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Synthesis of azo dye by coupling of diazonium salt with α-naphthol, β-naphthol

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Abstract

The continuous growth of population and increasing industrial activities in the different sectors, viz., textiles, leather, plastics, cosmetics and food processing industries require the development of varying nature of novel dyes. Among the dyes used in different industries, azo dyes are considered to be the most widely consumed and play an important role in the dyeing of textiles, leather, and plastics, etc.

Keyword:-Azo dye, coupling reaction, α-napthol, β-napthol, diazonium salt

Review of literature

We have to synthesize our azo dye therefore, we perform reaction between diazonium salt and different coupling reagent for example :-azo α -naphthol , β -naphthol salicylic acid it is not in the first step preparation of diazonium salt. The diazonium salt coupling with above coupling reagent when diazonium salt react with β -naphthol we get orange color also compound. When coupled with α -naphthol it gives brownish also compound when it couple with salicylic acid it gives yellow colour azo dye. When it coupled with Resorcinol it give brown colour azo dyes and couple with phenol gives yellow color dyes.

Introduction

Some type of organic structure give rise to color ,while others do not. A dye is a colour organic compound that is used to impart color to an object or fabric. Diet plays an indispensable role in human history since ancient time . Dyes are used in almost every commercial product such as food, clothing ,pigments and paints etc. There are many different classes of dyes in which azo dyes are certainly one of the most important classes. About half of the dyes used in industry are azo dyes. Azo dyes color compound containing the Ar-N=N-Ar' group There are Ar and Ar' aromatic groups. The unit containing the nitrogen-nitrogen double bond it's called azo group. The nature of the aromatic substituents on both side of the azo group controls the colour of the azo compound as well as water solubility of dyes and how will they blind to a particular fabrics.

Objective

1. To synthesis other dye and evaluate their microbial potential.
2. Other dye have antituberculosis, antibacterial, antifungal ,anticancer ,anti-inflammatory, antioxidant, antiviral activities.
3. Other die are straightforward to make end of industrial important.
4. They play a crucial Role in the governance of the dye and painting market.

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5. Otherwise are widely used in the food pharmaceutical cosmetic textile and leather industries.
6. A number of azo couples where synthesize via diazonium salt coupling with naphthols coupling partners.

Methodology

Preparation of diazonium salt

1. Dissolve 1ml reactant (aniline, 2-methoxy aniline) In a solution of 3ml concentrated HCL and 10ml H2O in a beaker(A).
2. In another beaker(B), dissolve 1 gram in a NaNo2 solid in 10ml distilled water.
3. Cool both biker in a ice bath.
4. Diazonium salt is prepared by adding solution in B slowly drop wise into solution A with constant stirring.

Preparation of azo dye

1) Dissolve 1 gm coupling agent (β -naphthol, α -naphthol, resorcinol, salicylic acid) in 12 ml 10% NaOH solution in beaker (C), cool it also in ice bath.

2) Now add solution in beaker (A) into (C) with constant stirring.

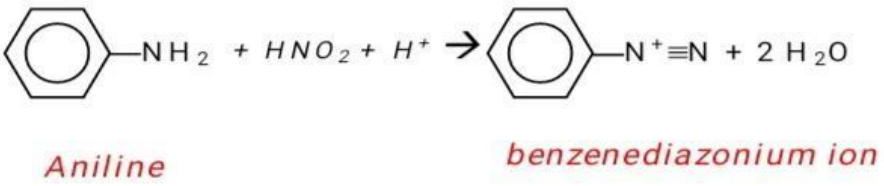
coloured crystal of azo compound is separate out.

3) Then filter the crystal using suction pump and dry it.

Preparation of Diazonium salt

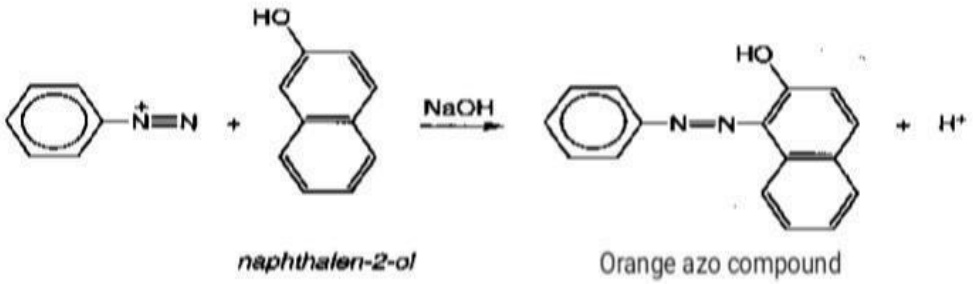
-Acid reacts with sodium nitrite to form unstable nitrous acid.

