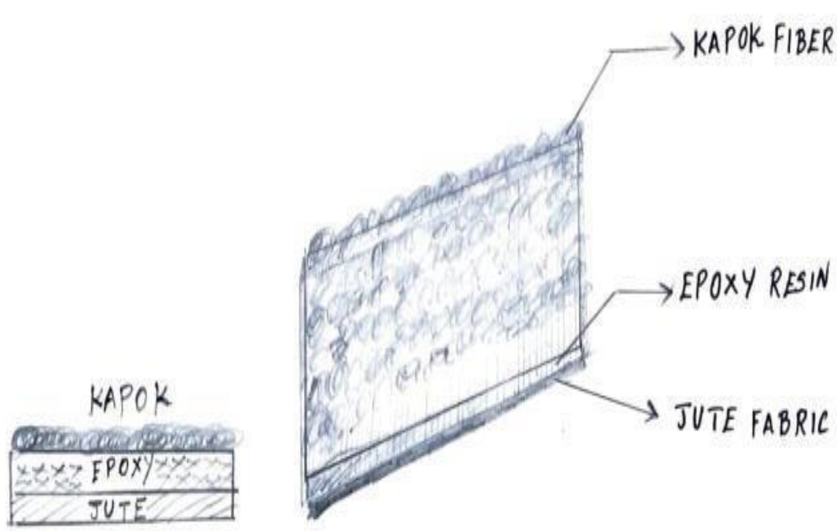
5. FABRICATION PROCESS:

5.1. Preparation of Epoxy resin:

LY556 is an epoxy pitch in view of Bisphenol-A reasonable for superior execution composite FRP applications like Filament Winding, Pultrusion, Pressure Moulding. It has following properties: - Good fiber impregnation properties incredible mechanical, dynamic and warm properties. We have taken a 50ml of LY556 epoxy sap and 5ml of thickener at the proportion of 1:10 and blend the pitch in with the assistance of stirrer for 5 to 10 min and the epoxy gum is prepared for covering process.

5.2. Coating process:

The jute fabric is weighted and the required amount of epoxy is taken and the thin plastic sheet is placed on the table to prevent the sticking of epoxy on the table. The resin is applied evenly over the jute fabric and conforms that the air bubbles are not formed on the epoxy layer. After the process done the kapok fibre is cleaned and spread evenly over the epoxy coating. This epoxy layer is act as an adhesive for combining these two materials. The product is kept in room temper-ature for 48hours for proper curing.




Front & Back view of Coated fabric

6. APPLICATION:

- This is the better alternative for window curtains blinds to resist UV and gives thermal comfort.

- This will be the good sound proofing material and we can use this for Automobile interior works.

- It has good thermal comfort property so we can use this as an building insulation and roofing material

7.CONCLUSION:

In case of observance, the final output material has put into the several treatment. Which may give the extance report on the coated fabrication that lead to the maximum intense level of absorbance for the future aspect material. The flame retardant gives the immature property that may led to the level of absorbance that pretend to the UV lighting and the external wave. When comparing the raw material with coated product the coated plays a good level of water absorbance so it may give a high valuable performance that make a decent level of coating with the kapok fiber. The cellulose structure mixes with the resin and combine with jute fabric has given the proper coated

8. REFERENCES:

1. sewport.com/fabrics-directory/jute-fabric researchgate.net/publication/332710522_Thermal_insulation_properties_of_kapokcotton_blended_non-woven_fabric swicofil.com/commerce/products/kapok/265/properties

2. 4) dalchem.com.au/how-to/what-is-epoxy-resin-used-for dragonplate.com/an-overview-of-epoxy-resins researchgate.net/publication/350709507_JUTE_FIBER- REINFORCED_POLYMER_COMPOSITES_A_COMPREHENSIVE_REVIEW hindawi.com/journals/ac/2017/1049513/

3. researchgate.net/publication/264659097_Jute_Composites_as_Wood_Substitute

4. In case of observance, the final output material has put into the several treatment. Which may give the extant report on the coated fabrication that lead to the maximum intense level of absorbance for the future aspect material. The flame retardant gives the immature property that may led to the level of absorbance that pretend to the UV lighting and the external wave. When comparing the raw material with coated product the coated plays a good level of water absorbance so it may give a high valuable performance that make a decent level of coating with the kapok fiber. The cellulose structure mixes with the resin and combine with jute fabric has given the proper coated outcome gives a valuable product.

5. degruyter.com/document/doi/10.1515/jmbm-2018-2006/html?lang=en researchgate.net/publication/310786203_Nanocellulose_coated_woven_jute-green_epoxy_composites_Characterization_of_mechanical_and_dynamic_mechanical_behavior

6. researchgate.net/publication/236148216_Synthesis_and_Characterization_of_Kapok_Fibers_and_its_Composite

A STUDY ON PROTECTIVE TEXTILE

Shuchi Shrivastava, Lecturer, Department of Textile Technology, Shri Vaishnav Polytechnic College, Indore (M.P.)

Pavan Paradkar, Student, Department of Textile Technology, Shri Vaishnav Polytechnic College, Indore (M.P.)

ABSTRACT

Hazmat suits are needed to protect against harmful chemicals, cold and heat, during factories, agriculture, military operations in hospitals and sometimes for person working at home too. In the chemical explosions. The many requirements have led to the development of different types of protective clothing. The choice of protective clothing should be based on weight, level of protection, comfort and the degree of protection required. Below is an overview of protective clothing, which plays a very imp role in self- protection of a person from

Keywords: Protective Clothing, Hazards, Level of Protection, Selection Criteri

INTRODUCTION:

Scientific achievements in a variety of fields increase the quality and value of human life without doubt. However, in, it recognizes that technology development has large risks, unknown physical, chemical, and the risk of the influence of biological attacks. One of this relevance is a bio-terrorism and a mass destruction weapon of, in addition, we continue to exposeto the risk of fire, chemicals, radiation and biological organisms such as bacteria and viruses. Fortunately, you can use protective measures from simple and effectivemost risks. The fabric constitutes an integral part ofmost protective equipment. Protection was manufactured in, as well assuch as weaving, knitting and nonwoven fabrics, as well as 3D weaving and human fibers using professional technology, such as weaving and weaving. Protection is the main part of the fiber classified as a current technology orindustrial fabrics. Protective blends mean clothing and other manufactured items designed to protect the owner from severe environmental effectsthat can lead to injury or death . Today,risks we exposed are specialized thatclothing would not be appropriate for protection. Extensive research is being conducted on the development of protective clothing for various regular and professional civilian and military occupations 1992; Holmes, 2000). The provision of protection to the public in the event of a catastrophe from a terrorist or biochemical attack is also taken seriously (Holmes, 2000; Leon,

MARKET PROSPECTS

Protective fabrics are the part of technical textiles defined by and include all textile-based products that are primarily used for work or functional properties that are not aesthetic or decorative properties. Consumption of hazmat suits has increased linearly over the past 10 years, with an estimated 340,000 tonesof hazmat suits consumed in 2010, 85% more than consumption in 1995. The Americas (mainly the United States and Canada) are the largest consumers ofhazmat suits at about

91,300 tones, followed by Europe at 78,200 tones and Asia at 61,300 tones (David Associates,2004). All other regions consume only 7,200 tones, which is 3.0% of the total consumption of protective fabrics.

