A Study of Reactive Dyeing and Enzymatic Treatment on Some Properties of Cotton Knitted Fabric

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Abstract : This paper studied the relationship and effect of reactive dyeing and enzymatic treatment, using cellulase as the enzyme, on some properties of cotton knitted fabrics. Two types of cotton knitted fabrics, single jersey and interlock, were used. These fabrics were treated with reactive dyeing (two reactive dyes of different chemical structures were used) and cellulase treatment. However, the sequence of applying the reactive dyeing and cellulase treatment was varied so as to find out the effect of application on the properties of the fabrics. After applying the dyeing and enzymatic processes, the strength loss, air permeability and dyeability, were evaluated. Experimental results revealed that the cellulase treatment has a more significant effect in the interlock knitted fabric than the single jersey knitted fabric. However, it was interested that the results of the evaluated properties were altered depending on the sequence of applying the reactive dyeing and cellulase treatment. The results were recorded and discussed thoroughly.

Keywords: Reactive dyeing, Enzymatic treatment, Cotton knitted fabric, Strength

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Alternative wet pretreatments for Ramie fabric and their evaluation

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Abstract: In this work, an attempt was made to substitute the conventional pretreatments of ramie with newer methods. Enzymatic scouring with pectinase and xylanase was carried out at fixed units/ml, for removal of specific impurities from the substrate. This was done with a view to have a treatment which is eco-friendly as well as less energy consuming. Also bleaching with potassium permanganate was done as against the usual high temperature hydrogen peroxide bleach. The evaluation of the processes by methylene blue exhaustion, residual lignin content and whiteness test gave satisfactory results. The scanning electron micrographs of selected samples further support the results.

Keywords: Enzyme, Pectinase, Ramie, Xylanase

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Antibacterial Activity by Kaempferia Parviflora Micoroencapsulation from and Applications for Textile Industry

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Abstract: This research was investigated in the efficiency of anti-bacteria by using Kaempferia Parviflora. The results found that Kaempferia Parviflora can be anti-bacteria in Staphylococus aureus type. The mean of Clear Zone Inhibition was 0.41 centimeter. The Process of Microencapsul produce was also studied, the result of which showed the size 10 – 150 µm.

Keyword: Kaempferia Parviflora, Antibacteria Activity, Microencapsul, Polylactic acid, Textile Technology

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Antimicrobial Activity of Chitosan and Tannic Acid on Cotton Fabrious Materials

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Abstract: Chitosan and tannic acid were applied in alone and in combination on cotton fibrous materials for the assessment of their antimicrobial activity. The antimicrobial activity of these antimicrobial agents was better in peroxide treated cotton fibrous materials than their untreated materials. Tannic acid showed higher antimicrobial activity than chitosan when applied alone. The application of chitosan and tannic acid combination on peroxide treated cotton materials provides the highest antimicrobial resistance.

Keywords: Antimicrobial, Chitosan, Cotton, tannic acid

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Application of Aromatherapy on Cotton Fabric by Microcapsules

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Abstract: This research were study microencapsulation method on cotton fabric, satisfaction of consumers towards five aromatherapy; lavender, rose, peppermint, jasmine, and eucalyptus and color fastness to washing according to AATCC 135-2006. The results found that the process of microencapsul was approximated with cool method and rose aromatherapy which showed the smallness size in average 2.4 µm. Finally, the result of the satisfaction found that lavender aromatherapy was 26.7% and the colorfastness to washing in lavender microcapsule was the highest level.

