Formation of a covalent bond biology essay

Literature, Russian Literature

Introduction

1. 1 Background

Reactive dyes are most widely used for dyeing cellulosic cloths.

Their application involves the formation of a covalent bond between dye molecule and polymer of the peculiar fibre. The great strength and comparative inertness of the covalent bond to most common degrading agents firmly anchors the reactive dye molecules to the polymers of the cotton fibres. It is for this ground that cotton fabric stuffs which have been dyed with reactive dyes have really good visible radiation speed. (1)Depth of colour is known as shadiness. When cloths are dyed, formula is used in which many ingredients are used, such as urea, leveling agent, anti migration agent, frothing agents and other aides to fit shadiness.

Sunglassess are classified harmonizing to measure of colour. In dark sunglassess, high measure of colour is used, so these are known as dark sunglassess. Crocking speed is the migration of colour from the bleached surface to another surface by intense contact, for illustration by rubbing (soiling/staining) . (2)Crocking is job faced by the fabric moisture processing industry.

Nowadays when clients purchase any cloth, they focus upon crocking speed. The ground for this is that every one wants to acquire a merchandise holding good quality and a cloth holding a weak crocking speed is proof of low quality. This job is more serious with dark sunglassess, because high sum of

dye is used to fix dark sunglassess. Crocking is tested by carbon black metre.

There are two chief crocking trial methods. ISO 105-D02 and AATCC Test Method 8In the trial methods, the influence of the wet is taken into history (dry or wet crocking trials) . Rubing may partially destruct wet cellulosic fibres, taking to extra staining. The rubbing force for the wet testing process is about double the friction force for dry friction. Due to this ground, the moisture rubbing evaluations of the same sample are ever poorer than the dry 1s (up to two evaluations difference) .

Some of the methods which improve rubbing speed, are formation of movies surfacing the fibres, reduced friction of the smoothened surface and it is besides done by hydro phobation. In cut downing the friction forces, the finish merchandises can act likewise to lubricators. Generally besides finishes cause an consequence (lasting imperativeness and easy-care coatings with cross associating agents for cellulose fibres) , which cut down the puffiness of hydrophilic fibres. Less migration of dyestuff but poorer tensile strength of the cellulose fibre cause more scratch.

Work has been done to better crocking speed. On the footing of the research, betterments have been put frontward for dye features, loose colour, H2O quality, stitch construction and surface smoothness of the cloth. And the betterment steps in each measure have been put frontward.
(3)Other research workers suggested conveying betterments in optimising the dyestuff, commanding the pH value of the cloth every bit good as utilizing appropriate repair agent. (4)

1. 2 Justification

The job of moisture crocking is being exposed in recent old ages. Nowadays industries are acquiring fewer orders due to hapless wet crocking.

So it is need of fabric moisture processing industry that work should be done for betterment of wet crocking of cellulosic cloths. Because quality of a cloth depends upon its speed belongingss. (5)One of those belongingss is crocking fastness. As there will be higher opposition to degrading effects, so a cloth would hold better quality. So a cloth of good quality should hold improved crocking speed. Dyestuff is besides under consideration. Because choice of dyestuff besides effects crocking speed. Work has been done to better dyestuff as to better moisture crocking, but it is non sufficient.

In Pakistan, besides this job is being faced by fabric industries that clients are nowadays really stressing and demanding high crocking betterment. The ground of choosing crocking speed for research, instead than rinsing and light speed, are because they consume high energy and clip and besides high considerations about environment would be needed to be set for that.

1. 3 Purposes and aims

For accomplishment of dark sunglassess, when the cloth is dyed, sufficient sum of dye is required to accomplish required shadiness.

(6) Wet cellulosic fibres may be partially destroyed by rubbing, taking to extra staining. Measure of dye can non be decreased because shadiness will be affected in that instance. In solution of this job, focal point should be upon cross-linking agents used during coating, which work as binders and arrested

development of dyes upon the cloth and resist attenuation of the cloth. One of import thing is that shadiness should non be changed with application of cross associating agents and strength should non be decreased.

Its tensile strength depends upon the sort of fibre, particularly ; little abraded coloured fibre atoms cause the staining consequence on the spouse fabric. When crocking speed evaluation is determined, harsh fibre atoms are non taken into consideration. Here we have following aims to accomplish.

1. Wet crocking betterment. 2. Shade should non be changed.

Chapter # 02

LITERATURE REVIEW

2. 1 Cotton

Cotton is being cultivated for more than 5000 old ages. (7) Pakistan is one of the states where cotton is produced and consumed in immense measure.

(8) Bing a natural fibre, its composing includes about 85. 5 % cellulose, 8 % wet and balance drosss (oil and wax 0. 5 % , proteins, pectoses and colourising matter 5. 0 % and mineral affair 1.

