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Synthesis of 2-hydroxy-5-phenyazo Acetophenone

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ABSTRACT

Azo chemicals are crucial to the textile dye, and fiber industries. In the current investigation, certain azo compounds were produced in high yields by diazotizing a few substituted aromatic amines with concentrated HCl and NaNO2, then coupling those products with 2-hydroxyacetophenone. The FTIR method was used to characterize the produced azo compounds

***Keyword** - Azo compounds, 2-hydroxy acetophenone, Aromatic amines.*

1. INTRODUCTION

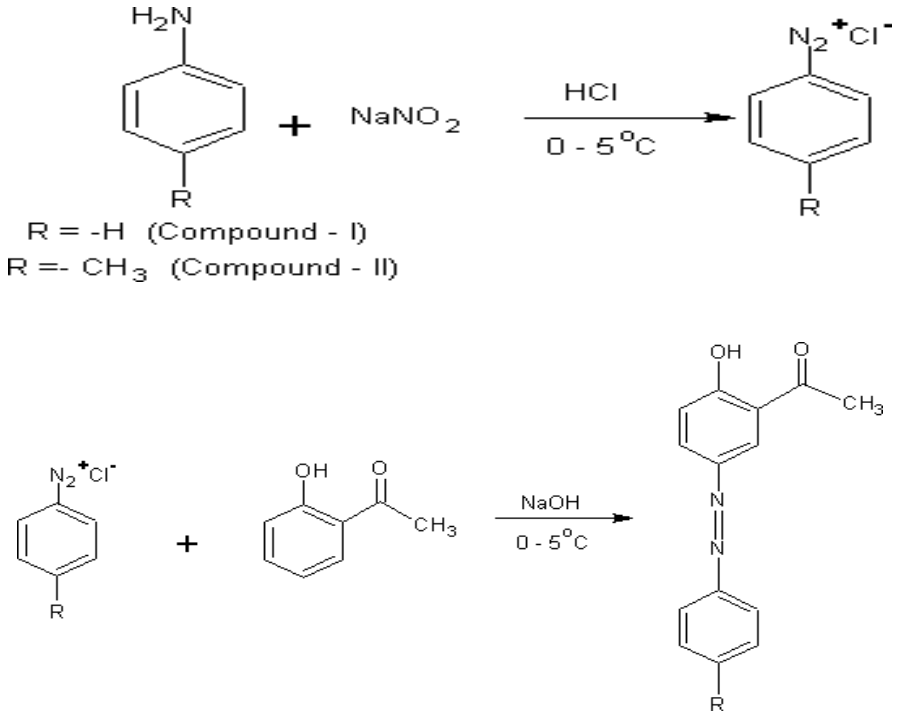
The azo dyes have variety of biological applications like antineoplastics, antidiabetics, antiseptics, anti-inflammatory and other useful chemotherapeutic agents.[1] Azo compounds are highly colored and have been used as dyes and pigments for a long time.[2] Azo dye compounds has great importance due to its environmental stability, electrical and optical properties.[3] The main advantage of azo dye is their cost effectiveness, which is due to the processes involved in manufacture.[4] The N=N group is called an azo or di-imide functional group and when found aromatic group in molecule this helps to stabilize the N=N group by making it a part of an extended delocalized system. This lead to making azo compounds colored and the molecules absorb the light in visible region.[5] Azo compounds are considered as class of organic colorants which consist of at least a conjugated chromophore azo (-N=N-) group in association with one or more aromatic or heterocyclic system.[6] The substituted azo compounds have the general structure R-N=N-R', where R and R' are alkyl, aryl or heterocyclic radicals. The azo dyes have been synthesized by the condensation of azo compounds with hydroxyl, aldehydes or ketones.[7] Some azo dye compounds shows biological activity against bacteria like digestive tract bacteria, Staphylococcus aureus etc.[8] The azo dyes compounds found to contain one or more azo groups(-N=N-) which are attached to carbon atom (SP2 hybridized).[9] Synthesis of most azo compounds involves diazotization of a aromatic amine, followed by coupling amino and hydroxyl groups are commonly used for coupling reactions.[10]

In the present study, the azo dyeswere synthesized by coupling 2-hydroxy acetophenone with benzene diazonium chloride and p-methyl diazonium chloride separately.

1.1 METHODS AND MATERIALS

Synthesis of 2-hydroxy-5-phenyazo acetophenone

The aryl diazonium chloride was prepared by dissolving pure aniline (0.93gm) with concentrated HCl (3ml) and water (3ml) and allow to cool at 5oC. in ice bath.NaNO2 (0.69gm) was dissolved in water(10ml) at 5oC.The above two solutions were mixed with constant stirring. This mixture was added to the solution of 2-hydroxyacetophenone (1.36gm) which was dissolved in 10% NaOH solution at 5oC.The mixture were kept in ice bath with constant stirring for about 10min.The product precipitate was filtered and re-crystallized from glacial acetic acid, m.p.128oC.



2. RESULT AND DISCUSSION

The azo compounds I and II had distinct melting points. By using IR spectra and qualitative functional group analysis, the synthesised azo compounds were identified.

2.1 hydroxy-5-phenyazo acetophenone

IR (KBr) cm-1

The dye shows the absorption peak due to azo group, -N=N- stretching vibration at 1470cm-1. Aromatic C-H stretching vibration bands appeared in the region of 2850- 2940 cm-1. aromatic C-H bending vibration bands appeared in the region of 845-730 cm-1. -OH stretching vibration bands appeared in the region of 3150 cm-1. -C=O stretching vibration bands appeared in the region of 1620 cm-1. The decreased value of –C=O stretching vibration may be attributed to the conjugation of the double bond.

There are functional groups such -OH, -N=N-, and -C=O, according to the qualitative functional group analysis..

3. CONCLUSIONS

It was decided to create azo dyes using the coupling agent 2-hydroxyacetophenone. The N=N group is present in the produced compounds, making them suitable for use as dyes.

4. REFERENCES

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