Keyword: Aromatherpy, Bedsheet, Microcapsul, Rose, Lavender, Peppermint

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Application of Nano Technology in Textile Finishing

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Abstract: Nano technology is the science of manipulating individual atoms and molecules for the development of practical application. The Properties of a material changes drastically at the nano scale due to high surface area to volume ratio and influence of quantum mechanics. A great potential has been demonstrated by textile finishing due to the advent of nano technology. Surface properties of a fabric can be manipulated and enhanced, by implementing appropriate surface finishing, coating, and/ or altering techniques, using nano technology in many ways. Finishing of the textile fabric using nano technology can be done, using nano materials in conventional finishing bath and in-situ synthesis of nano material on textile that can form nano structure on the surface. Various new techniques for application of nano material on textile i.e. Sol-Gel coating, Layer by layer deposition and plasma polymerisation can develop a multi functional fabric with relatively high durability, less energy consumption and low chemical usage as compared to conventional methods of application. Nano silver as an efficient leaching agent along with nano titanium dioxide has been stabilized on the surface of the fabric by using a cross linker to provide anti microbial effect to the textile fabric. An Eco-friendly approach for in-situ synthesis of silver nano particle using natural material like eucalyptus leaves has the potential of replacing the other costly chemical synthesis methods for applications of nano material. A fabric can be made a self cleaning using semiconductor nano titanium dioxide and this application has great chances of commercialization for being labor- saving and diverse substrate application. Both antimicrobial and self cleaning effect can be imparted using the combination of nano silver and nano titanium dioxide. Along with that wrinkle resistance can be imparted, using a cross linking agent with above two mentioned material. A Biomimatic super hydrophobic fabric using silica nanoparticles and perfluoro-octylated quaternary ammonium silane coupling agent (PFSC) showed

high hydrophobicity and oleophobicity. A novel durable flame-retardant cotton fabric using sodium hypophosphite, nano TiO2 and maleic acid was developed. The UV-Blocking property of a fabric can be enhanced using semiconductors like Zinc oxide and titanium dioxide to minimize the effect of natural weathering on the textiles used in agriculture and horticulture and to reduce the person UV exposure protecting the skin from damage. Improvement in warmth property of cotton using nano wool fibres indicates that nano wool fibres can be used as a functional finishing agent. Above mentioned important properties imparted by nano materials showed that applications of nano technology are increasing, reason being the increased consumer demands for multifunctional fabric. However few things such as higher cost and release of nano particles that may pose health risk should be taken into consideration.

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Application of Neural Networks for Colour Recipe Prediction of Reactive Dyes

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Abstract: Conventional theory for colour matching is Kubelka-Munk, but it fails in some situations. New intelligent procedures such as neural networks could learn the behavior of a complex system and produce accurate prediction. This paper investigates the ability of MLP (multiple-layer perception) neural network for colour matching of cotton fabric. Three reactive dyes, namely Levafix Red CA, Levafix Yellow CA and Levafix Blue CA, were used for experiments. The dyed samples were scanned and some features were extracted. Different neural networks were trained and tested. The results were encouraging. Colorants and their concentration were predicted with a mean square error (MSE) less than 10^{-3}.

Keywords: Colour recipe, Neural network, Reactive dyes, MSE.

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Application of Plasma in Difference Branches of Industries

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Abstract: Plasmas underlie numerous important technological applications and devices as well as our understanding of much of the universe around us. Plasma processing technologies are of vital importance to several of the largest manufacturing industries in the world. Foremost among these industries is the electronics industry, in which plasma-based processes are indispensable for the manufacture of very large-scale integrated microelectronic circuits. Plasma processing of materials is also a critical technology in, for example, the aerospace, automotive, steel, biomedical, and toxic waste management industries. Most recently, plasma processing technology has been utilized increasingly in the emerging technologies of diamond film and superconducting film growth. The dominant role of plasma-treated surfaces in key industrial sectors, such as microelectronics, is well known, and plasmas, certainly experimentally and, in places, industrially, are being used to modify a huge range of material surfaces, including plastics, polymers and resins, paper and board, metals, ceramics and in organics, and biomaterials. The objective of this work is to give a comprehensive description and review of the science and technology related to plasmas, with particular emphasis on their potential use in the textile industry.

