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RESEARCH ARTICLE

Biological Activities of Hydroxytriazenes and their Nickel Complex

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ABSTRACT

The purpose of research was to synthesized better antimicrobial compounds of hydroxytriazenes, by Synthesis of different substituted aromatic nitro compounds as the starting material for synthesis. Hydroxytriazenes and their Iron complexes as biological active compounds.

KEYWORDS

Hydroxytriazenes, Antimicrobial Activity, Nickel Complexes Biological Activity

INTRODUCTION

Hydroxytriazenes are the important compound owing to their wide range of biological activities and application. They have been found to possess the pharmacological activities such as antifungal[1-3], antibacterial[4-6], insecticidal[7-12], analgesic[13] and anti-inflammatory[14-15] and wound healing agents[16] etc. They also serve as organic chelating agents, also used for the determination of transition and non-transition metal ions in complexometry determination. The antimicrobial activity, which can be altered depending upon the type of substituent present on the aromatic rings. In view of these above biological importance of hydroxytriazenes. We synthesized some novel hydroxytriazenes. All the synthesized compounds have been characterized on the basis of their M.P, TLC, and IR. The antimicrobial activity of these compounds was evaluated by Agar diffusion method. The main aim of the present work is to find new antimicrobial molecules

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MATERIALS AND METHOD

General Procedure for the Synthesis of Hydroxytriazenes

Step A: Preparation of Phenylhydroxylamine

The present work is oriented towards synthesis of some hydroxytriazenes of by three step method[17] in following manner. In this method 0.1mol of nitrobenzene, 7.5g of NH_4Cl, 100mL of water along with 50mL of rectified spirit were taken and stirred mechanically. The temperature of the reaction mixture was maintained between 50 to 60^oC. After this, 20g of zinc dust was added in small portions with continuous stirring. After complete addition of zinc dust, the reaction mixture was further stirred mechanically for another 15 minutes. The resulting mixture was filtered under suction and the residue was washed with ice cold water. The filtrate was taken in another beaker and kept in fridge to cool.

Step B: Diazotisation of 2, 5-Dichloro Aniline

In a 500mL beaker, 0.1mol of 2,5-dichloro aniline was dissolved in warm mixture of 25mL of concentrated HCl and 25mL of distilled water. After stirring vigorously the mixture was

put in an ice bath to maintain temperature between 0-500C. In another beaker 6.9g of sodium nitrite was dissolved in 20mL of distilled water and it was kept in freezer for cooling. Sodium nitrite solution was added to p-aminobenzoic acid dropwise with continuous stirring. The diazotised product so obtained was directly used for coupling.

Step C: Coupling

The diazonium compound prepared as above was added slowly to the phenylhydroxylamine solution under constant stirring. Temperature of mixture was maintained between 0- 5^{o}C. The pH of mixture was adjusted close to six by occasional addition of sodium acetate solution as and when required.

The reaction mixture was further stirred for 15 minutes after complete addition of diazonium compound. Sodium chloride was added in sufficient quantity to saturate the solution.

Stirring was continued and after sometime product came out as brownish coloured. The compound was filtered under suction and washed with cold water.

It was repeatedly crystallized with absolute alcohol. The final product was obtained as yellow needle shaped crystals.

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The purity of compound was checked by the Physicochemical Method like color, M.P and CHN analysis etc. Melting points of the synthesized compounds were determined by open capillary and are uncorrected. The purity of the compounds was checked using pre-coated TLC plates (MERCK, 60F).

IR Spectral Analysis

Following bands were observed 1489 cm (vN-N), 1732 cm^{-} (N=N Str), 3086(C-H), 3252(OH), 1391(C-N Str), 763(C-Cl)

Antimicrobial Activity

The antimicrobial activity of all the synthesized compounds were examined against different Staphylococci, Streptococci, E. coli and Klebsiella organisms by measuring zone of inhibition. The antimicrobial activity was performed by Agar diffusion method at the concentration level of 200µg/ml. Fluconazole used as standard drug at same concentration. Nutrient agar was used as culture media for antibacterial activity and Sabouraud dextrose agar was used as culture media for antifungal activity and DMSO as control. The results of the antimicrobial activity are shown in Table 1.

Table 1: Physical Characteristics, M.P., CHN values of the Reagent

Molecular formula	**Colour and shape of the crystals**	**Solvent Used**	**Elemental analysis**				**M.P. (°C)**
				% Carbon	**% Hydrogen**	**% Nitrogen**	
$C_{12}H_9N_3OCl_2$	Yellow Coloured Micro Crystals	Ethanol	Th. Exp.	41.86 41.90	4.65 4.61	24.41 24.40	81

Table 2: Zone of inhibition (mm) data of synthesized compounds at 200PPM

Comp. Code.	Name of Compound	Staphylococci	Strept ococci	E. coli	Klebsiella
(i)	3-hydroxy-3-phenly-1-(dichloro phenyl)triazene	22	16	16	18
(ii)	3-Hydroxy-3-m-tolyl-1-(2,5 dichloro pheny)triazene	17	20	23	17
(iii)	3-Hydroxy-3-p-tolyl-1-(2,5 dichloro pheny)triazene	24	22	21	19
(iv)	3-Hydroxy-3-isopropyl-1-(2,5 dichloro pheny)triazene	22	22	23	20
Control		-	-	-	-
Fluconazole		25	25	25	25

RESULTS AND DISCUSSION

All the synthesized compounds were bioactive agent. In accordance with the data obtained from antimicrobial activity, all the synthesized hydroxytriazenes have shown good activity against the tested microbes at 200µg/ml. The antibacterial studies of Hyroxytriazenes show very good result against *E. Coli* and least activity against bacterial stain *Klebseila.*

CONCLUSION

Antibacterial and antifungal activity of the synthesized compound was done in comparison with Fluconazole as standard to reveal the potency of synthesized compounds.

All the three selected strains of microbes namely Staphylococci, Streptococci, *E. Coli*, Klebsiella sensitivity to all compounds at higher concentration (200µg/ml) and no sensitivity at lower concentration

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