CLASSIFICATION:

Classification of personal protective fabrics is complicated becauseclassifications cannot clearly summarize all types of protection. Overlapping Definitionshasdifferent requirements for technologies and protection for the same kind of protection of many jobs and applications. Depending on the end of use, individual protective fabrics, agricultural protection fiber, military protective fabrics,private protective fibers, medical protection fabrics, sports protectionfabrics and spatial protection fabrics. Thermal (cold) protection, fire protection,chemical protection, exposure prevention, radiation protection,biological protection, electrical protection and owner's visibility can be further classified depending on the visibility of the owner. Unless otherwise specified, this classification is used in the following description

1.Heat and Cold Protection

The basic metabolism that takes place in our body produces heat, which can belife-saving or fatal, depending on the environment and atmosphere we are in. ±86°F) In summer, heat must be removed from metabolic activity as quickly as possible, and in winter, methods must be found to prevent heat loss, especially in extremely cold conditions. Thermal stress, defined as a situation in which the body is unable to dissipate excess heat into the environment, is a serious problem, especially during physical exertion. Richardson and Capra, 2001; Basically, it is delivered to a combination of conductivity, convection, radiant heat , or these modules, depending on the heat source where the atmosphere of the heat source is located and the protection of the heat is available. Heat Exchangeis at least one of these modes is an increase in the fiber speed (6) to reduce at least one mode and heat protection function or to protect heat transfer. For conductive heat heat, the tissue thickness and density of the tissue are major considerations, because the traps between the fibers have the lowest thermal conductivity of all the materials. It is important thatprotection (especially flame flames) for fox heat is important. Fire fabric properties are important. Regarding the radiation radiation heat, the tissue is electrically conductive electricity as well as metalized tissue, as well as high surface reflection as well as high surface reflection, Metalized fabrics such as those are preferred. Ideal garments for protection against heat transfer are fabrics with heat adapting properties.Phase change material (PCM) is one such example where it can enter a high-energy phase, but reverse the process to release heat in a cold environment

3.Chemical Protection

Fortunately, most protections do not participate in the process of dangerous and toxic chemicalsbecause prevention cannot provide complete insulationfor chemicals. Recently, the chemical industry was faced with the original regulatory degree to avoid staff exposed to chemical risks. Chemical Protection Clothing (CPC) should consider the last protective line in chemical exploitation, and if possible, to develop and implementhazardous chemicals, which are less than hazardous

chemicals, you must be tilted. Or removal of contacts withchemical risks. Chemical protective clothing can be divided into encapsulated and non-encapsulated depending on the wearing style. Encapsulation systems cover the whole body and includerespiratory protection and are commonly used wherehigh chemical protection is required. Leak-Proof Clothing is assembled as separate components and the Respiratory System is not part of the CPC. U.S. Environmental Protection Agency (EPA)classifies protective clothing from highest to normal protection based on protection level. The CPC corresponds to four levels of protection, levels A, B, C and D, from highest protection to general protection. European standard for CPC: is based on "types" of clothing based on testing for all clothing, is classified as types 1 to 7 depending on the type of exposure to CPC tight, leak-tight, etc. (Carroll, 2001). Traditionally used disposables are also resistant to a wide range ofchemicals, and some disposables can be repaired with adhesive patches and reused prior to disposal Chemicals in liquid form are used more often than solid chemicals. Therefore, chemical protective clothing must be waterproof or impervious to liquids. Another important function of a chemical protective suit is to protect them from airborne chemicals such as toxic and toxic gases present in the air or fumes, dust and microbes from vehicles. Safety masks containing activated carbon particles capable of absorbing dust present in the atmosphere are commonly used to protect against air pollution.

3.Fire Protection

Humans could not survive without the use of fire in the primitive age of, However, fire can be dangerous. Fires often occur, with non-fatal consequences. Of theincidental fires in residential, occupied buildings, and outdoor fires, the majority of(79% of total deaths in 1986) resulted from fires inhomes, but only 16% of fires occurred in residential buildings The materials most commonly ignited were textiles, particularly upholstery and furniture However, it should be noted that the main cause of fire deaths is not direct combustion, but asphyxiation from the smoke and toxic gases emitted during combustion. In the UK, 50% of 4, fire deaths were directly related to this causeTherefore, the use of non-toxic or low-toxic combustible materials is very important for fire prevention. Protection belonging to protection from flames should be, that is, a firefighter, and a heat barrier must be formed. The latter is a very important factor in if the owner must remain near a spark for a long time. In fact, 75% is the risk of burning to the part of the body covered with a garment that shows that there is a hand and face (Holmes, 2000). Flame meter clothing is generally used in class uniforms (Holmes, 2000). Government rules and security issues are increasing, with children sleeping, carpets, stable organizations and bedding, 2 stable, and clothing and household fibers are required. The use of proprietary flame retardant materials such as Kevlar and Nomex, flame retardant coatings, or a combination of these methods are commonly used to make garments and textiles flame retardant.

CONCLUSION:

Waterproof Fabrics, a closely woven fabric, fine porous membrane and coating, hydrophilic membrane and coating combination, fine porous and hydrophilic membranes and coatings, and combinations of coatings. Technology is constantly developed in the production process, increasing the properties of the material of the film and the coating, and improves the size of the pores and the size of the distribution, and improve the properties of the hydrophilic. Development of robust membranes, and new technologies in various applications (e.g., smart fabrics). Nanotechnology is used for fabric engineer, which respells water and oil without prejudice for natural respiratory and fabric comfort.

REFERENCES:

(1) Authors Ewelina Malek, Dnuta Miedzinska, Michal Dtankiewicz Departemt Military University Of Technology, Faculty Of Mechanical Engineering, Kaliskiego 2 St, 00-908, Warsaw, Poland 2 nd International Conference On StructuraI Integrity, ICSI 2017, 4-7 September 2017, Funchal, Maderia Portugal.