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Application of the Synthesized Arylazopyrazolopyrimidine Dyes in Printing Polyester and Polyamide Fabrics

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Abstract: New series of arylazopyrazolopyrimidine dyes having bright colours were prepared. These dyes were identified and characterized for their: melting point, IR spectra, ^{1}HNMR spectra, Mass spectra and their antibacterial properties.
The use of these new dyes for printing of PE-A, PE-B and polyamide fabrics by the transfer as well as the screen printing techniques was thoroughly investigated. The colour strength, the effect of dye particle size, antibacterial properties as well as the dye fastness properties was also investigated.

Keywords: polyester, printing, colour strength, particle size

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Development of Polyester-Wool Fabrics Dye Ability Using Plasma Sputtering

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Abstract: In this paper, the dye ability of worsted (polyester-wool) fabrics after plasma sputtering treatment was investigated. The samples were sputtered by copper particles. The natural dye (madder and weld), metal complex and disperse dyes were used for dyeing at the boil point. The Scanning Electron Microscope (SEM) was used for morphological study. Results were monitored by using, reflectance spectrophotometer analyses and the EDX was used for elemental analysis.
The results show that, the dye ability of fabrics after plasma sputtering is improved and this effect is more pronounced for natural dyes.

Keywords: polyester-wool, dyeing, natural dyeing, plasma, plasma sputtering.

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Dyeing of Enzymatic Treated Hemp Fibre by Microwave Method

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Abstract: Microwave method is quite new method for textile wet processes and it has some advantages such as low energy requirement and fast process duration. Treatment of cellulose fibres before dyeing process effects the colour values of the natural fibres. In this study, hemp fibres were treated with pectinase enzyme in different concentrations (1%, 2%). Conventional and microwave methods were used for the enzymatic treatment of hemp fibres. After enzymatic treatment, hemp fibres were dyed by using conventional and microwave methods. Colour values of the dyed hemp fibres were investigated.

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Dyeing of Polyester by Using Microwave Method in Glycercerine Media

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Abstract: High temperature dyeing is used for dyeing of 100% polyester materials. Carrier method is used for polyester/wool blends. Generally dispers dyestuffs are used for polyester dyeing. These dyestuffs do not dissolute in water and they are applied to the polyester material as dispersion by the help of a dispergator.
In this study, glycerine-water/dyestuff blend were prepared by using microwave method. Then this blend was applied to 100% polyester fabric by using microwave method. Colour values of the dyed polyester fabric were investigated.

Effect of Alkali Treatment & Dyeing on Fibrillation Properties of Lyocell Fiber

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Abstract: Lyocell is a new generic name given to a cellulosic fiber which is produced under an environmentally friendly process by dissolving cellulose in the tertiary amine oxide N-methylmorpholine-N-oxide (NMMO). Lyocell fiber shows some key advantageous characteristics over other cellulosic fibers; for instance, a high dry and wet tenacity and high wet modulus. However, the fiber also shows an extensive tendency to fibrillate in the wet state, which causes the formation of longer and more oriented crystalline regions and smaller but more oriented amorphous regions in the fiber structure. This fibrillar structure is responsible for the high fiber tenacity but low lateral cohesion, especially when subjected to mechanical stress in the swelled state. These have been proven to be problems in launderability of the product and difficulty to control the uniformity of color uptake during dyeing, Pills formation and streak marks in dyeing.

In the present study, report on a fibrillation tendency of lyocell, in different types of alkali-treating, and dyeing of poly functional reactive dyes. The effect of alkali concentration, poly functional reactive dyes on fibrillation tendency can be absorbed by SEM Analysis also various physical and chemical properties can be evaluated for treated fabrics.

Keywords: Alkali treatment, Fibrillation, Pilling, Polyfunctional reactive Dyes, SEM.