0 %) . (9) Cotton cloths are extensively used throughout the universe. Its construction includes of cuticle, primary cell-wall, secondary cell-wall and a lms.

2. 1. 1 Micro construction of cotton

Cotton fibre is a individual works cell. Its cross-section is egg-shaped, compared with the normal hexangular works cell. Its construction includes of cuticle, primary cell-wall, secondary cell-wall and a lms.

Cuticle is the outmost bed or tegument of the fibre. It is composed of a waxy bed (cotton wax) merely a few molecules thick. Due to waxy nature, it remains adhered to the primary cell-wall and due to inert nature ; remainder of the fibre is besides protected by it against chemical and degrading agents. During cotton completing much of the cuticle or wax is removed by Kier boiling and bleaching. Due to this, cotton absorbs moisture more rapidly.

Most of the staying cuticle is removed by subsequent laundering. Deterioration of the cotton textile stuff additions, as the extent of the cuticle is decreased farther. Immediately underneath the cuticle, there is the primary cell wall. It is about 200nm midst. It is composed of filaments, really all right togss of cellulose.

The thickness of the filaments is about 20 nanometers, but their length is yet unknown. The primary cell wall can be visualized as a sheath of gyrating filaments. The fibrils spiral at approximately 70EsC to the fibre axis. Strength is imparted to the primary cell wall and therefore, to the fibre, by this spiraling. Further towards the centre is secondary cell-wall, which forms majority of the fibre. Secondary cell wall is made up by homocentric beds of spiraling, cellulosic filaments, non unlike the turning rings of trees.

Thickness of its filaments is about 10nm, but they have undefined length. The filaments of secondary wall spiral at approximately 20Es to 30Es to the fibre axis, near the primary cell wall. The coiling angle widens to approximately 20Es to 45Es for the fibrillar beds nearer the lms. These gyrating filaments are responsible for the strength and ability of the cotton fibre and hence of the narrations and cloths. Whenever the way of their spirals of the filaments is changed, in a consequence, a weak country exists in the secondary wall construction.

Altering of the way of the turn of the fibres by the whirls of the fibre happens at these weak countries. Lumen is the hollow canal, running the length of the fibre. Its walls are the innermost, homocentric beds of spirals of the secondary cell wall. The cardinal vacuole of the turning cotton fibre was one time the lms. Cuticle was full of cell sap.

The cell sap was composed of a dilute, aqueous solution of proteins, sugars, minerals and cell-waste merchandises. On the vaporization of the sap, its components remained behind and colour of the cotton fibre was contributed by it. The force per unit area inside the fibre became less than the atmospheric force per unit area on the outside, as the sap evaporated. The prostration of fiber inward ensuing in the characteristic reniform cross-section of the cotton fibre is caused by this.

2. 1.

2 The cotton polymer

(10)Fig. 2. 1The cotton polymer is a additive, cellulose polymer.

There are about 5000 cellobiose units in the cotton polymer, so its grade of polymerisation is 5000. Its length is about 5000 nanometer and thickness is about 0. 8 nanometers, so it is a really long, additive polymer. There are Vander Waal ‘ s forces on cotton polymer, but more of import chemical groupings on the cotton polymer are the hydroxyl groups or -OH groups. These are besides present as methylol groups or -CH2OH. Their mutual opposition gives rise to hydrogen bonds between the OH-groups of next cotton polymers. Cotton is a crystalline fibre. About 65-70 per cent of its polymer system is crystalline and correspondingly about 35-30 per cent formless.

That is the ground of good orientation of cotton polymers and so they are likely no farther apart than 0. 5 nanometers, in the crystalline parts. This is the maximal distance across which H bonds can organize between polymers. In the polymer system of cotton, H bonds are the dominant and most of import forces of attractive force nowadays. Due to this ground, Vander Waal ‘ s forces which are besides present have small relevancy. The polymer system of cotton can be imagined as a function of wire gauze, because the visual aspect of the cellulose polymer is non unlike a concatenation of hexangular units.

2.

1. 3 Hygroscopic nature

As there are infinite polar -OH groups in its polymers ; so they attract H2O molecules, being besides polar. Due to this ground cotton fibre is really absorptive. But entry of the H2O molecules is merely possible in the polymer

system in its formless parts, as the inter-polymer forces are excessively little for the H2O molecules in the crystalline part. Inactive electricity is prevented to be developed due to hygroscopic nature of polymer system of cotton.

Reactive Dyes

Reactive dyes were produced by Rattee and Stevens in 1953. These were first dyes which could organize a covalent bond with cellulose. Due to chemical reaction, these are known as reactive dyes. The reactive dyes are water-soluble anionic dyes, which react with hydroxyl groups of cellulose to go covalently bonded to the fibre. The chemical reaction between a reactive dye and a cellulose fibre takes topographic point in the presence of a base. (11)Base (-HCl)DYE-Cl + H-O CELLULOSE i,® DYE – O – CELLULOSE + SALTSupramine Orange R (CI Acid Orange 30) is believed to be the first commercially available dye capable of covalent reaction with a fabric fibre.