(2) Nishkamkasturiya, M.S.Subbulakshmi, S.C.Gupta and Hans Raj. System design of cold weather protective clothing. Kanpur - 208 013. Mathur, G.N,; Hans Raj &Kasturiya, Nishkam. Protective clothing for extreme cold region. Indian J, Fibre Textile.

(3) Author Mohd Shayan Suhail B.tech(Chemical Engineering) Aligarh Muslim University, Aligarh-202002, India.

(4) Author Taruna Grover, Conventry University, Ameersing Luximon, The Hong Kong Polytechnic University, Asimanand Khandual, College Of Engineering And Technology, Artical In

THE USE OF TECHNICAL TEXTILE IN DAILY LIFE

Kalyan Sarkar, Lecturer, Department of Textile Technology, Shri Vaishnav Polytechnic College, Indore (M.P.)

Krunal Gokhe, Student, Department of Textile Technology, Shri Vaishnav Polytechnic College, Indore (M.P.)

ABSTRACT

Today it is necessary to take a different approach to textiles. Textiles should be considered as materials for all purposes and purposes, not only as graphically interpretable surfaces, but also as having unique internal structures and properties. There are numerous niche markets and products in the field of technical textiles. Medical textiles are a very essential subcategory of technical textiles as they cover a wide range of products. The term medical textile encompasses all types of textile materials used for various purposes in the medical system.The development of sportswear trends in the daily life of consumer has been explainedby the emergence of a new trend called at leisure

Keywords: Textile, Technical Textiles, Clothing\

INTRODUCTION :

If you have fibers, you can provide innovative solutions forglobal issues, such as contamination, health problems, transportation, protection,fiber, all of modern society, parts of cars, buses, trains, vessels and aircrafts or construction elements, protect and self-containedexpressions for homes, office, hospitals, hotels or public buildings, and decorations of the hotel, and a comfortable element.Tents, roof, bridge or stiffener of the road, as well as a bag, network or artificial turf, network or artificial turf, with a bag, network or artificial turf. Sector, has been one of the main tests related to the new business strategy. The fiber product market began to be fundamentally changed, with a low level of innovation and low levels of innovation and technology levels,performances which was identified as a weaker customer. The ARTtechnology and product research, powerful aesthetics as well asspecific and high levels of quality, solutions, production flexibility and high-quality innovation levels using high products using rapid requirements for flexibility and customer service.

SCOPE OF TECHNICAL TEXILE IN DIFFERENT SECTORS:

Technical textiles have brought significant changes to modern technology. Hecontributes not only to the textile sector, but also to some medical, civil and other engineering industries. Although technical textiles are receiving considerable attention, the use of fibers, yarns andfabrics for a variety of purposes other than clothing and furniture is not a new phenomenon.

1.TRANSPORT TEXTILE

Transportation applications such as cars, trucks, buses, trains, vessels andaerospace are the largest United use of technology fiber area , which considers about 20% of total products in the range of carpets and buses throughout, hose belt and enhancement. , Safety belts and airbags, car body wings and engines, civil and military aircraft and composite stiffeners for components ofother uses.

2.MEDICAL AND HYGIENE TEXTILE

Medical and sanitary textiles used as baby diapers (diapers), wet wipes, adult hygiene and incontinence products. All but the last are relatively mature markets where volume growth has peaked. Manufacturers and processors are now looking to further refineto add value to the increasingly sophisticated products. Here, nonwovens dominate applications, accounting for more than 23% of total nonwovens usage, and account for out of 12 products. It plays a big role.

3.HOME TEXTILE

Hollow fibers with excellent thermal insulation performance are widely used in bedding and sleeping bags. Other types of fibers are increasingly being used as a replacement for foam in furniture due to concerns about fire and health risks posed by these types of materials. Textiles or household articles for household use textiles and furniture, especially down filling.

4.CLOTHING COMPONENTS

In the textile and apparel industry, apparel components include fibers, yarns and fabrics, used as technical component in apparel production. These garment components are Thread , Filling, Pads, and Insulation. Here, the Apparel Component does not include the main outer and lining of the Apparel, nor does it include the Protective Apparel or Apparel.

5.GEO TEXTILE IN CIVIL ENGINEERING

Geotextile is technical textile and is mainly used in the civil engineering field, and environmental and economic advantages are well established in the form of separate drainage and filtration using geotextile.

6.SPORT AND LEISURE

There is a great opportunity for the use oftechnical textiles as sportswear and footwear in the sports and leisure market.

CONCLUSION

It is estimated that about 60% of all textiles produced worldwide today contain 4, fibers that were not yet on the market just 50-60 years ago, and 30% of products sold 50 years ago are still un invented. The fabric of the future will be completely reinvented. researchers around the world have been asked about what products will hit the market over the next few decades, and they are convinced that there will be materials that can repair themselves when the is damaged. Textiles with embedded digital devices, smart textiles with nano materials, communications, and soon.

REFERENCES

(1) Tortora, Phyllis G.; Merkel, Robert S. (1996-01-10). Fairchild's Dictionary of Textiles (7th ed.). New York: Fairchild Publications. p. 567. ISBN 9780870057076.

(2) ^ Jump up to:a b Techtextil: Application areas. Techtextil, Frankfurt: Trade fair for Technical Textiles and Nonwovens] consulted 28 March 2015

(3) ^ Anderson, Donald L (2016). Cases and Exercises in Organization Development & Change. SAGE Publications. p. 155. ISBN 9781506365794.

(4) ^ Subhash C. Anand, A. Richard Horrocks (2015). Handbook of Technical Textiles: Technical Textile Processes 2nd Edition. Woodhead Publishing. p. 13. ISBN 9781782424581.

(5) ^ Shukla, Ashutosh Kumar (2020). Nanoparticles and their Biomedical Applications. Springer Singapore. p. 129. ISBN 9789811503917

MODERN DEVELOPMENT IN BLOWROOM AND CARD

Sanjay Gurjar Aniket Bagde# * Sanjay Gurjar, Lecturer, Department of Textile Technology, Shri Vaishnav Polytechnic College, Indore (M.P.)*

Aniket Bagde, Student, Department of Textile Technology, Shri Vaishnav Polytechnic College, Indore(M.P.