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Effect of Calcium Chloride on Electrospinning of Silk Fibroin Nanofibers

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Abstract: Silk fibroin is one of candidate materials for biomedical application, because it has good biocompatibility and minimal inflammatory reaction. Electrospinning is a simple method capable of producing nanofibers for biomedical applications. In this study was interested to produce nonwoven sheet from silk fibroin with needleless electrospinning method andconcentrated on the alternative way of spinning solution preparation by using a mixture of formic acid and calcium chloride as solvent. The effects of salt concentration in formic acid and voltage of electric field on fibers morphology were studied. It was observed that nanofiber has good uniform fiber distribution on nonwoven sheet with increasing the applied voltage. Calcium chloride is able to increase solubility of silk fiber in formic acid with the 2 wt% calcium chloride being preferred. Silk nanofibers with diameters ranged from 200 to 2300 nm.

Keywords: silk fibroin, needleless electrospinning, calcium chloride

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Effect of Dispersing Agents on Synthesis and Application of Nano Titanium Oxide for Antimicrobial Property

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Abstract: With the growing demand for comfortable, clean and hygienic textile goods, an urgent need for production of antimicrobial textiles has arisen. In this work, synthesis of nano titanium oxide has been done by sol gel method and the effect of dispersing agents with varying ionic character on the particle size of the synthesised nano particles in terms of crystallinity and particle size was studied. Also, they were applied on cotton substrate and tested for their antimicrobial activity. The effect of the application of nano titanium oxide on the physical properties of the substrate, such as tensile strength, bending length, crease recovery angle has been analysed.

Keywords: Antimicrobial, Nanotechnology, Nano titanium oxide, dispersing agents

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Effect of Plasma Treatment on Denim Fabric

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Abstract: The plasma technology is considered to be very interesting future oriented process owing to its environmental acceptability and wide range of applications. Since recently, however, the plasma Technology is being introduced in textile industry as well. Fields of application are desizing, functionalizing, and design of surface properties of textile fibers. Plasma technology is suitable to modify the chemical structure as well as the topography of the surface of the material. This study was aimed to investigate the influence of atmospheric-pressure plasma (exposure time and electrode spacing) parameters on various properties of indigo dyed denim fabrics. FAST system was used to examine various properties of untreated and differently plasma treated denim fabrics. The morphology of plasma treated fabric was assessed by SEM analysis. The results showed that fabric properties were highly affected by plasma parameters. The results also showed a considerable increase in surface friction coefficient although. The SEM images clearly showed that the atmospheric plasma modified the fibre surface outwardly.

Key words: Denim, Plasma technology, FAST system

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Effect of Reactive Dyeing and Cellulase Treatment on the Pilling Properties of Cotton Knitted Fabric

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Abstract: With the increasing popularity of cotton knitted fabric, greater demands for quality have been required as end-users have become more aware of its negative properties. Pilling has become a much more serious problem for the knitted apparel. Although cellulase treatment has been well known as a suitable method for overcoming the pilling problem so as to gain more desirable quality and appearance of dyed goods, it is important to understand how the dye affects the performance of the cellulase treatment. Therefore, this paper is aimed to study the relationship of reactive dyes and cellulase treatment on the pilling properties of cotton knitted fabric. Two commercial reactive dyes with different chemical structures were used. The dyeing and cellulase application were conducted in different sequence which were aimed to study the effect of those processes on the pilling properties of cotton knitted fabric. Experimental results revealed that the pilling results were varied depending on the different stages of applying reactive dyeing and cellulase treatment. The results were recorded and would be discussed thoroughly.

Keywords: Reactive dyeing, Cellulase treatment, Cotton knitted fabric

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Elastic Electrospun Nanostructures Based on Polyurethane/MWNT

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Abstract: Electrospinning is a process by which nanofibers can be produced by an electrostatically driven jet of polymer solution. Polyurethane and Polyurethane/ Multiwalled carbon nanotubes (Pu/MWNT) nanocomposite nanofibers were prepared by Electrospining process. Possibility of fabrication of stretchable nanofiber mats was reported and electrical conductivity of the mats was measured at various strain levels. Viscosity of solutions increased with increasing MWNTs Content. Scanning Electron microscopy (SEM) results indicate that diameter of nanofibers is 83.3 nm up to 844.5 nm depending to MWNT content in the nanocomposite. Electrical conductivity of PU/MWNT nanofiber mats Increased with increasing MWNT%. It was shown that, the conductivity of the coated yarns has noticeable strain sensitivity.

