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Saraquest

Exclusive Insight

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Chemistry Behind Good Feelings

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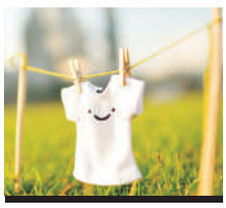


Pre-treatment of cotton yarns

Univ-AIO

Cotton is most important natural fibre whose consumption is constantly increasing day by day. Natural cotton is hydrophobic and coloured. Scouring is a purifying treatment of textiles. The objective of scouring is to reduce the amount of impurities sufficiently to obtain level and reproducible results in dyeing and finishing operations.

Scouring of cotton textiles is an essential treatment in textile wet processing in order to get high absorbency. During scouring, waxes and other hydrophobic materials are removed from the cotton fibres. Conventionally, scouring is done with hot aqueous solution of caustic (NaOH) to remove hydrophobic components from the primary wall (e.g. pectin, protein and organic acids) and the cuticle (waxes and fats). Though alkaline scouring is effective and cost effective process, it is inefficient because it consumes large quantities of water and energy.

Also, Hydrogen peroxide (H_2O_2) is most popular oxidant use to remove natural colourant of cotton fibres. Generally, combined scouring and bleaching is carried out to make cotton fibre hydrophilic and white. Conventionally, scouring and bleaching is done with aqueous solution of caustic and H_2O_2 at boil.

The conventional pre-treatment process of yarn requires strong alkali viz. caustic soda for bleaching. The main reason to use this strong alkali is to get high absorbency.

It is a well known fact that caustic has property to make the yarn harsh and hairy which makes it difficult to run yarns on looms. Further, during dyeing also there is strong alkali used for fixation. This also gives additional harshness to the yarn.

To reduce the harshness of yarn, softener is used in the final process. It improves the lubricity of yarn which reduces coefficient of friction. However, the yarn still needs waxing treatment to remove hairiness and to make suitable to run on the loom.

To overcome these drawbacks, **Sarex** has introduced a new concept for cotton yarn processing to get better productivity on looms with good end use performance. **Univ-AIO** acts as bleach activator and provides required alkalinity to achieve absorbency just sufficient for dyeing. It replaces most of the bleaching auxiliaries.

Unique Features:

- Yarn quality is maintained with good lubricity with improved loom productivity.
- Yarn strength is maintained during processing.
- Less lubricating agent require to improve yarn performance.
- Sewing threads will have more strength and lubricity.
- Comparatively less effluent load.
- Lesser acetic acid is required to neutralize the bath.
- Minimum inventory.

Recommended dosage:

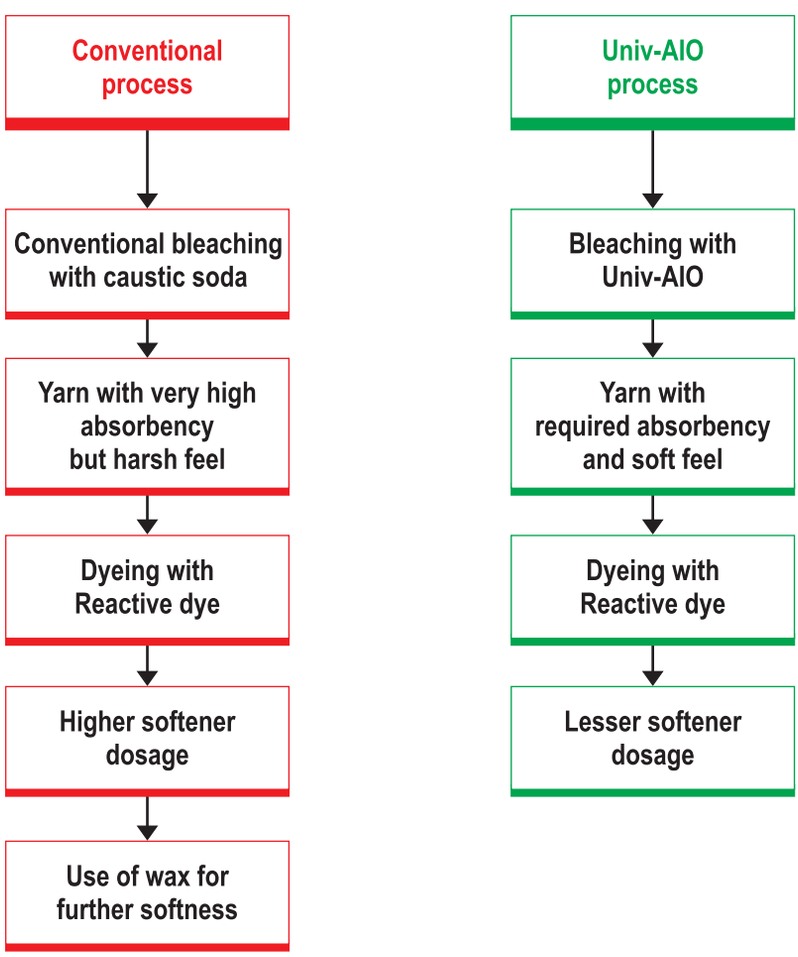
Recipe for RFD yarn (Ready for Dyeing yarn):

