Azoic Dyes:- (AKA → Ingrain Dyes)

Method:- Water Insoluble Azodye is produced in the fabric itself.

Mechanism:-
cloth is first soaked in a solution of coupling regeant usually a phenol or napthol. Then it is immersed in a solution of auxochromes. Both react and form dye in the fabric itself.

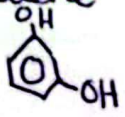
* Particularly useful for cotton and other cellulose fibre but may also be used for nylon.

5) Disperse Dyes:-

* Insoluble in water but can be dispersed in a colloidal form in water.
* Fabric is immersed in colloidal dispersion of the dye.
* The fine dye particles are absorbed into the crystal structure of fibre.
* Used for modern synthetic fibres like:-
  Nylon, orlon, polyester, cellulose acetate.

* Hair Dyes:-

Raw Materials:- Generally, hair dyes includes:-

1) **Dyes:-** eg) 4-amino-2hydroxytoluene
2) **Modifiers:-** eg) Rescorcinol

3) **Antioxidants:-** eg) Sodium Sulphite (Na_2SO_3)
4) **Alkalizers:-** eg) Ammonium hydroxide (NH_4OH)

* Can also contain shampoo, fragrance or chemicals to make dyes creamy, foamy and thick.

Direct Dyes:

Method of application: Applied to fabrics by direct immersion in water solution of the dye.

Mechanism of working:
A direct dye contains acidic or basic auxochrome which combines with opposite polar group present in chemical structure of the dye.

Example: **Martius Yellow.**
* contains an acidic auxochrome (–OH), which interacts with the basic amino group (–NH_2) of the wool or silk protein.

$$Fiber\text{—}NH_2 + HO\text{—}Dye \longrightarrow Fibre\text{-}NH_3 + \cdots O\text{—}Dye$$

(Dyed fibre)

* Wool & Silk are readily dyed by this method.

(iii) VAT Dyes:- (Vat is bucket).

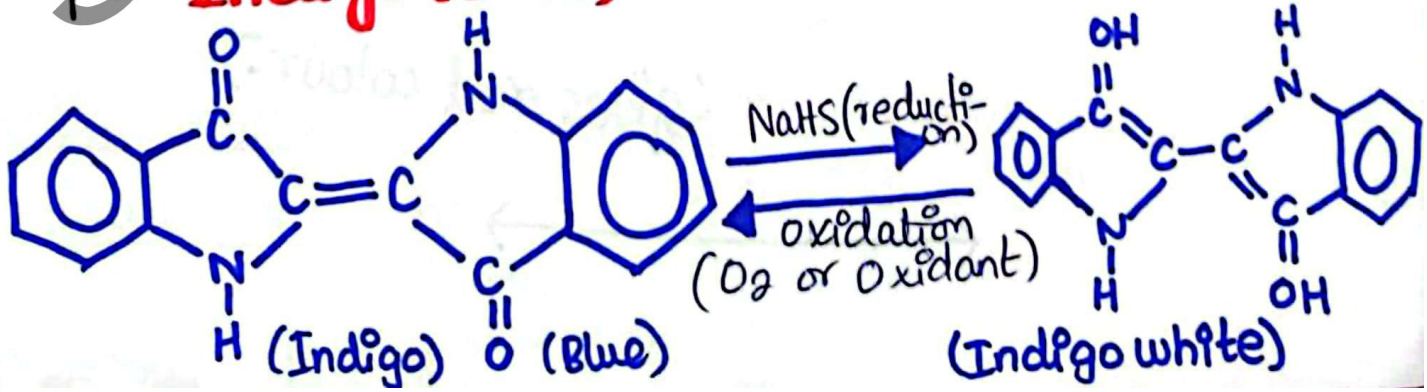
Method of application: Insoluble in water. It is first reduced using Sodium Hydrosulphide (NaHS), inside a vat to form a colourless water soluble compound having great affinity for cotton or cellulose fibre. Then the colourless compound is oxidized back to coloured dye.

Mechanism:

$$\text{Dye} \xrightarrow[NaHS]{\text{reduced}} \text{Colourless compound} \xrightarrow[O_2 \text{ / oxidizing agent}]{\text{hung in air, oxidized}} \text{Colourful fabric}$$

* The fabric is first soaked in the solution of reduced dye, and then hung in air to get oxidized or treated with oxidants. As a result colourless compound is oxidized back to insoluble dye which is now bound to the fabric.

Example: **Indigo (Blue)**



Topic: DYES (Industrial chem)

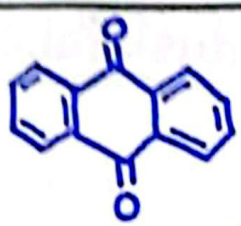
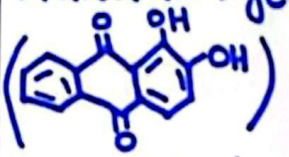
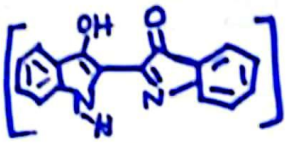
(1) Classification of Dyes based on chromophore.

chromophore:- atom or group whose presence is responsible for colour of a compound.

Auxochrome:- a functional group which is attached to the chromophore and intensifies it's absorbing ability and fixing property. can be acidic or basic & example (i) NH_2 (ii) NR_2 (iii) OH (iv) SO_3H etc.

"DYES ON BASIS OF CHROMOPHORES"

*Name of DYE	chromophore	Auxochrome	Examples
1) Nitro & Nitroso dye	NO or NO_2 groups	-	*Naphthol Yellow S. *Mordant Green 4. *martins yellow *Palatine orange
2) AZO Dye	one or more azo group:- $-N=N-$ (aka:- diazenyl)	comon auxochrome are:- $-OH$, $-SO_3H$, NH_2, NR_2.	*Para Red *Congo red *Bismarck Brown. (used as brown dye in boot polishes and for dyeing wool & cotton).
3) Triaryl-methane dyes.	*central carbon attached to 3 aromatic rings, one is quinoid form. ( type) The chromophore	$-NH_2$. $-NR_2$. $-OH$	*Malachite Green. (has a deep bluegreen colour, used as a direct dye for wool & silk).

4) Anthraquinone Dyes.	 * Paraquinoid. * Anthracene type, derived from anthracene & pthlalic acid	-	Example:- Alizarin Dye  * used to dye wool & cotton. * gives orange red colour. (eg: Alizarin Crimson)
5) Indigo Dyes.	contains carbonyl chromophore.  → carbon-oxygen double bond with indole ring.	-	* Cpb a Blue (Blue) * Brilliant Indigo. (Reddish blue) * Indigosol. (Blue) (Used for dyeing cotton by the Vat process).

(ii) Classification of Dyes on the basis of methods of application.