Keywords: Strain sensor, Smart textile, Nanofiber, MWNT

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Electrical conductivity and chromic behavior of poly (3-methylthiophene) - coated polyester fabrics

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Abstract: Electrically conductive substrates with chromic behavior are prepared using conductive polymer coating of the substrate. Poly (3-methylthiophene) (P3MT) - coated polyester fabric with specific electrical and chromic properties, for instance electrochromic and piezochromic behavior, was successfully obtained by chemical polymerization with the help of continuous and speed stirring technique. The effect of polymerization time, temperature and oxidant concentration on conductivity of the P3MT - coated fabric was studied. The presence of P3MT particles on the surface of the coated substrate was confirmed by scanning electron microscopy (SEM), fourier transform infrared (FTIR) and UV-Vis spectroscopy, electrical surface resistivity, pressure and applied voltage dependence visible reflectance spectrophotometer measurements, and X-ray diffraction (XRD) analysis. The blue shift of c95 nm in wavelength of maximum absorption observed in the reflectance spectra of coated polyester fabric. Under high pressure, the P3MT - coated polyester fabric demonstrated piezochromism. The coated substrate also showed electrochromic behavior under an electrical applied voltage of 12v.

Keywords: Poly (3-methylthiophene); Chemical polymerization; Chromic behavior; Piezochromism

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Investigation on Antibacterial Activity of Cotton Silver Coated Fabric After Dyeing

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Abstract: In this research work, the cotton fabrics were sputtered using DC magnetron sputtering system for different times of exposure by silver. Then the silver coated samples were dyed by different classes of synthetic and natural dyes. The dye ability of coated samples was compared with untreated cotton. The reflective spectrophotometer was used for this purpose. The morphology of the cotton fabrics before and after dyeing was observed using a scanning electron microscope (SEM). The antibacterial activity of samples before and after dyeing, were investigated and compared. For antibacterial investigation, the agar test (Halo method) is a well-established method to provide a semi-quantitative analysis. Also the antibacterial counting tests were used.

Very good antibacterial activity was achieved and the details will be discussed in full paper.

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Investigation on the effect of titanium dioxide nano particles on NIR camouflage

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Abstract: Cotton fabrics were dyed with three commercial vat dyes in order to providing camouflage in NIR region and imitate reflectance profile of greenish leaves. For reducing contrasts between target and its surrounding in visible range, used vat dyes combined in appropriate proportion and two standard shades of the 1948 U.S army pattern, NATO and forest green, were received on cotton fabrics with color difference less than 2. Reflectance profiles of dyed cotton fabrics were measured and results showed that reflectance profile of dyed samples located between reflectance of greenish leaves. For investigation on the effect of nano particles on NIR camouflage, nano particles of TiO_2 were applied on dyed cotton fabrics using pad-dry-cure method. Reflectance of coated dyed samples was measured in various amount of nano TiO_2. Results showed that in both shades, nano TiO_2 increases the reflectance in NIR region and with increasing amount of nano TiO_2 the reflectance profile of samples nears to maximum amount of reflectance of greenish leaves. Because of the effect of white color of nano TiO_2 powder on the shade of dyed cotton and increasing color difference of coated dyed samples with standard shades, in visible range with increasing the amount of nano TiO_2, optimum amount of nano TiO_2 for NATO and forest green shade determined 0.75% and 0.5%, respectively.

Keywords: NIR camouflage; NATO green; Forest green; Nano TiO_2; Reflectance

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Ionic Crosslinking of Polyurethane Copolymers by the Grafted Pendant Groups

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Abstract: In this investigation, the PU grafted with a dimethylamino or a carboxyl pendant group were ionically crosslinked by neutralization to increase their molecularinteraction and the impact on tensile strength and shape memory is examined. The maximum tensile stress was improved by controlling the ratio of A and C-type PU. Shape memory properties are high and reproducible, although grafted with the pendant groups.