Reactive dyes have simple dyeing process with no oxidization and decrease. (12)

2. 2.

1 Mechanism of Reactive Dye Fixation

It utilizes dichlorotriazine as reactive linker. It is Nucleophilic aromatic permutation. It allows for a broad assortment of chromophores to be used. It requires a nucleophilic group on the chromophoreFig. 2. 2(13)

2.

2. 2 Natural cellulosic fibres

An electrolyte is added in that H2O in which, the reactive dye is dissolved, to help exhaustion of the dye. Then the fabric stuff is introduced to the dye spirits and the dye is exhausted onto the fibres. Alkali must be added to the dye spirits, as the reaction between dye and fibre may take topographic point.

This reaction can be carried out with base with some reactive dyes at room temperature. However, to consequence the reaction between the dye molecule and the polymer system of the fibre, in some instances to the furuncle, the temperature of the dye spirits must be increased, with most reactive dyes. There are specific temperatures for reactive dyes at which reaction between dye and fibre are optimal. In any instance, the add-on of an base is required for the formation of the covalent nexus.

The formation of covalent nexus takes topographic point between the dye molecules and the hydroxyl groups of the cellulosic fibre.

2. 2. 3 Methods of dyeing with Reactive dyes

2.

2. 3. 1 Pad-Batch

Semi uninterrupted method of dyeing is inexpensive where first-class colour speed can be achieved. All the types of sunglassess from light to dark can be achieved. It is more environmentally sound and higher quality dyeing method. Dyes and aides are prepared in separate armored combat vehicles.

Dyes and aides are assorted merely before colour trough to avoid the hydrolysis of dyes.

Fabric is continuously padded in dyes and trough at temperature 20-25EsC. Fabric may be taken from streetcar and batcher. Fabric after embroidering is wound on to a batcher instantly with aid of plastic.

It is wrapped to forestall drying out. When batching clip is completed cloth is washed on rinsing scope of pad steam. The colour speed of tablet batched cloth is first-class, particularly light speed can be obtained with great consequences. The matching of shadiness on tablet batch is hard. This method has higher production than exhaust dyeing method but less than uninterrupted because arrested development of dyes is completed in 8-12 hours.

Cold tablet batch dyeing is a more environmentally sound and higher quality dyeing method. The procedure removes salt from the wastewater, reduces the usage of H2O and energy, reduces the volumes of wastewater and occupies less infinite on the production floor. It besides uses fewer chemicals, and the switch to Cibacron C dyes farther reduces the colour carried in the wastewater.

2.

2. 3. 2 Pad-Dry-Cure

This is procedure of Continuous dyeing. This is besides known as Thermosol procedure.

Here fabric is padded in dye spirits, dried and cured at higher temperature. After embroidering, the stuff passes through pre drying unit which may dwell infrared pre driers which removes 30-45 % of interior wet and hot fluke Chamberss where cloth is wholly dried. The dried stuff incorporating the movie of embroidering mixture is so heated to the desired temperature which is normally 150-180EsC for reactive dye and 200EsC for disperse dye. Thermo sol scope complete scope scray, cushioning, I. R bring arounding Chamberss. Thermo sol scope with four Chamberss for drying and bring arounding.

Scray is used for fabric storage to avoid arrest of machine. Entry of fabric happens with Airing, V. T. G and I. R zones.

Here is footpad with trough and automatic dosing systems. Here are drying and bring arounding Chamberss with air circulation mechanism. Here, building of Chamber is with unvarying flow of stuff and unvarying temperature. Face back jobs are reduced by even circulations of air.

Compensators are used at get downing of each chamber to cut down fold job.

2. 2. 3. 3 Pad-Steam:

Pad steam has limited usage. This procedure is applied merely to cellulose stuffs.

It is besides used for combination of procedures with themosol i. e. ; vat development or chemical tablet. At pad steam by moisture on moisture method merely light sunglassess less than 10g/l can be produced. Pad steam

is one spell procedure. Fabric is continuously dyed and washed which is so ready for completing. Unlike thermo colloidal suspension saturated steam is used for the arrested development of dyes. Dark shades like black are largely produced by tablet dry chemical tabletPad steam scope: Main subdivisionsEntryPad steam scope with soft-shell clamPad steam lavation scopeWashing or oxidising armored combat vehicles with snoozing systemsDrying of cloth after rinsingExit

2.

3 Sunglassess

Colorss are applied on fabrics to supply them beauty, lustre and assorted designs. Measure of colour is known as shadiness.