ABSTRACT

In the modern age of the industry, the textile industry played a key role in the textile industry. The innovation of spinning textile industry specialization is a model of other sectors of modern technology, and rapidly increases production at medium time intervals that are generally accepted, and the main export sector and dominance of the dominant. The invention of the high modernization machine and the final technology of the modern age robot system has actually replaced the area radiation system while maintaining time and increasing productivity, reducing general principles. Very efficient rotating technology cavities have changed common rotation technology through innovative rotating machines. The high-efficiency chrome king machine was considered the most efficient and very innovative technology in the rotation era. This chapter of this book has discussed the use of innovative machinery and robotics in spinning technology to save time, reduce yarn defects and improve cotton yarn spinning quality.

Keyword: Advance Spinning Process, Cotton, Blow room, Carding

INTRODUCTION

When processing materials, different types of machines are required, such as opening machines, cleaning machines and mixing machines. Different processing intensities are also required as the beam is constantly getting smaller as it moves from step to step. Therefore, it is ideal to rough clean the machine after the bale opener. For example, inappropriate at the end of a line. So there is no universal machine, a blow shop line is a series of different machines arranged in series and connected by transport channels. In the line, each machine offers optimum performance. Other locations give less than optimal performance. It can also benefit from different modes of transport, feeding, handling, cleaning, etc. from one machine to another along the line. The Blowing Room consists of several machines used in succession to open and clean the cotton fibers. As the fluff becomes smaller and smaller, the required processing intensity requires different machine configurations.

Importance of Blow Room

The blow room is the first working area for short staple spinning. Enormous first and pre-mechanical loads are applied to the fibers in this area. The Blow Room employs a technique involving the rotation of short staples

BLOW ROOM LINE

1. Bale opener UNIfloc A 11;

2. Pre-cleaner UNIclean B 12

3. Homogenous mixer UNImix B 75;

4. Storage and feeding machine UNIstore A 78; 5. Condenser A 21;

5. Card C 60;

6. Sliver Coiler CBA 4

RECENT DEVELOPMENT IN BLOW ROOM

The current trend in spinning mills is to replace manual bale openers with automatic bale openers. Automatic bale openers produce smaller batches, improving the opening and cleaning efficiency of subsequent machines. The manual baling process relies more on the integrity and efficiency of the operator, and the bundles supplied to the bale openers vary in size. 1. The Rieter UNIfloc A11 uses a single pull roller called a deflection roller. Automatic bale openers gradually level the bales by measuring the profile of the stacked material at regular intervals. 2. The Trützschler BLENDO-MAT BOA is equipped with two counter-rotating plugging rollers. Three different batches of cotton/blend can be processed simultaneously, which can be fed to three separate wash lines. 3. The automatic bale opener Marzoli Super Blender B12SB has two draw rollers with 254 blades on each roller to ensure small flocks. The automatic bale opener can handle 4 different mixes. The declared productivity at a working width of 2250 mm is 1600 kg/h. 4. Automatic Drawer The Lakshmi LA 17/LA 28 is equipped with a double draw roller. Picking roller grids are selected according to the required bundle size. Small Blowing Line: Using 3 or 4 drums (Trützschler CVT4 Cleaner) in series on one machine instead of 2 or 4 machines in series ensures the same cleaning. In this way, modern blow shop lines are shorter without sacrificing quality.

CARD

Carding is a second spinning process that transforms the feed material (overlap) into uniform strands of fibers called “slivers”. A high-quality carding of cotton is very important because the quality of the yarn is highly dependent on it. The nep rate of the yarn depends on the quality of the carding process. "Cards are said to be the heart of spinning." In the carding process, the material passes through a carding machine. The fibers are parallel to each other. During this operation, the fibers are entangled and can remove all kinds of impurities present on the cotton. Carding, stripping and lifting operations occur during carding operations. A continuous and uniform parallel fiber sliver is thus obtained that is substantially free of impurities after carding

OBJECTIVE OF CARD

Here are the main goals of the carding process: • Full opening of the cotton bundle (individual fibers of the cotton bundle are opened during the carding process). • Make the fibers parallel to each other along the length of the tape. Removes impurities present on the surface as much as possible. (To achieve higher cleanliness. Today's cards achieve 90-95% cleanliness. So the overall cleanliness of the blower and card chamber is 95-99%. Card tape still contains 0.03-0.05% contaminants. • For removal of very short fibers that cannot be spun yarn. • Remove any neps present in the material from previous processes such as blowing and mixing • For fiber blending and achieving fiber blending. • To finally turn the cotton web into a uniform ribbon

FUNCTIONS OF CARDING MACHINE

1. Individual Textile Opening
2. Impurity Removal
3. Liberation Nep
4. Dust Removal
5. Remove Short Fibers
6. Blend Fibers
7. Orient or Align Fibers
8. Add Tape Forming Tape Layers

RECENT DEVELOPMENT IN CARDING MACHINE

- Higher production rate up to 250 kg/hour
- Direct feeding system FBK: Chute feed
- Feed rate control system: CFD (CORRECTA FEED)
- Multiple lickerin system: 3 Lickerin
- Precision Flat Setting System PFS
- Precision Mote Knife Setting System PMS
- Aluminum flats without bolted connection
- Computer control with Touch Screen
- Electronic Flat Measuring System FLATCONTROL TCNCT

• ONline nep counting with NEPCONTROL TCCNCT

• Waste quality measuring with WASTECONTROL TCWCT

• Digitally controlled, maintenancefree servodrives

• Integrated Carding Grinding system:

• IGS Tops

• IGS Classic

• Magnetic flat bar: MAGNA TOP

• Integrated and continuous suction system

• Larger can size: 1000X1200 mm

• Roller doffing system

Grinding and Its Importance:

There are three areas in any carding machine. These are: 1. Opening and Cleaning area 2. Carding area 3. Sliver formation The main segments of carding machine are covered by card clothing. These metal cloth with sharp wire. The wire looses its sharpness due to metal to metal or metal to fiber friction. That’s why it needs resharpening

CONCLUSION

Rieter blow chamber is an important part of yarn production. This is the first m/s going into the card m/s. It follows some linear textile processing patterns. It is very important to follow these lines in order to complete the treatment correctly. Carding is the process of making fibers into parallel alloys. This is required for all staple fibers. Otherwise, fine threads cannot be produced. The remaining impurities must be removed before the raw material is turned into yarn. The fibers must be at different angles and rotate in a straight line. Cards are coarse-spun mills, well-combed ones are semi-spun. It shows the deep meaning of carding for final opening work.