Keywords: Polyurethane, Ionic crosslinking, Grafted pendant groups, Shape memory property

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Microwave Assists the Synthesis of Aryl Azopyridones Dyes and Studying Their Printing Properties

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Abstract: The Purpose of this research is to synthesize several new pyridine-containing an arylazo function using a microwave technique as the preand their applications in textile printing.
The structure of prepared dyes were established and confirm for the reaction product on the basic of their element analysis and spectral data (MS, IR and ^{1}H-NMR). The suitability of the prepared dyestuffs for either heat transfer printing or traditional printing on polyester fabrics has been investigated. The prints obtained from dyes possess high color strength as well as god overall fastness properties.

Keyword: polyester, printing, colour strength, pyridpne

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Polypropylene Nanocomposite Fibres with Improved Dyeability and Thermal Stability

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Abstract: A series of polymer-clay nanocomposite materials were prepared consisting of Polypropylene (PP) matrix and dispersed inorganic clay modified with Steryl amine (SA), Cetyl pyridinium chloride (CPC), Benzyl dimethyl N-hexadecyl ammonium chloride(BDHAC) and hexadecyl trimethyl ammonium bromide (HTAB) by direct melt intercalation. The organoclay loading varied from 0.5 to 3 %(by wt.).
Organoclays were characterized by X-Ray diffraction (XRD) and detailed analysis of mechanical, thermal and X-Ray diffraction (XRD) study of PP/Clay nanocomposites was carried out. With the increase of loading of clay the crystallinity of the composite fibre decreased resulting in the improvement in the dyeability with disperse dyes. The PP nanocomposites containing organically modified clay decreased the tensile strength properties, although such a decrease was confirmed to the acceptable limit.

Keyword: Fillers; organaclay; nanocomposite; polymer; matrix; polypropylene.

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Preparation of Flexible Fabric Based Electronic Circuit Using Inkjet Printing Co Eelectroless Plating Technique

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Abstract: A convenient method has been developed for applying patterned nickel tracks on polyester fabric for electronic applications. The process comprises inkjet printing of an aqueous palladium (II) solution on surface treated polyester fabric, followed by reduction to metallic palladium and electroless nickel plating. The nano-structure of the nickel pattern was investigated using scanning electron microscopy (SEM) and the size of the nanoparticles were in a rang of 20-100nm.In addition the electrical conductivity was evaluated using four probe technique and results showed reliable and stable conductivity about 2632S/m. Using a desktop inkjet printer,the procedure was successfully applied for manufacturing inter digitated conductive pattern as used for many applications such as antenna, electronic circuit, coil, ECG sensor, and capacitor .

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Some Studies on Temparary and Permanent Flame Retardants on 100% Cotton Fabric

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Abstract: To provide additional protection from fires and to increse escape time when fire occurs, methods to enhance the flame retardance of consumer goods have developed. Present work reports on process undertaken to prepare flame retardant cotton fabrics with well establised borex/boric acid mixture as temparary finished fabric and pyrovatex process for permanent finish in vary small laboratory scale. Fabric properties with permanent finishes and without permanent finishes were observed and compare. It was observed that 70/30 borex/boric acid combination is cheapar option for attaining flame retardancy but looses its handle, strength and feel. Pyrovatex results flame retardant fabric with almost no negative effect on fabric properties.