2. 3. 1 Dark Shades

When high measure of colour is applied on fabrics, to supply them luster and designs of colour, those are known as dark sunglassess. Dark and navy sunglassess play a important function in the industry for all textile terminal article segments whether knitting, shirting, toweling or bedding.

(8)

2. 4 Crocking

A alteration in colour of the rubbed fabric (by shed blooding and melting) is known as rubbing speed. The staining consequence is caused by little abraded coloured fibre atoms on the spouse fabric, depending on the fibre ‘ s sort, particularly its tensile strength. When the crocking speed evaluation is determined, harsh fibre atoms are non given so importance. Besides it is the

ground of staining if the dyestuff involved is H2O soluble and non sufficiently fixed on the fibre. But limited/restricted wet crocking speed has even been determined in dyeing with the best moisture belongingss, for illustration VAT dyeing, because of cellulose fiber scratch.

2. 4. 1.

After intervention with softeners, silicones, cross associating agents

aˆ? For fibre (tensile strength, wet scratch)aˆ? For fabric in contact: shadiness, surface, sort of fibre and clothaˆ? Intensity of the contact: force per unit area, clip, wet and temperature.

2. 4. 2 Applied chemical sciences

Partially hydrolyzed polyvinyl ethanoate (Pac/PVA) or polyvinyl ether and the application of pigment binders can accomplish improved rubbing speed, largely based on acrylic copolymers similar to those used as manus buildersApplication methods largely use pad-dry techniques.

2. 4.

3 Crocking: Standard Test Methods

AATCC Test Method 8 – Basic Crock metre Method

AATCC Test Method 116 – Rotary Vertical

AATCC Test Method 165 – Rugs

ISO 105-D02 – Organic Solvents

ISO 105-X12 – Colorfastness to rubbing

SAE J861 – Organic spare stuffs

ASTM D5053 – Leather

2. 4. 3. 1 AATCC Test Method 8

Here, recommended specimen size is 5cm by 13cm.

In this trial, moisture and dry samples can be tested. Mount white trial fabric with the weave analogue to the way of rubbing. Run trial for 10 complete bends. Measure the white trial fabric utilizing the Gray Scale for staining

For the wet trial:

Technique should be established for fixing wet carbon black fabric squares by weighing a conditioned square. Then a white testing square should be exhaustively wetted out in distilled H2O. The wet pick-up should be 65 A± 5 % during the trial.

Before rating, white fabric should be dried and conditioned.

2. 4. 3. 2 AATCC Test Method 116

This method is particularly utile for prints where the singling out of countries smaller than possible to prove with Method 8 is required. This is specific for both wet and dry trials. 20 complete bends are specified. Staining is evaluated with the Gray Scale.

2. 4. 3. 3 AATCC Test Method 165 (Carpets)

This method is used for proving before/after interventions such as shampooing, steam or hot H2O extraction, or antistatic/antisoil application. This can be used for both wet and dry testing.

Ten complete bends (one per second) are needed. Staining is evaluated with Gray Scale.

2. 4. 3. 4 ISO /DIS105-X12 – 1999 Colour speed to rubbing

This method is suited for all sorts of fabrics.

Here, two alternate sizes of rubbing fingers are specified. Here, cylinder of a 16 millimeter diameter finger exerts a download force of 9 N and a finger with a rectangular rubbing surface of 19 millimeters x 25. 4 millimeter (crock block) exercising a download force of 9 N for pile cloths including fabric floor coverings. It is suited apparatus mentioning to AATCC TM 8. Wet and dry, both trials can be done on it. Size of specimen should be at least 50 mm x 140 millimeter

2.

4. 3. 5 Crock metre – CM1

This is manual unit recommended for shorter trials. It has rhythm counter. It is available in standard with 16mm finger and 9N arm.

Both wet and dry trials can be done on it.

2. 4. 3. 6 CM5 Crock metre

Bing recommended for long/frequent trials, it is automatic unit, which is electrically powered and it besides counts up timer with automatic shut down

2. 4.

3. 7 CM6 Crockmeter

This is manual unit. It reciprocates rotary gesture to run into AATCC Test Method 116. For both wet and dry testing, it can be used.

(15)

2. 4. 4 Largely used Evaluation methods

aˆ? ISO 105-X12 and AATCC Crock metre Method, Test method 8: Color speed to crocking. aˆ? For little cloth samples and for printed samples AATCC developed the Rotary Vertical Crock metre Method (AATCC Test method 116) . aˆ? For proving disentangled fiber stuff, for illustration flock, tussock, loose stock, the method and device harmonizing to Ruf is recommended. The tried stuff is pressed with a gum elastic membrane and so rubbed.