REFRENCES:

1. K R Salhotra: Significance of Modern Developments in Blowroom, NCUTE Pilot Program on Spinning, Blowroom and Carding, IIT Delhi, Oct 9-11,1998

2. Blowroom System: Variations on Success, Reiter Textile System Information Brochure.

3.UNIfloc A 11: Efficient Cleaning Starts with Small Tufts, Reiter Textile System Information Brochure. 4. Hans Roosli: Reiter Blowroom and Carding - The Choice for Success in The New Millennium, RieterTextile System Information Brochure

5. Rajendra Ghatage: Modern Concept in Blowroom and Carding, NCUTE -- Program on Latest Textile Machinery Used Globally, D K T E, Ichalkaranji

AGRO TEXTILES: PROPERTIES, MANUFACTURING AND APPLICATIONS

*Shuchi Shrivastava Faculty, Department of Textile Technology, Shri Vaishnav Polytechnic College, Indore (M.P.) #Sachindra Vishwakarma, Student, Department of Textile Technology, Shri Vaishnav Polytechnic College, Indore (M.P.)

ABSTRACT

Agricultural textiles are the most important and growing sector of all industrial textile sectors. Covers all fibers from horticultural applications to fish and livestock applications. However, it can be said that the importance of agrochemical fibers is of global importance. Also in India, some applications of agrochemical fiber have produced excellent results and have a positive effect on the growth and production of various crops and vegetables. The main purpose of of this study is to provide an overview and importance of agricultural textiles and represents the prospects of agricultural textiles for the future of India. Some market analysis was performed for this study, which suggests an increase in local production and use of agricultural machinery. Another objective of this study is to provide entrepreneurs, entrepreneurs and entrepreneurs with an understanding of this sector and encourage investment

Keyword: - Agro textile, Agriculture, Synthetic fiber, Horticulture, Protection.

INTRODUCTION

Agriculture, Forestry,Horticulture,Floriculture,Fishery,Landscape Horticulture, Livestock, Aquaculture, and Agricultural Technology. All of these industries collectively referred to as Agricultural Technology Sector. Agro textile is the application of textile materials in fields. This is a very important part of industrial textile. The word "AGRO TEXTILE" is now used to classify woven, non-woven and knitted fabrics used in Agricultural Industry , including livestock protection, awnings, weed and insect control, and cultivation. season extension. As the global population of 4, continues to grow, the pressure on crops has increased. Therefore, is needed to increase the yield and quality of agricultural products. However, does not fully satisfy the traditionally accepted methods of pesticide and herbicide application. In today's agriculture and horticulture sector, they realize the need of tomorrow and have made a choice in favor of different technologies to achieve higher yields, quality and taste of produce.

FIBERS USED IN AGRO TEXTILE

Man-made (synthetic) fibers are preferred over natural fibers for agricultural use due to their high strength, durability, and other properties that make them suitable for agricultural use. Natural Fiber Pesticide, on the other hand, has specific uses as well as decomposes over time to act as a natural fertilizer.

PROPERTIES USED FOR AGRO TEXTILE

1. Tensile Strength

The tensile strength of an awning mesh can be a decisive factor in its durability and service life. A good tensile strength is therefore an essential parameter of shade netting

2. Bio- degradability

Natural fibers such as wool, jute and cotton are also used where biodegradability of the product is required. Natural polymers provide the biodegradability benefits of , but have a shorter lifespan than synthetic materials

3. Abrasion Resistance

The wear and tear the shading mesh is subjected to can be either the material itself (material to material) or a stray animal. As the shade mesh wears, it creates holes where animals and pests can enter the structure and damage the crop. Awning nets require good abrasion resistance

4. Protection Property

The wear the shade mesh applies to can be either the material itself (material to material) or a stray animal. As the shade mesh wears, it creates holes that allow animals and pests to enter the structure and damage the crop. Tarpaulin nets require good abrasion resistance

5. Protection Property

It must have the properties of balancing temperature and humidity by protecting it from the wind and creating a microclimate between the land and the nonwoven. This increases the temperature in the root zone. It is that causes early harvest, sufficient rigidity, flexibility, uniformity, elasticity, biodegradability, dimensional stability and resistance to moisture. Germicidal coating to prevent soil contamination (up to 2% of total mass.

ADVANTAGES

Agro textile is an environmentally friendly technology that reduces the need for fertilizer, water, harmful pesticides and herbicides, provides a healthy crop, and is environmentally friendly. Prevents soil drying and increases yield. Thermal Protection fabric is treated with UV stabilizer, saving up to 40% energy in the greenhouse, which prevents stains and improves color uniformity. Increases the early maturation of crops and non-seasonal plants and protects them from climate

change and its impacts. Agro textile prevents branch breakage, improves crop cleanliness, simplifies harvesting and provides more space. Agricultural Textile can improve the quantity, quality and safety of agricultural products due to excellent environmental resistance, mechanical properties, ease of processing and durability characteristics. Currently, textile products are operated as a

relatively important part of agriculture under climate situations and production conditions. Exceptional ecology, mechanical properties, simple methods, ecological characteristics, agricultural products, agriculture, resource safety, agricultural environmental safety, market competitiveness of products can improve the quantity and quality and safety of the product. The yield yield and product improvement and increased quality by increasing the quality. These fabrics protect the farmer from harmful pesticides. Textile products such as AGRO settings and shadows on the column screen can save 40% to the energy used in the heating greenhouse. It has also been found that the use of agricultural acids generates development as a fruit and prevents color homogeneity and prevents dyeing. As a result, an agricultural fiber use critical roles to help the waiting to help, eliminate climate change, change of weather conversion, and generates optimal conditions for improving plants. Therefore, demand for fiber products in the field of Agriculture has enumerated and role of herbicides to reduce the use of toxic pesticides, reducing the use of toxic pesticides and to create emphasized cultures of healthy agriculture.

SOME APPLICATIONS OF AGRO TEXTILE

1. Ground Cover Net

Ground Cover is a very versatile landscaping and horticultural fabric for long term weed control, moisture retention and separation. It effectively inhibits the competitive growth of weeds, retains soil moisture, maintains a clean surface, protects from UV rays and creates a favorable environment for healthy plant growth. Ground cover can save money and minimize the use of unwanted herbicides. It is mainly used in border and rock gardens, nurseries, greenhouse floors, soft fruit beds and orchards, pavement areas, horse bridles and seed collection areas. We use 100% polypropylene.

2. Windshield/ Wind Protection Net

Windscreens are used in agriculture to protect fields of young plants, fruits, trees or crops from wind damage. Installing the windshield at a right angle will help prevent extinction or destruction of young seedlings and mature plants. The nets used here help to reduce the effects of strong winds and keep the sand and salt of areas close to the sea floating in the air. Protecting plants from strong inds also promotes plant growth and reduces the number of irrigation required. It also prevents the plants from cooling down by the wind.