Univ-AIO	: 1.5-2.5%
Hydrogen peroxide (50%)	: 1.5-3%
Temperature	: 95-110°C
Time	: 15-45 min

Recipe for Full white yarn:

Univ-AIO	: 1.75-2.5%
Hydrogen peroxide (50%)	: 6-8%
Temperature	: 95-110°C
Time	: 45-90 min

Advantages of Univ-AIO process against conventional process of bleaching



Dye fixing agent for dyeings with Tie-dye technique

Garfix (Conc)

In recent years, the importance of handicrafts has been surged due to their cultural and financial values. The small scale industries including handicrafts can play a major role in the development of economy of both, developed and the developing countries. Tie-dye is a modern term for a set of ancient resist-dyeing techniques. Tie-dye commonly referred to as “bandhani” from the Sanskrit root “bandh” meaning “to tie”, is one of the oldest forms of surface design.

The process of tie-dye typically consists of folding, twisting, pleating, or crumpling fabric or a garment and binding with string or rubber bands followed by application of dyes. The manipulations of the fabric prior to application of dye are called resists as they partially or completely prevent the applied dye from colouring the fabric. More sophisticated tie-dyes involve additional steps, including an initial application of dye prior to the resist, multiple sequential dye and resist steps, and the use of other types of resist (stitching, stencils) and discharge.

Unlike regular resist-dyeing techniques, tie-dye is characterized by the use of bright, saturated primary colors and bold patterns. In some patterns, ties may be opened and re-tied for different dye baths. The dyers generally use dyed thread for the tying process. This colour then becomes imprinted on the fabric, leaving coloured, rather than white, rings. After the final dye bath, the cloth is given a thorough rinsing to remove excess dye.

Several classes of dyes can be used in tie-dye technique for cellulosic fibres, such as direct, vat, reactive and napthol. The choice of dye class used depends on factors such as cost, ease of application and fastness properties. Reactive and Direct dyes have gained more popularity due to its cost effectiveness, brighter shade and ease of application.

It is well-known to treat the textile after dyeing with a dye fixing agent in order to improve the wet fastness property of the dyed substrates. It is observed that the fabrics treated with formaldehyde based dye fixing agents releases formaldehyde into the atmosphere directly or during processing. Due to several disadvantages of formaldehyde based dye fixing agents, demand for low/non-formaldehyde based fixing agents have arise.

Sarex has developed **Garfix (Conc)** which is a concentrated dye fixing agent especially developed to improve wetfastness properties of fabrics dyed with direct and reactive dyes by tie-dye technique. Due to its unique characteristics, it not only leads to excellent fixation of dyes but also prevents migration of direct dye before drying.

Unique Features:

- Improves wash and water contact fastness.
- Improves fastness to perspiration.
- Re-matching not require as it does not affect shade.
- Can be applied by exhaust as well as pad application.
- Compatible with cationic and non-ionic softeners.
- No adverse effect on handle of the fabric.
- Can also be applied on garments.