2. 4. 5 Troubleshooting and particular jobs

Possible jobs with coatings used to better rubbing fastness include the followers: aˆ? There may be merely little effects frequently. Silicone coatings (soft grip, H2O repellency, stretch) may cut down the crocking speed, although silicones give really smooth movies around any sort of fibre. aˆ? More disperse dye migration is frequently caused by softeners on bleached polyester (particularly thermo migration) and besides reduced crocking speed is caused. On the footing of fatty acids and azoic dyeing, this is similar to softeners.

aˆ? An after intervention is needed for profoundly bleached polyester, to obtain acceptable crocking and wet speed belongingss largely with cut downing agents that destroy the low or unfixedDisperse dyes.

2. 4.

6. Rubbing/Crocking speed

Fig. 2. 3 Crock metre

2. 4. 6. 1 Effect of deepness of shade/selection of DyesFor reactive dyes, evaluation will be comparatively higher with high solubility and good lavation speed belongingss.

However, in deep sunglassess, a speed evaluation of 2-3 on the gray graduated table is accomplishable, even with dyes with good rinsing speed, and is considered satisfactory and acceptable. The liquid introduced with the moisture crocking cloth consequences in impairment in rub speed of up to 2 points in comparing to dry friction, in all instances.

2. 4. 6. 2 Effect of Mercerizing

For the mercerised cotton, the colour transportation is comparatively less, and the friction speed class is higher.

There is a 30 % less extent of remotion of fibre atoms, due to alter in the fibre construction on mercerizing, during wet friction and lesser sum of colour on the fibre for the same ocular deepness of shadiness.

2. 4. 6. 3.

Consequence of completing interventions

Assorted types of coatings are applied to cloths for acquiring different consequences. Different types of coating intervention are applied to dyes, viz. softness, polysiloxanes, Zr-compounds, fluorocarbon, chitosan and cellulase enzymes etc. Fabrics do non demo betterments in wet friction evaluations. With some of the cross associating agents, rubbing speed class is lowered by 1/2 to 1 unit. In one of the recent survey it is claimed that for reactive dyed inkinesss and Bordeaux stuffs, with polyacrylate coatings there is some betterment in the moisture rubbing speed evaluation.

2. 4. 6. 4 AATCC trial method for analysing colour speed to crocking

Size of the trial: 5 x 13 centimeter. (2 x 5 in)Conditioning: Prior to proving, status each specimen for at least 4 hours in an ambiance of 21A°C and 65 % RH.

Apparatus: AATCC Crock metre, AATCC Chromatic Transference graduated table, Gray graduated table for staining, White AATCC Textile Blotting paper specimen holder for carbon black metre.

2. 4. 6. 4. 1 Procedure:

(I) Dry crocking trial

(a) Topographic point a trial specimen on the base of the carbon black metre resting level on the scratchy fabric with its long aside in the way of friction.(B) Place specimen holder over specimen as added means to forestall slippage.(degree Celsius) Mount a white trial fabric square, the weave analogue with the way of rubbing over the terminal of the finger which undertakings downward from the leaden sliding arm.

A Use the particular coiling wire cartridge holder to keep the trial square in topographic point. Position the cartridge holder with loops upward. If the cringles point downward they can drag against the trial specimen.(vitamin D) Lower the covered finger onto the trial specimen. Get downing with the finger positioned at the front terminal, crank the rneter handle 10 complete bends at the rate of one bend per 2nd to skid the covered finger back and away 20 times.

Set and run the motorised examiner for 10 complete bends. Refer to single specifications for any other needed figure of bends.(vitamin E) Remove the white trial fabric square, status and evaluate.

(two) Wet crocking trial

Establish technique for fixing wet carbon black fabrics square by Weigh a learned square, so exhaustively wet out white proving square in distilled H2O. Prepare merely one square at a clip. Bringing the moisture pick up to 65+ 5 % by squashing wet proving square betweenblotting paper through a manus wringer or similar convenient agencies. Avoid evaporative decrease

of the wet content below the specified degree before the existent carbon black trial is run. Continue crocking process as per Dry crocking trial. Dry the white trial square with air, so status before measuring. In the instance of napped, brushed or sanded stuff when loose fibre might interfere with the evaluation, take the immaterial hempen stuff by pressing lightly on the carbon black circle with the gluey side of cellophane tape before measuring.

Appraisal: Grey scale 1-5 for staining, where 1 is for hapless, 5 is for excellent2. 4. 6. 5 TEST METHODS of American Association of Textile Chemicals and Colorists (AATCC) to look into rubbing blubber:(I) AATCC 8-2001One of the trial methods of the American Association of Textile Chemists and Colorists (AATCC) is AATCC 8-2001. In this method a standard white cotton cloth is rubbed against the surface of the trial cloth. For trial of moisture crocking, the standard cloth is wet before rubbing against the trial cloth. After rubbing under controlled force per unit area for a specific figure of times the sum of colour transferred to the white trial squares is compared to an AATCC colour chart and a evaluation is established. Grade 5 = no colour transportationGrade 1 = high grade of colour transportation(two) AATCC 116-2001: One of the trial methods of the American Association of Textile Chemists and Colorists (AATCC) is.