3. Insect Meshes Net

Various pests, such as powdery mildew and scale beetles, often infect some ornamental plants and vegetables. Clearly woven and knitted nets made of polyethylene monofilament to protect against

pests in greenhouses and tunnels or to keep pollinating insects inside. A thin woven net protects plants from insect attack (no pesticides used)

AGRO TEXTILE IN INDIA

The use of agrochemical fibers in India is diverse. In India, farmers are using alternative ingredients for pesticides. Most farmers cannot afford to directly purchase pesticides and instead use alternative materials to achieve their pesticide purposes. The insect screen is not actually an insect net, but it does use a fine mesh that serves its locally intended purpose. These nets are available in a variety of mesh sizes depending on the end use. Some brown mesh bags have been shown to be used to grow mangoes, watermelons, eggplants, gourds, and pumpkins. No true mulch in India. Most farmers do not know what mulch is. They use different materials such as PE sheets, jute bags, and dry leaves to act as weed control cover mats. Sometimes water hyacinth, rice straw is used for mulching. In India, cows are raised indoors. Pasture-grazing cows primarily require the use of udder nets. Therefore, the use of papillary nets here is very limite

CONCLUSION

Today, AGRO fibers play an important role in monitoring the production environment of harvest, eliminating climate change and weather conditions, and generate optimal countries for plant growth. Taking Hi-tech Agricultural Technologies Used with Fiber Structures can improve quality and total agro product output. different types of fiber structures are used in Open Field as well as House / Poly House, Green House to monitor environmental factors such as temperature, water and humidity. In agricultural areas, is a healthy agriculture, to reduce the use of textile products and unauthorized pesticides and herbicides. The characteristics of a unique production technology and a mixture of products in this field AGRO fiber sector, pesticide and chemicals less than, herbicides. "Agro textile" provides a multidimensional perspective and solutions to the challenges facing the agricultural industry. Fabrics have proven to be flexible in their suitability for specific geographic locations. Now it's our turn to carefully build this early technology into and contribute to the national economy

REFERENCES

1. Agro-textile Products & Their Usage By- Mrs. Manisha A. Hira Scientist C Sasmira, Mumbai

2. http://www.textilemedia.com/technical-textiles/new-textile-materials/agrotextiles/

3. http://www.textileworld.com/Issues/2005/September/Nonwovens-Technical_Textiles/Agro-textiles A_Growing_Field

4. http://www.indiantextilejournal.com/articles/FAdetails.asp?id=4709

CONVERSION OF TEXTILE HARD-WASTES INTO USEFUL CUSHION FILLING MATERIAL

Chidambara Meena K, Textile Technology, Kumaraguru College Of Technology, Tamilnadu, India
Venkateshwari P, Textile Technology, Kumaraguru College Of Technology, Tamilnadu, India
Sindhoora R P, Textile Technology, Kumaraguru College Of Technology, Tamilnadu, India

ABSTRACT

Today, the textile industry is one of the most polluting industries in the world and in India, it is the third-largest source of waste after plastic, paper and compost. Large textile hubs in the country can produce up to 45,000 meters of fabric waste on a daily basis. And the worst part is, the majority of our clothes goes to landfill, even though we could easily reuse or recycle them. We came up with an idea of converting the fabric waste into filling the cushion by making it into the fiber form.

Keyword: *garment waste, softeners, cushion material*

1. INTRODUCTION

Textile materials of cotton, synthetics and blends in various forms like yarns, ropes, fabric, shirts, pants, children ladies wear etc. Thrown out as waste into waste yarn along with domestic garbage. Based on type of the substrate, the bio degradability level of textile materials varies and takes up a reasonably longer duration. Getting the textile hard waste burnt is the only current option, by which no recycling become feasible.

There is scope to collect the textile hard waste, including production line wastes like chindies, stitches & tearings etc, individualize them to fibrous yarn stage and cut into suitable sample. Inconcorporating bounce finishes like poly siloxane / PU finishes etc, can impart bounce effect on this stapled textile hard wastes. Such finished hard waste tufts can be used as soft cushion filling stuff with better softness and comfort. Cushion filling material compared to synthetic sponge / modified coir materials. Will the an eco friendly option.

1.1. Garment waste

Solid wastes in the apparel manufacturing industries include design and production pattern papers, marker papers, fabric scraps, cutting wastes, and trims such as damaged zippers, thread, buttons, labels, fusing materials, and pads.

1.2 Is garment waste a problem?

And when consumers throw away clothing in the garbage, not only does it waste money and resources, but it can take 200+ years for the materials to decompose in a landfill. During the decomposition process, textiles generate greenhouse methane gas and leach toxic chemicals and dyes into the groundwater and our soil.

1.3 Types of Textile Waste

Textile waste can be classified into three main groups, which are cellulose fiber, protein fiber and synthetic fiber relating to the textile raw material. Cellulose fiber is made from plant materials such as cotton, flex, hemp and ramie.

Types of waste used in clothes

Textile waste is produced in every phase of the textile manufacturing process like spinning, weaving, dyeing, finishing, garment manufacturing and even at the consumer end. We can classify them as, soft waste: Generated from combing, drawing and spinning.

1.4 5S Garment

5S comes from 5 Japanese words and each of them starts with S. These are seiri, seiton, seiso, seiketsu, and shitsuke, if we translate these 5 Japanese words into English then we get Sort, Set in Order, Shine, Standardize, and Sustain. In the garment industry 5S works as a basic tool of Lean Manufacturing, a technique to set a well organized, clean, and visually attractive workplace. That's why the implementation of 5S in the Apparel Industry is required.

Implementing the 5'S method is a base to implement quality improvement/lean procedures. Expecting the team to be and they do activities in each department: like monitoring, evaluate and drive the aspects very clean and organized so that, your Factory will look very planned and well Set-up.

Let's have a look at the difference in English and Japanese words for 5S

	Japanese	English
5S	Seiri	Sort
	Seiton	Set in Order
	Seiso	Shine
	Seiketsu	Standardize
	Shitsuke	Sustain

Figure - 1: 5S

2. METHODOLOGY

We have collected hand waste textile materials in the following categories

1. Jean material
2. Knitted fabrics

3. Cotton waste fabrics
4. Yarn waste
5. Removed fibre waste from knitted fabric scrap

- The various hand waste fabric materials were into small fragments 0.8mm to 1.5mm.
- The cut fabric wastes are bundled in a porous fabric and treated in the required chemicals in a boiling temperature in order to improve the absorbency.
- After boiling the fabric bundle was undergone washing treatment using 1:20 M:L ratio.
- After washing the fabric bundles were squeezed to extract the water. Then it is opened out squeezed, apart by opening the compressed tufts and dried in opener. The dried mess of fabric was further dried in a curing chamber meant for yarn drying, using metal treys.
- As the stage the fabrics were checked for resistance recovery after squeezing.
- The resistance / recovery properly after pressure application was found very low, which meant, we need to give additional bounce resistance finish to that, the material can be used.
- The material was spread into the tub in a uniform manner, the finish solution was sprinkled and mixed together and given wet soaking for 1 hour. The material was squeezed gently and was dried in open air for 3 to 4 days to get rid of all moisture. By regular turning of the material.