Recommended dosage:

Pad application

Garfix (Conc)	: 20-30g/l
Pick-up	: 65-70 %
pH	: 5.0-5.5
Drying	: 130-170°C

Exhaust application

Garfix (Conc)	: 2-3%
pH	: 3.5-4.0
Temperature	: 40°C
Time	: 15-30min

Results:

Without Dye fixation

Dye fixation with 2.5% Garfix (Conc)

From above figure, it could be seen that fabric dyed with 4% Direct Black 17B in tie-dye technique shows staining on adjacent cotton fabric during washing whereas fabric dye-fixed with 2.5% Garfix (Conc) show absolutely no staining on the adjacent fabric giving brilliant tie-dye effect.

Resistance to Chlorine bleach during home laundering

Chlobleach

Cotton is world's most popular fibre which finds end applications for various types of articles for homes, hospitals, hotels etc. Reactive dyes are best choice of dyeing cellulosic substrates as they produce a full range of bright colors with high degree of fastness.

Use of Clorox or other chlorine based chemicals during home laundering is standard practice in most of the countries as a part of hygiene. Apart from this, domestic water supply also contains very low level of chlorine, which further adds to concentration of chlorine during laundering. Chlorine is used in domestic water supplies as a disinfectant, to kill bacteria thereby ensuring sanitization. This chlorine in water or bleach liquors used, tend to discolour / fade the garments which in turn decrease their aesthetic value. Thus, most of the times fabrics are tagged as *"Only non-Chlorine bleach"*.

Further, bleach liquors are also used in bathrooms, kitchen for cleansing purpose. Accidental spillage of such liquor on fabrics or garments will also lead to bleach spots which are not acceptable at consumer's end. In today's competitive business of apparel, quality is indispensable aspect. Consumer prefers textiles with good wash-and-wear properties.

Looking at this consumer's demand, **Sarex** has developed the speciality product **Chlobleach** which provides resistance against chlorine present in water or chlorine based products (Clorox). Treatment with Chlobleach prevents fading of fabric and make it look new for longer time.

Unique Features:

- Improves colour fastness/fading to chlorine.
- Improves colour resistance to chlorine by rating 1-2.
- Improves water contact and wash fastness.
- Durable to multiple home laundering.
- Does not affect the original handle and absorbency of fabric.
- Formaldehyde free hence suitable for Oekotex standard 100 and baby wear.

Recommended dosage:

Chlobleach	: 50-150g/l (depending on chlorine content in water)
Pick-up	: 65-70%
pH	: 5.0-5.5
Drying	: 140-160°C

Testing by chlorine bleach method:

42.5 grams of 6% Clorox solution (35ppm available chlorine) + 42.6g of Tide detergent
Washing conditions as per AATCC 135.

Results:

Below figure shows change in shade of the fabric after washing as compared to unwashed unfinished fabric. It can be observed that blue tone of the original unfinished fabric has become susceptible to Clorox solution during washing resulting in change in shade. Fabric finished with 150g/l Chlobleach, resists bleaching action of Clorox solution and does not show shade changes as compared to unfinished fabric.

Unfinished fabric after 3 washings

Original fabric

150 g/l Chlobleach finished fabric after 3 washings

150g/l Chlobleach finished fabric shows very less colour fading after 3 washings as compared to the unfinished fabrics.

Stripping agent for Turquoise blue and OBA's

Fabstrip-RTO

The removal of colour from material which have already been dyed is termed as "stripping" in contrast to bleaching with the object of producing a white material from the natural state. Stripping is defined as any operation aimed at removing or destroying some or all of dye from the dyed textile yarn or fabric without damaging it. Stripping of dyed fabric is carried out mainly either in order to utilize already dyed material or to correct the faulty dyeing or printing methods. Both operations are of considerable technical importance but the choice of method and the factors governing the stripping vary considerably.

When the grey fabrics are taken to the finishing department, the final product is aimed to be produced at the first time without having any fault. However, the finishing processes consist of a lot of specific working parameters. The risk of producing faulty material increases depending on these parameters. Stripping is one of the processes used in the textile finishing to reproduce and repair these faulty materials. There is definite need for a stripping agent which will attack the colours without damaging the material itself.