AATCC 116-2001. Specifically for printed cloths that do non impart themselves to the AATCC 8-2001 method, this trial is used. In this trial, the trial cloth is held at the base of a Rotary Vertical Crockmeter and is so rubbed with a standard cotton white cloth either dry or moisture. After rubbing under controlled force per unit area for a specific figure of times the

sum of colour transferred to the white trial squares is compared to an AATCC colour chart and a evaluation is established.

2. 4. 6. 5. 1 Application procedure of humanitarian WPU for wet friction speedIn above research done by Jie, ZHU Quan of Donghua University, Shanghai, China, deep colour cloths were prepared with self-made waterborne polyurethane to better the moisture rubbing speed of cotton cloth dyed with reactive dyes. Through treatment on the dose, bring arounding temperature and clip, the optimum procedure of cushioning was settled, that is WPU 40 g/L, bring arounding 3 = min, and without softening. The consequences showed that WPU can obviously heighten dry and wet friction speeds of cloths with small affect on other colour speeds, while the colour speed to chlorinated H2O was improved.

(16)

2. 5 AUXILIARIES

These chemical compounds include bearers or swelling agents, leveling agents, anti-foaming agents, scattering agents, detergents and wetting agents. The manner in which these aides affect the dyeing procedure and their chemical fundamental law is reasonably complex.

2. 5. 1 Carriers or swelling agents

To better the dye exhaustion, bearers are added to the dye spirits for extremely crystalline fibres such as polyesters. Merely pale colourss can be achieved by aqueous dyeing without bearers, because of their very crystalline nature.

The dye is assisted by the add-on of bearers to the dye spirits to perforate the highly crystalline polyester fibres. How the bearers improve the dye ability of polyester fibres, there is no universally accepted account for that, but most widely accepted theory is that bearers help to swell the fibre and do it easier for the dye molecules to come in the polymer system. As a general regulation, bearers are merely used to dye polyester fibres with disperse dyes.

2. 5. 2 Leveling agents

The dye spirits is helped by the add-on of leveling agents to bring forth a more unvarying colour in fabric fibres.

Retarders or retarding agents are those leveling agents which tend to decelerate down the dye consumption of the fibres. In such state of affairss where dyes tend to hotfoot on to the fibre and consequence in an unevenly colored textile stuff, it is indispensable to utilize retarders. Leveling agents are surface active agents, and are chemically related to soaps, man-made detergents and wetting agents. They may be anionic, cationic or non-ionic organic compounds.

2. 5.

3 Description of aides used

2. 5. 3.

1 TENAWET PAD

It is merchandise of German BAYER. It has first-class wetting efficiency right into the nucleus of the fibres, side/centre soaking up differences are leveled

out. TANAWET PAD is peculiarly suited for a broad scope of applications in the cotton sector, due to its first-class wetting efficiency, low-foaming quality and suitableness.

2. 5. 3. 2 TANATERGE RE

This is an subsidiary used for after-soaping reactive dyeings on cotton and cellulosic fibres and their blends. It provides really good remotion of hydrolyzed, substantial captive dyes.

It is suited for post-scouring flock, narration, woven and knitted cloths.

2. 5.

3. 3 TANAWET Q

TANAWET Q is particularly suited for wetting fabrics on jet, narration and beam setup and embroidering equipment holding really good wetting belongingss. It is suited for enzymatic desizing. It has really good deaerating belongingss and is really suited for discontinuous and uninterrupted readying and dyeing procedures. Its other chief features include really low foaming, readily biodegradable and APEO-free.

2. 5.

3. 4 FIBRAWASH RS

FIBRAWASH RS is highly suited lathering agent for reactive dyeing and prints on cellulosic fibres and their blends. FIBRAWASH RS promotes solubility of hydrolysed reactive dyes and there is rapid migration of hydrolysed dye from the fabric fibre. It corrects H2O hardness in lathering baths for reactive dyeing and prints.

It has no electrolytic consequence. FIBRAWASH RS has no demetallizing consequence.

2. 5. 3. 5 BAYPRET NANO-PU

BAYPRET NANO-PU provides Nano-emulsion for optimum distribution over and incursion into the cloth.

It forms a movie about and between fibres. It yields alone belongingss and applications possibilities. It has particular coating and can besides be used to obtain particular handle alterations. It besides provides anti-pilling interventions and has increased lastingness of selected softeners and rosin coatings. It yields lasting hydrophilic coatings on all fibres.

Chapter # 03

EXPERIMENTAL WORK

3. 1 Dyeing:

3. 1.