CUTTING BEFORE
CUTTING AFTER
1.JEANS FABRIC
JEANS FABRIC
2.KNITTING FABRIC
KNITTING FABRIC
3.COTTON FABRIC
COTTON FABRIC
4.YARN
YARN
5.FIBRE
FIBRE

Collection of garment waste

↓

Soaking treatment

↓

Drying

↓

Chemical treatment with softeners

↓

Final product

3. CONCLUSIONS

The project work was come out very well in turn with the process and end results predicted. The various hand wastes, proceed out into fragments from yarn wastes, denim wastes …. Etc were formed suitable for stuffing as cushion filling material. The absorbency of the fragments means was formed improved by surfactant boiling. The bounce effect feel was successfully improved usually ELASTROMATIC SILICON SOFTENER chemical system. Prolonged sun light curing also gives rejected end results leading to equipment simplification and energy costs. User study using the pillow and cushion made from the hand wastes, revealed stable performance of bulkiness and softeners. Compound to yarn silky / cotton / synthetic stuffing fibres, the textile hand wastes can be usefully recycled with least harm to environment.

4. REFERENCES

[1]. Sakthivel, S., Melese, B., Edae, A., Abedom, F., Mekonnen, S., & Solomon, E. (2020). Garment waste recycled cotton/polyester thermal and acoustic properties of air-laid nonwovens. Advances in Materials Science and Engineering.

[2]. Kavitha, S., & Manimekalai, G. (2014). A study on waste disposal management in garment industry. International Journal of Textile and Fashion Technology (IJTFT).

[3]. Johnson, S., Echeverria, D., Venditti, R., Jameel, H., & Yao, Y. (2020). Supply chain of waste cotton recycling and reuse: A review. AATCC Journal of Research.

HIGH PERFORMANCE FIBER,FIBER FILTER FOR AUTOMOTIVE

S C Bansal, Lecturer,Department of Textile Technology, Shri Vaishnav Polytechnic College, Indore (M.P.)
Sahil Tandekar, Student, Department of Textile Technology, Shri Vaishnav Polytechnic College, Indore (M.P.)

ABSTRACT

High performance, fibers, organic, inorganic, future directions, such as mechanical, dimen-sional stability, and the properties of polymers and non-dimensional fibers such as heat resistance. Growth leads to fiber products with abnormal properties. Like wise,highefficiencyfi- bers are important engineering products and are widely used due to excellent mechanical properties with size stability. They have found wide use with fiber optic reinforcement and canbe used in many applications such as code, rope, productivity fabric, electronic packaging, sports equipment and fiberoptic. The highest intensity and elastic modules reported about these fibers are still well known that they are still much lower than theoretical values.The largeopen gap between theoretical values and actual results encourages scientists to work and improve mechanical properties. On the other hand, due to unconventional chemistry andinstrumentation, many studies have focused on reducing manufacturing costs. Also, no single fiberchemistry can withstand all end-use conditions. The purpose of this review is to provide a critical and constructive analysis of current methods for the production and modification of high-performance fibers. Current issues and new solutions are highlighted separately.

Keywords: *Filter cloth, Technical Textile, Automotive Technology*

INTRODUCTION

Fabric filtration is a widely used method to control particulate emissions .In fabric filtration, par-ticulate-laden gases passthrough aseriesofparallelfilterbags,leaving the fabric dusty. To use the cloth filter or bag filter for a long time, you should periodically clean the Duston the cloth surface and remove it from the bag filter. Anew cloth leaves behind residualmassof dust that becomes the filter material after several use and cleaning cycles. This phenomenon is responsible for the high-efficiency fine particle filtration properties of bag filters. The automotive industry is primarily concerned with the design, manufacture and sale of automobilesand reliesonancillary sectors such as suppliers of rubber, glass, steel,plastics,aluminum,textilesandother accessories. Itis estimated that over 75millionvehicles were produced worldwide during 2011, of whichapproximately60millionwere passenger cars. India's the 6thlargest automobile producer in the world, producing approximately3.9millionunitsper year, and is expected to contin-uegrowingat16-18%peryear.According to the Society of India Automobile Manufacturers, annual car sales will increase to 5million units by 2015 and more than 9million units by 2020.

CHEMICAL STRUCTURE OF HIGH PERFORMANCE FIBERS

1. Aromatic Polyamides:

Aromatic polyamides or aramid polymers include both mermaidens paramid polymers. Aramae-ans that the meta-aramids linked to the meta position of the phenylene ring, and paramid means that the para-aramids linked to the para position of the phenylene ring.

2.Kevlar:

One of the best-known fibers in the aramid family, Kevlar is based on the polymer poly (phenyl-eneterephthalamide)(PPTT). The chemical structure of Kevlar fibers. on figs.6 shows the mono-mers and polymerization process used to make PPTA or Kevlar.

Nomex:

NOMEX Aramid Weibel's based on Phenillidio that amide, which commercialized DuPont in 1967in 1967asAramid fiber. Kevlar between Kevlar between Kevlar and Nomex is that Kevlar is Para aramid, if Kevlar Paraaram ID, is aramid. A small difference in structure leads to a significant difference between physical and mechanical properties. For exam-ple, in a Kevlar, a PPPenyleneth amide, the polymer chain is difficult and difficult to have a polymer chain due to phenylene ring and amide groups. Related to the provision points. However, in NOMEX fibers, phenylene ring and amide groups are randomly linked to induce the lower stretching module, as an irregular structure chain and as irregular structural chains.