-Nitrous acid reacts with the aniline to form benzene diazonium chloride.



1) Coupling with β -naphthol:-

Benzene diazonium salt and alkaline naphthalene-2-ol gives a orange azo compound



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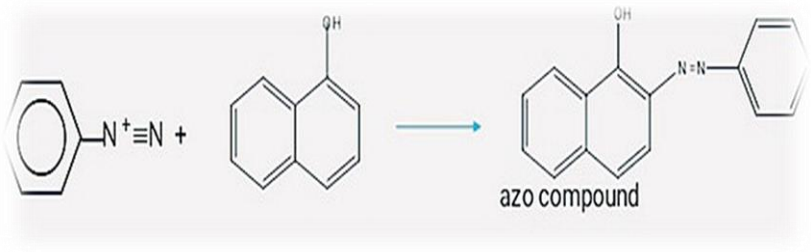
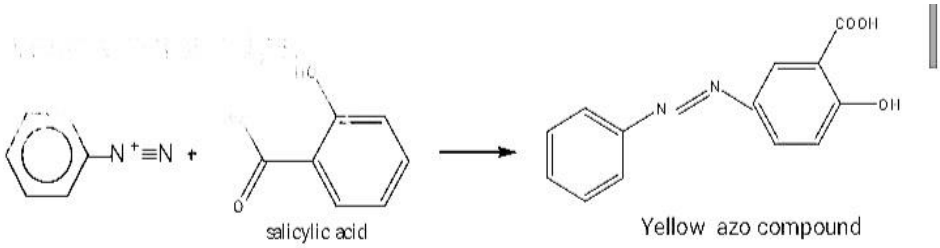
2) Coupling with α -naphthol:-



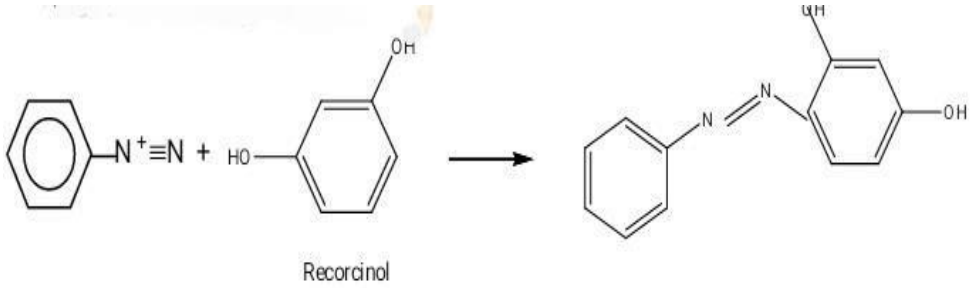
Benzenediazonium salt and alpha-naphthol gives a chocolate brownish azo compound.

3) Coupling with salicyclic acid :-



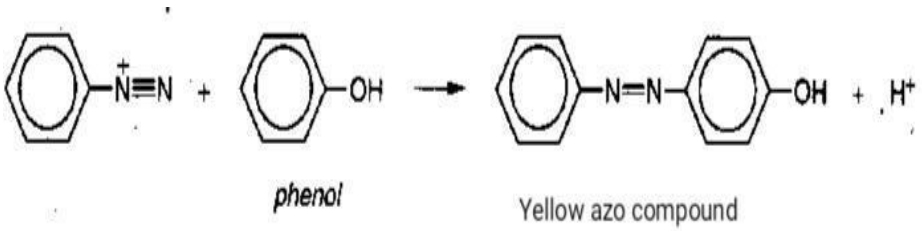
Benzenediazonium salt an alkaline salicylic acid gives yellow colour dye.

4) Coupling with resorcinol:-



Benzenediazonium salt and resorcinol gives a brown color compound

5) Coupling with phenols:-



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Benzenediazonium salt and alkaline phenol gives yellow azo compound.

Result

The result of the washings fastness, suggest that the azo dyes have affinity for the cotton fibers.