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Studies on Wicking Behavior of Polyester Fabric

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Abstract: Wicking plays a vital role in determining comfort and moisture transport behavior of active wear and sports wear. An analysis of vertical wicking of polyester woven fabric was done by using Lucas-Washburn [1] equation.

$$\frac{dh}{dt} = \frac{\left(\frac{R_{mi}}{\tau}\right)^2}{8\eta h}\left(\frac{2\gamma_L \cos\theta}{R_{mi}} - \rho g h\right)$$

For determining the theoretical wicking height by Lucas-Washburn equation, the macro capillary, micro capillary and tortuosity factor of plain weave was considered.
Experimental results were compared with the theoretical results. For polyester the experimental wicking height was more than that of the theoretical wicking height. It was found that vertical wicking of fabric was significantly influenced by the tension applied, micro capillaries, macro capillaries and tortuosity. The warp way and weft way wicking behavior of the fabrics were different. The variation in weft yarn densities of polyester fabric also had a considerable effect on wicking.

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Synthesis and Characterization of Shape Memory Polyurethane Grafted with a pH Indicator

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Abstract: Shape memory polyurethane (SMPU) was grafted with a pH indicator (Thymol blue, Alizarin Yellow GG, Bromocresol purple and Bromocresol green) having OH functional group for coupling. The SMPU showed a quick response to pH change, did not lose the dye in aqueous solution, and could be reused for several times. The SMPU was characterized by UTM, IR, UV-Vis, DSC, NMR, and Viscometer, which showed that high tensile strength and shape recovery compared to linear SMPU, UV peak shift depending on the surrounding pH, and the increase of melting temperature with the increase of dye content. Therefore, a smart SMPU that can detect pH change could be successfully made.

Keywords : Shape memory polyurethane, pH indicator, Thymol blue, Alizarin Yellow GG

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Synthesis and Evaluation of A Novel Insect-Repellent MCT Reactive Dye on Nylon 6

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Abstract: Insect-repellency of fibre is a property which makes the fibre to be of interest in the field of military and health. The insect-repellent substrate could be prepared using either functional finishing or applying an insect-repellent dye. In this paper, Insect-repellent nylon 6 is obtained using a novel insect-repellent reactive dye containing N, N-diethyl-m-toluamide. To do this, N, N-diethyl-m-toluamide (DEET) was first nitrated at the para–position relative to amide functionality. The nitrated product was reduced in the presence of C_2H_5OH, $SnCl_2$ and HCl. The produced amine was then condensed with 2, 4, 6-trichloro-1, 3, 5-triazine (cyanuric chloride) as a reactive group in below 5 °C. The resultant adduct was finally reacted with an amino group present in 6-amino-1-hydroxy naphthalene-3-sulfonic acid (J-acid) to produce 7-(4-chloro-6-(4-(diethylcarbamoyl)-2-methylphenylamino)-1,3, 5-triazin-2-ylamino)-4-hydroxynaphthalene-2-sulfonic acid. In order to synthesis azo dye, sulfanilic acid was diazotized using HCl and $NaNO_2$ and then coupled to the above prepared component to produce insect-repellent reactive dye. An analogue dye was prepared via the same route without insect-repellent group making stage. The chemical structures of the novel dyes were characterized using FT-IR and ^{1}H NMR spectroscopy. The spectroscopic properties of the dyes were determined in terms of λ_{max} and ε_{max} in aqueous solution. The novel dyes were then reacted with nylon 6 and bonded to it covalently to provide permanent insect-repellent substrate. The insect-repellent efficacy of the reacted nylon 6 was studied using standard methods for Anophle mosquito repellent. The insect-repellent dye reacted nylon 6 showed insect-repellent activity.

Keywords: Reactive dye; Insect-repellent; Nylon 6; DEET; ^{1}H NMR

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Surface Modification of Cotton and Polyester Fabrics Using Alginate and Copper (II) Sulphate Interactions: Characterisation of Thermal Comfort Properties

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Abstract: Fulfilling physical and thermal comfort and functionality in hospital beddings, curtains and apparel are critical for healthcare workers and patients. The maintenance of thermal comfort and necessary protective performance of medical apparel are important due to hard and diverse physical activities in hospital environment. A common threat with antibiotic resistant bacteria is that they are spread very easily through patient-staff and patient-patient contact. These prevalent bacteria are often found on general surfaces such as the floor, radiators, and beds and are also on fabrics such as hospital gowns, gloves, bed linen and curtains. Copper has been identified as being effective against a broad spectrum of microorganisms such as Clostridium difficile, Escherichia coli O157:H7, Influenza A (H1N1), Listeria monocytogenes, and methicillin-resistant Staphylococcus aureus.