TYPES OF HIGH PERFORMANCE FABRIC

1.Polyolethin fibres:

In recent years, there are important demand for various applications in various applications in various applications such as daily life and electric materials, medical, transportation, Geotech style, and sports. Results, excellent inner -chemical resistance, reasonable thermal stability capable of producing low cost. The polyolefin fibres may be formed as a polymer formed by a latch that is formed by a polymerization of polymerization composed O'Faolain (alkene) such as ethylene ,propylene or other ole fine block. Indeed, dominant products for polyolefin fibres are polyethylene with high-rise(HDPE) and polypropylene, which are very diverse plastics, which are very versatile and various materials,70 and14.5billiondollars. In2019, the World Market Super Polymer Polyethylene (UHMPE) or polyethylene fi-bre(HPPE)is ahigh strength, which is a high module based on a simple and high-cost polyeth-ylene molecule. These fibres are chemically the same as normal PE. For example, as con-structing a very long chain, such as constituting a very long chain, the orientation of high-level and high crystallization is the orientation of high-level crystallization, and the current high effi-ciency polyethylene fibre(HHPE)is Dyneme HIGH PERFORMANCE DYNEEMA and Japa-nese joints in the Netherlands Venture to be commercially available from venture toys / DSM. Another brand is-Spectra®, which produced US Honeywell (formerly agonist signal so federated fibres).

DEVELOPMENT OF FILTER CLOTH

The design of the filtering medium depends on heat and chemical conditions, filtering requirements, equipment consideration and cost. The type of polymer to be selected for filtering depends on the heat and chemical state of the material to be filtered. Natural fibers, such as those thatcan produce high efficiency media for filtering, but can produce very efficient media insurability, are limited to use compared to synthetic fibers. Polyamides, polyesters and polypropylene can be used as fabrics for filtering, but PTFE(Fluoroethylene Polymet- ric)for manufacturing bags for manufacturing bags is in vivo, because it is resistance to all chem-icals, and bio compatibility and hydrophobicity in nature. Low melting points, low thermal con- ductivity, and low load capacity are used only for optical low speed applications. The filter fabric is used to maximize particles from liquids and is not always necessary for absolute sharp- ness. In some Grava rials, the vacuum screening operation of the filter fabric is for capturing particles that simply exceeds specific size , and in other filtering systems, the filtering systemcan be allowed to measure the solids of the filter, and the necessary sharpness maybe achieved .Various fiber structures such as mono and total volume, multilayer(porous or fiber diameter)are different from the diameter of porous or fibers, and composed of layered layers)are used for manufacturing and specific purposes. Bio Foldlin remains a problem that is still not resolved. Mellow technology with double extruders can generate fiber filters with antimicrobial nano purloinments located on the surface.

CONCLUSION

Filtration is considered a core stone cleaning of water and waste water, and is used for a variety of purposes such as deposited dehydration and concentration of any solution. The material can also be removed from a molecular and ion chemical species to a membrane filtering technology extended from large visible particles. The filtering performance depends on the operating conditions such as fluid properties, filtering speed, and filtering media. Among them, the correct choice of filtering media / membrane materials in the filtering Process is often the mostimportant considerations to ensure effective separation .Filter media can be classified as building materials such as wool, underwear, glass fiber, porous carbon , metal and region
. Recently, new polymeric materials were used individually and / or mixed in filtration processes for water and waste water treatment. The purpose of this chapter is to attract reviews of organizational filtering materials in filtration applications in existing filtering, as an ad- vanced membrane process. There are very few reports on the filtering media, but in the classic, the Raul Sege technology is used to use the filtering material in the premium membrane process in the classic. Textile materials and membranes are two important factors of surface filtering
.The surface filtering capacity is closely related to the physical properties of the filter surface. It creates a new material or surface of an existing material to increase the performance of the filter surface .Such modifications may comprise the use of various chemicals (e.g., polymer mixtures)(e.g., nano particles, nano pipes) (e.g., nanoparticles, nano pipes) (e.g., na- noparticles, nano pipes) (e.g., nanoparticles, nano pipes) (e.g., nanoparticles, nano pipes).In recent years, the fiber nano fibers have emerged in liquid filtrations with unique properties such as high aspect ratio ,wide non-surface area, unique physical and chemical properties and

chemical / physical surfaces, and will attract more attention Liquid and gas filtration In the near future as a filtering material.

REFRENCES:

1. Akers, P., Chapman, R., 1987. Properties and performance of a new flame retardant poly-acrylate fibre. Lenzing. Ber. 44–46, Aqusia®, KB Seiren, Ltd., 2016.
2. http://www.kbseiren.com/english/pro-aqu.html(accessed June 2016).
3. Bajaj, P., Sengupta, A., 1992. Protective clothing. Text. Prog. 22, 1–110. Belima, KB Seiren, Ltd., 2016.https://www.kbseiren.com/english/pro-b1.html(accessed June,2016).
4. Bourbigot, S., Flambard, X., 2002. Heat resistance and flammability of high performance fibres: a review. Fire Mater. 26, 155–168.
5. Cannon, S.L., McKenna, G.B., Statton, W.O., 1976. Hard-elastic fibers (a review of a novel state for crystalline polymers).
6. J. Polym. Sci. Macromol. Rev. 11, 209–275.
7. Casey, P., Chen, H., Poon, B., Bensason, S., Menning, B., Liu, L., Hu, Y., Hoenig, W., Gelfer, M., Dems, B., Rego, M., 2008, Polyolefin based crosslinked elastic fiber: a technical review of DOW XLA™ elastic fiber technology. Polym. Rev. 48, 302–316

DEPARTMENT OF TEXTILE TECHNOLOGY

Vision

To be a Centre of Excellence in Textile Technology and Management with basic and applied research for the fulfilment of societal needs.

Mission

- **Develop industry relevant curriculum**, innovative teaching and project based learning methods that enables students to be efficient professionals.
- **Motivate Faculty** to update their knowledge and skills through continuous learning.
- **Provide holistic student development** by creating opportunities for lifelong learning and to develop entrepreneurship skills.
- **Undertake inter-disciplinary research and development**/ Internship/Consultancy in the field of Textile Technology to support the industry and society.

B.TECH (TEXTILE TECHNOLOGY)

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

Graduates of B.Tech Textile Technology programme will

- PEO: 1 Hold leadership responsibilities in Textile and related segments such as product development, production, technical services, quality assurance and marketing.
- PEO: 2 Become successful entrepreneur in Textile and related field and contributing to societal, technological and industry development.
- PEO: 3 Partake professional qualifications/ certifications in Textile Technology related areas by pursuing specialized studies in engineering and business.

PROGRAM SPECIFIC OUTCOMES (PSO'S)

- PSO1: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization for Process Optimization, Cost and Value analysis, Productivity improvement, Solutions to quality issues and Product development in textile and related fields.
- PSO2: Demonstrate learned techniques, experiments, modern engineering tools and software to estimate the optimum utilization resources such as raw materials, machineries, manpower and to predict the properties of fibre, yarn, fabric and garments as per the end uses.

INDER PUBLICATIONS
11/2, Thadagam road, Velandipalayam, Coimbatore – 641 025