Conclusion

It is describes the synthesis and application of azo dye compound on cotton fibers. Among these compound α -naphthol and phenol dye show better dye absorption properties on cotton fabric while and β -naphthol and salicylic dye show poor absorption ability.

Acknowledgement

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Authors contribution

I would like to thank you Dr.Shobha Waghmode mam for Such great guidance to us. Ma'am can also help us to writing the review knowledge ,how to write a review in proper format .They give us such a best knowledge.

Competing Interest Statement

No competing Interest.

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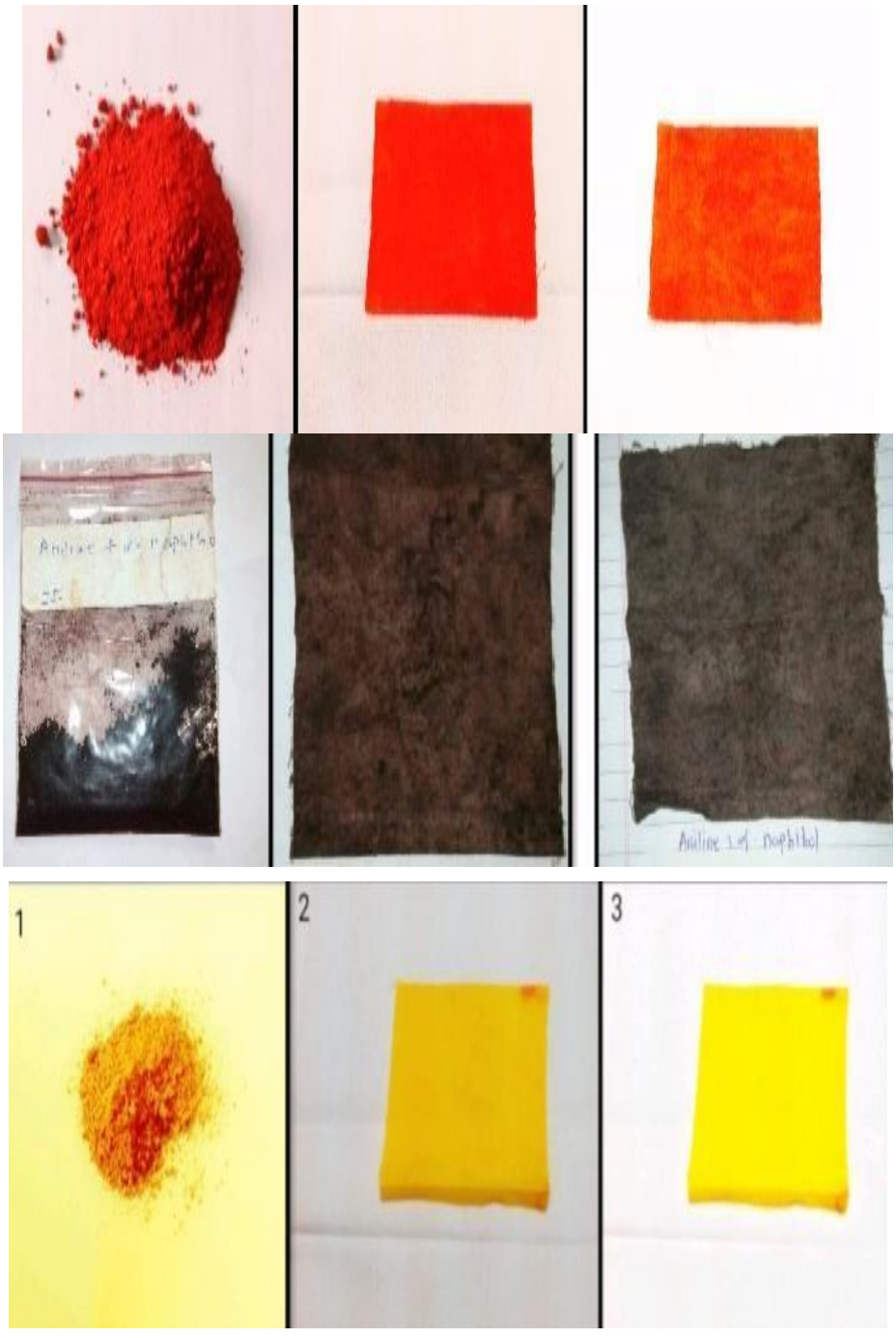
Figure



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