1 Fabric Specifications:

Weave: Twill Weave, Count: Deflection: 15, Woof: 15,

3. 1. 2 Dyeing formulas

3. 1. 2. 1

Recipe I

Dyes: 1 g/l SUNFIX YELLOW MFD: 0. 12g/l NAVY BLUE SPD: 0. 21g/l SUNFIX RED MSFB: 0.

120g/l Sodium Carbonate: 250g/l Urea: 51g/l wetting agent TANWET Q:

110g/l Antimigraring agent LEVALLIN MIP: 1Entire: 100ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 2

Recipe II

Dyes: 2 g/l SUNFIX YELLOW MFD: 0.

24g/l NAVY BLUE SPD: 0. 42g/l SUNFIX RED MSFB: 0. 220g/l Sodium Carbonate: 270g/l Urea: 71g/l wetting agent TANWET Q: 110g/l Antimigraring agent LEVALLIN MIP: 1Entire: 100ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3.

1. 2. 3

Recipe III:

Dyes: 5 g/l SUNFIX YELLOW MFD: 110g/l NAVY BLUE SPD: 25g/l SUNFIX RED

MSFB: 120g/l Sodium Carbonate: 470g/l Urea: 141g/l wetting agent TANWET

Q: 0. 210g/l Antimigraring agent LEVALLIN MIP: 2Entire: 200ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1.

5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 4

Recipe IV

Dyes: 8 g/l SUNFIX YELLOW MFD: 1. 615g/l BLUE SPD: 39g/l SUNFIX RED MSFB: 1. 820g/l Sodium Carbonate: 470g/l Urea: 141g/l wetting agent TANWET Q: 0.

210g/l Anti migrating agent LEVALLIN MIP: 2Entire: 200ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Cold wash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 5

Recipe V

Dyes: 15 g/l SUNFIX YELLOW MFD: 38g/l BLUE SPD: 1. 69g/l SUNFIX RED

MSFB: 1. 820g/l Sodium Carbonate: 470g/l Urea: 141g/l wetting agent

TANWET Q: 0.

210g/l Antimigraring agent LEVALLIN MIP: 2Entire: 200ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 6

Recipe VI

Dyes: 9 g/l SUNFIX YELLOW MFD: 1. 87g/l BLACK DN CONES 1. 410g/l SUNFIX RED MSFB: 220g/l Sodium Carbonate: 470g/l Urea: 141g/l wetting agent TANWET Q: 0.

210g/l Antimigraring agent LEVALLIN MIP: 2Entire: 200ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 7

Recipe VII

Dyes: 9 g/l SUNFIX YELLOW MFD: 1. 82g/l BLUE SPD: 0. 45g/l SUNFIX RED

MSFB: 120g/l Sodium Carbonate: 470g/l Urea: 141g/l wetting agent TANWET

Q: 0. 210g/l Antimigraring agent LEVALLIN MIP: 2Entire: 200ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 8

Recipe VIII

Dyes: 10 g/l SUNFIX YELLOW MFD: 210g/l BLUE SPD: 22g/l SUNFIX RED

MSFB: 0. 420g/l Sodium Carbonate: 470g/l Urea: 141g/l wetting agent

TANWET Q: 0. 210g/l Antimigraring agent LEVALLIN MIP: 2Entire: 200ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 9

Recipe IX

Dyes: 1 g/l SUNFIX YELLOW MFD: 0. 22g/l BLUE SPD: 0. 41g/l SUNFIX RED

MSFB: 0. 220g/l Sodium Carbonate: 470g/l Urea: 141g/l wetting agent

TANWET Q: 0. 210g/l Antimigraring agent LEVALLIN MIP: 2Entire: 200ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 10

Recipe X

Dyes: 15 g/l SUNFIX YELLOW MFD: 35g/l BLUE SPD: 12g/l SUNFIX RED MSFB: 0. 420g/l Sodium Carbonate: 470g/l Urea: 141g/l wetting agent TANWET Q: 0. 210g/l Antimigraring agent LEVALLIN MIP: 2Entire: 200ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 11

Recipe XI

Dyes: 2g/l SUNFIX YELLOW MFD: 0. 45g/l BLUE SPD: 11g/l SUNFIX RED MSFB: 0. 220g/l Sodium Carbonate: 470g/l Urea: 141g/l wetting agent TANWET Q: 0. 210g/l Antimigraring agent LEVALLIN MIP: 2Entire: 200ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Cold wash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 12

Recipe XII

Dyes: 8g/l SUNFIX YELLOW MFD: 1. 62g/l BLUE SPD: 0. 410g/l SUNFIX RED

MSFB: 220g/l Sodium Carbonate: 470g/l Urea: 141g/l wetting agent TANWET

Q: 0. 210g/l Antimigrating agent LEVALLIN MIP: 2Entire: 200ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Cold wash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 13

