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Short Communication

Synthesis of Schiff's Bases with Simple Synthetic Approach

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ABSTRACT

A series of Schiff's bases (3A-G) were synthesized using a simple synthetic approach. 0.05 mole of m-nitro aniline and aromatic aldehydes in ethanolic solution was subjected to reflux for 2 hr to obtain pure products. All the products obtained were having excellent yield in the range of 80-90 % w/w. Products were purified using hot ethanol and reaction was monitored by hexane: ethyl acetate (60:40).

Key words: Schiff's bases, m-nitroaniline, Aldehydes

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INTRODUCTION

Schiff bases named after German chemist, Nobel Prize winner, Hugo Schiff in 1864. They are formed when primary amine reacts with an aldehyde or a ketone under specific conditions. Schiff base (also known as imine or azomethine) is a nitrogen analogue of an aldehydes or ketone in which the carbonyl group ($C=O$) has been replaced by an imine or azomethine group¹⁻³. As the Schiff bases are derived from aromatic amine and aromatic aldehydes have a wide variety of applications such as biological activity, catalytic activity and also used as ligands to obtain metal complexes⁴. Schiff-base compounds have been potentially used as fine chemicals and medical substrates. Number of methods are been applied for synthesis of schiff's base. In traditional method of synthesis which commonly involve the removal solvents from the reaction mixture or liquid extraction especially in the case of aprotic dipolar solvent with high boiling point, or product isolation through liquid-liquid extraction⁵

Schiff bases have also been shown to exhibit a broad range of biological activities, including antimicrobial⁶⁻⁷, anti-inflammatory⁸⁻⁹, analgesic¹⁰ anticonvulsant¹¹,

anticancer¹² etc. They also have great utility in various fields such as medicine, agriculture, cosmetic products etc. Recently, Schiff base complexes have drawn attention in biochemistry and biomedicine because of their unique properties. Schiff base ligands are considered "privileged ligands" because they are easily prepared by the condensation between aldehydes and imines. Stereogenic centres or other elements of chirality (planes, axes) can be introduced in the synthetic design¹³. Aim of present study to develop a simple, fast and atom efficient synthesis of Schiff's bases due to its importance as great pharmacophore as previous conventional methods of synthesis are complex and tedious,

MATERIALS AND METHODS

Reagents and solvents

All the chemicals and solvents were produced from S.D. fine chemicals and sigma Aldrich. The reagents used were of analytical grade and were used without further purification. The solvent used were of commercial grade.

Method

0.05 Mole m-nitroaniline in hot ethanol (20 ml) was added to an ethanolic solution of 0.05 mole aldehyde resulting mixture was stirred under reflux for 2 hours, filtered, washed with cold ethanol and recrystallized using absolute ethanol, reaction was monitored by using n-Hexane: Ethyl acetate (60:40)

RESULT AND DISCUSSION

Novel method for the synthesis of different Schiff bases has been established with very simple synthetic approach as compared other conventional methods. The synthetic scheme has been given in Figure 1. The results summarized in Table 1. Series of Schiff's bases (3A–3G) synthesized with excellent yields in the range of 80-90 % w/w. All the compounds are purified by hot ethanol and reaction was monitored by TLC by using n-hexane and Ethyl acetate (60:40) as a mobile phase.

Table 1: Results of Synthesized Schiff's Bases

Code of compounds	R1	R2	R3	Yield	Time in hours	Melting Point (° C)
3A	-(3-NO ₂ -C ₆ H ₄)	-(4-Cl-C ₆ H ₄)	H	85%	2	120-121
3B	-(3-NO ₂ -C ₆ H ₄)	-(2-OH-C ₆ H ₄)	H	80%	2	172-174
3C	-(3-NO ₂ -C ₆ H ₄)	-(4-OCH ₃ -C ₆ H ₄)	H	87.5%	2	104-105
3D	-(3-NO ₂ -C ₆ H ₄)	-(4-N(CH ₃) ₂ -C ₆ H ₄)	H	83.8%	2	90-92
3E	-(3-NO ₂ -C ₆ H ₄)	-C ₂ H ₂ -C ₆ H ₅	H	88%	2	76-78
3F	-(3-NO ₂ -C ₆ H ₄)	-C ₆ H ₅	H	80%	2	101-103
3G	-(3-NO ₂ -C ₆ H ₄)	-(4-NO ₂ -C ₆ H ₄)	H	84.7%	2	119-121

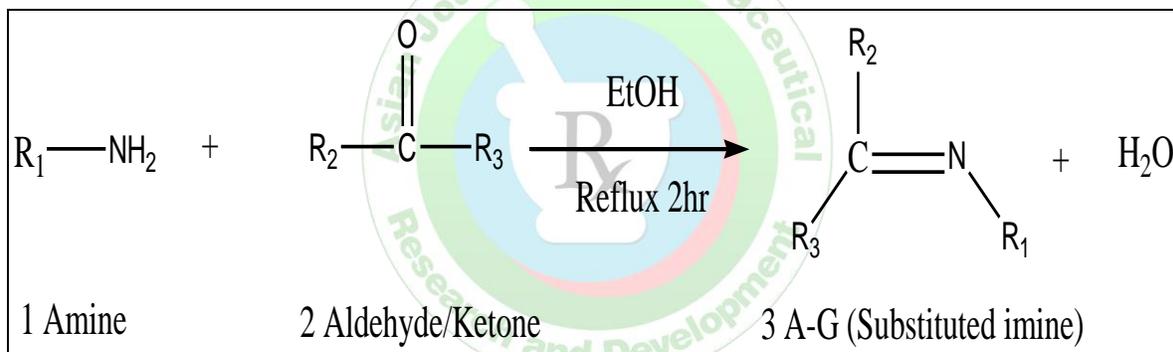


Figure: 1 Synthetic scheme of various synthesized Schiff's bases

CONCLUSION

A simple and productive and novel synthetic method was established over complex and tedious conventional methods used to synthesize schiff's bases by using various aldehydes and m-nitro aniline. All the products obtained with good yield in the range of 80-90 %, purified using ethanol and reaction was monitored by Hexane: Ethyl acetate (60:40) as mobile phase.

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