In this experimental study, 100% cotton and 100% polyester woven fabrics which are commonly used in hospital environment were treated with sodium alginate and copper sulphate by using ultrasonic energy. The fabrics were immersed in sodium alginate solution (2.5% w/v) for 24 hours and rinsed with distilled water. The rinsed fabrics were submerged in 1%, 3%, 5%, 10% and 15% w/v copper solution and subsequently the fabric specimens were subjected to 10 minutes of ultrasonic energy treatment. The untreated and the treated fabrics' thermo physiological properties including; thermal conductivity, thermal resistance, thermal

absorbtivity, water vapour permeability, and heat loss were tested and analysed by using Alambeta and Permetest instruments. Analysis of variance (ANOVA) was employed to determine the significance of the tested properties for assessing the statistical significance of the differences between i) the untreated and the treated fabrics; and ii) dry and wet states of the comfort test results.

The results clearly demonstrated that the cotton and polyester fabrics were successfully treated with the copper sulphate solutions and the coated fabrics showed considerable changes compared to their untreated forms. The fabric's thermal conductivities and thermal resistances were increased significantly after the treatment. It was also observed that the conductivity of the fabrics increased gradually. Furthermore, the treated fabrics had lower thermal absorptivity values. The treated fabrics showed considerably lower water vapour permeability compared to the untreated fabrics.

Keywords: alginate, copper treatment, thermo physical properties, ultrasonic energy

Thickening Agent Based on Tamarind Seed Gum for Disperse Printing of Polyester

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Abstract: The technical feasibility of using tamarind kernel powder from different areas in Thailand as a thickener for printing polyester with disperse dye in comparison with the tamarind kernel from India which used in textile printing factory was examined. The result indicate that the properties of printed samples (colour values, colour strength (K/S), overall fastness properties, handling and sharpness) were good to very good level. Only slight differences were observed between two sources of tamarind kernel (Thailand and India) utilized for thickener.

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The Atractylodes Lances Extract for Microbial Resistant in Textiles

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Abstract: Different solvents of varying polarity were examined and compared their capabilities to extract essential active agents from dried Atractylodes lancea. Aqueous was found to be the best among interested solvents for extraction which yields 30.63% of dried herb. Methanol yields 21.3% whereas acetone and hexane can extract only 6.72 % and 4.17% of dried herb, respectively. Compared to all other extracts, the acetone extract was found to exhibit the most significant antibacterial activity against all types of bacteria while the aqueous extract showed no inhibition**.** Cotton fabrics were treated with the acetone extracts and evaluated for their antibacterial activities. The treated fabrics showed stronger activity against Gram-negative than Gram-positive.

Keyword: Atracylodes lancea, antibacterial activity, cotton fabric, textile

The Tabacco Leaf Extract and Antibacterial Activity in Textile

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Abstract: Effect of the use of water and organic solvents such as acetone, N,N-dimethylformamide (DMF) and ethanol at various concentrations on the total polyphenol content and antioxidant activity was studied for the tobacco leaf. The fifty percent DMF extract showed the highest polyphenol content of 167.4 mg GAE/g and provided the greatest antioxidant activity. The results showed that solvent with different polarity had significant effect on polyphenol content and antioxidant activity. The inhibition activities on *Escherichia coli* and *Staphylococcus aureus* were also measured for evaluating the antimicrobial activity of cotton fabric treated with the tobacco leaf extract. The diameters of inhibition zones were 21.33 ± 0.86 and 18.50 ± 0.77 mm, respectively. The results showed that the polyphenol extracted from tobacco leaf had great potential as antioxidant and antimicrobial agent for textile application.

Keywords: Tobacco leaf, polyphenol, antioxidant, antibacterial activity