Recipe: Thirteen

Drimarine CL Navy

2g/l SUNFIX YELLOW MFD: 0. 43g/l SUNFIX RED MSFB: 0. 630g/l SUNFIX NAVY MFRD: 6Entire 200mlUrea: 25Pad: 0. 4, MIP: 3, Roentgenium: 1Soda Ash: 8

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 14

Recipe: Fourteen

Drimarine CL Black:

80g/l BLACK DN CONES: 16125g/l Urea: 2540g/l Soda Ash: 825g/l TANAWET

PAD: 0. 415g/l LEVELLIN MIP: 35 g/l ULTRAPRINT RG: 1

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 2. 15

Recipe: Fifteen

Drimarine CL Burgandy:

25 g/l SUNFIX YELLOW MFD: 538 g/l SUNFIX RED MSFB: 7. 63. 2 g/l SUNFIX NAVY MFRD: 0. 64Urea: 25Pad: 0. 4, MIP: 3Roentgenium: 1Soda Ash: 8

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 160EsC for 1. 5 proceedingss

a†“

Washing

a†“

Coldwash for 90 seconds

a†“

Cold wash

a†“

Hot wash at 95EsC with PERLAVIN RIS

a†“

Neutralize

a†“

Soaping at 95EsC

a†“

Cold Rinse

3. 1. 3 Completing with cross associating agents.

3. 1. 3. 1 Completing Recipe:

40g/l BAYPRET NANO PU: 20Entire: 500ml

a†“

Drying at 120EsC for 2 proceedingss

a†“

Bring arounding at 140EsC for 1. 5 proceedingss

3. 1. 4 RESULTS & A ; DISCUSSIONS

3. 1. 4. 1 Tensile Consequences

3. 1. 4. 1. 1 Dying

Drimarine CL Navy: 41Drimarine CL Burgundy: 001640Drimarine CL Black: 000136

3. 1. 4. 1. 2 Completing

Drimarine CL Navy: 42Drimarine CL Burgundy: 001639Drimarine CL Black: 001637

3. 1. 4. 2 Result Samples

3. 1. 4. 2. 1 Sample I

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 2 Sample II

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 3 Sample III

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 4. Sample IV

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 5 Sample V

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 6 Sample VI

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 7 Sample VII

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 8 Sample VIII

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 9 Sample IX

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 10 Sample X

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 11 Sample XI

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 12 Sample XII

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 13 Sample XIII

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 14 Sample XIV

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

3. 1. 4. 2. 15 Sample XV

Dyed Dry crocked Wet Crocked

Finished Dry crocked Wet Crocked

a- 3. 1. 4. 3 Crocking Test Consequences

3. 1. 4. 3. 1 Dyed samples

Dyed

Dry

Moisture

14/5324/53/434/53/444/53/454/52/364/5374/5384/5394/53/4104/53114/53/4124/5313531454154/ 53/4

3. 1. 4. 3. 2 Finished samples consequences

Finished

Dry

Moisture

14/53/424/5434/5444/5454/5364/53/474/53/484/53/494/54104/53/4114/53/4124/53/41354/51454154/ 54

3. 1. 4. 4 Fabric softness

3. 1. 4. 4. 1 Dyed

Less soft

3. 1. 4. 4. 2 Finished

Softer

a- 3. 1. 4. 5 Shade

Batch: Navy after Completing Standard Navy before Completing

DE*

DL*

Da*

Db*

DC*DH*Batch is

D65/10

0. 4340. 233-0. 268-0. 2490. 239-0. 277Lighter less ruddy bluer

F11/10

0. 5160. 172-0. 351-0. 3360. 348-0. 340Lighter greener bluerBatch:

Burgundy after Completing Standard Burgundy before Completing

DE*

DL*

Da*

Db*

DC*DH*Batch is

D65/10

1. 169-1. 060-0. 404-0. 282-0. 483-0. 096Darker less ruddyless xanthous

F11/10

1. 292-1. 120-0. 501-0. 405-0. 637-0. 098Darker less ruddyless

xanthousBatch: Black after Completing Standard Black before Completing

DE*

DL*

Da*

Db*

DC*DH*Batch is

D65/10

0. 516-0. 426-0. 127-0. 2620. 089-0. 277Darker less ruddy bluer

F11/10

0. 585-0. 470-0. 230-0. 2600. 177-0. 299Darker less ruddy bluer

Chapter # 4

CONCLUSION & A ; FUTURE SUGGESTIONS:

The aim was betterment in wet crocking of dark sunglassess dyed with reactive dyes. Wet crocking was improved till some extent, but still it was non upto high degree. Improvement in speed evaluation was from dyeing to completing was from 4 to A? and 5 to 4/5, in some instances. So still work is needed to better it. Besides Hydrophobicity was increased with betterment in wet-crocking. This is besides chief consideration point along with crocking betterment. So work should be done to command hydrobicity along with betterment in wet crocking ;