Generally, there are two types of stripping (i) back stripping- used to reduce the depth of colour and (ii) destructive stripping - used to completely remove or strip or destroy the dye from the dyed textile. Sodium dithionite and thiourea dioxide are the leading dye stripping agents in the textile industry. Sodium dithionite is the most popular and is often used with sodium carbonate as a fire retardant however the textile industry still suffers from many spontaneous fires and the concomitant emission of sulphur dioxide when the dithionite powder comes into contact with moisture. Inspite of several problems and the fact that dithionite powder is inefficient and unreliable, it has retained its standing as the preferred stripping and reducing agent.

The problem is aggravated and acute in case of stripping Turquoise blue shade and/or Royal blue shades. Worse still is the situation to strip an Optical Brightening Agent (OBA) from the fabric.

It is clear, therefore, that the industry needs a more efficient and more reliable stripping system that gives satisfactory color removal. **Sarex** has developed one such product **Fabstrip-RTO** which is especially recommended for stripping turquoise blue, reactive dyes and optical brightening agent from cotton. Fabstrip-RTO also strips various classes of dyestuffs from the fabric.

Unique Features:

- Strips turquoise blue and other reactive dyes & OBA hence fabric can be re-dyed.
- Complies Oekotex-100 hence eco-friendly.

Recommended dosage:

Fabstrip-RTO	: 3-6%
Temperature	: 95-98°C
Time	: 30-45 min

Followed by treatment with 2 g/l sodium thiosulphate at 60°C for 15 min, hot wash and cold wash.

Note:

1g/l Sodium nitrate is recommend to add during stripping process to avoid fabric damage and machine corrosion.

Stripping of dyed fabric was also carried out with conventional caustic-hydros system (i.e.2g/l caustic + 2g/l hydros) in order to get a comparison between conventional and Fabstrip-RTO process.

The stripping efficicency of Fabstrip-RTO for dyed fabrics is analaysed by comparing the Percent Colour Strength value of stripped fabric with dyed fabirc and also by visual assesment. The stripping efficiency for OBA treated fabrics is analysed by detereming the Whiteness Index by using Computer Colour Matching system.

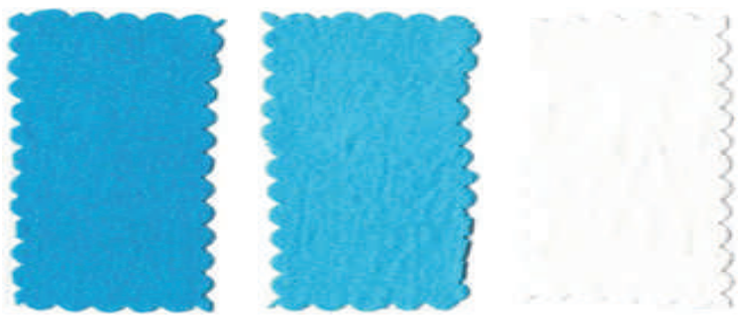
Results:

Below table clearly shows that almost complete stripping of turquoise dye from the fabric as the colour value has dropped down to almost 1-2% while with conventional caustic-hydros system, the colour value is 58% indicating incomplete stripping. Also it could be seen that the whiteness index of the OBA stripped fabric has dropped down from 144 to 72-79 which is generally considered as the whiteness index of ready for dyeing fabric. The stripping efficiency again gets verified with given figure where the dye and OBA gets completely stripped.

Recipe	4% Turquoise Blue H2GP dyed cotton knits	OBA treated cotton knits
	% Colour strength	Whiteness Index (WI)
Original fabric	100	144
2% Fabstrip-RTO	2	84
4% Fabstrip-RTO	1	79
6% Fabstrip-RTO	1	72
2g/l Caustic + 2g/l Hydros	58	-

Stripping of Turquoise blue dye from cotton knit

4% Turquoise blue H2GP | 2g/l Caustic + 2g/l Hydros | 4% Fabstrip-RTO



Stripping of OBA from cotton knit

OBA treated fabric
W.I : 144

4% Fabstrip-RTO
W.I : 79

Fabstrip-RTO is an efficient and effective stripping agent for Reactive dyes specially for Turquoise blue dye and OBA's from cotton and hence stand a promising position in textile industry.

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