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ANTIMICROBIAL ACTIVITY OF 1-(4-(1H-IMIDAZO[4,5-B]PYRIDIN-2-YL)PHENYL)-5-METHYL-3-ARYL-1,3,5-TRIAZINANE-2-THIONES AND 3-(4-(1H-IMIDAZO[4,5-B]PYRIDINE-2-YL)PHENYL)-5-ARYL-1,3,5-OXADIAZINANE-4-THIONES

G. Dayakar[1], Dr. A. Jeyanthi*[2] and R. Ajay Kumar[1]

[1]Department of Chemistry, Kakatiya University,Warangal – 506001 (Telangana) India.
[2]Department of Chemistry, Satavahana University, Karimnagar– 505001 (Telangana) India.

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***Corresponding Author**
Dr. A. Jeyanthi
Department of Chemistry,
Satavahana University,
Karimnagar– 505001
(Telangana) India.

ABSTRACT

The 1-(4-(1H-imidazo[4,5-b]pyridin-2-yl)phenyl molecule **(I)** reacts with $MeNH_2$, CH_2O to give triazinane thiones **(II)** and with CH_2O to give Oxadiazinane thione **(III)** derivatives of it. The antimicrobial activity of these new compounds with various substituents have been reported in the present study.

KEYWORDS: Triazinane thiones, Oxadiazinane thione, Impregnated discs, Degree of Inhibition.

INTRODUCTION

Imidazopyridine derivatives are of great importance because of their remarkable biological properties. The derivatives of imidazopyridine are used in medicinal chemistry due to their biological and pharmaceutical properties. This biogenic amine is associated with an array of physioloical processes including glucose metabolism in the liver and cardio valvular operations as well as those of the central nervous system. Some of the compounds with imidazopyridine skeleton are used in psychiatry and autoimmune disorders.

Studies have demonstrated the stability of these materials towards the major pathways of nucleoside inactivation.eg-deamination of adenosine deaminose and glycosidic cleavage by nucleosides phosphorylases, which is an important factor in the design of therapeutic agents.Synthetic nucleosides containing the 7-amino-imidazo[4,5-b]pyridine nucleus(i.e. 1-deazapurines) have already been employed in numerous chemotherapeutic applications.

This has prompted us to synthesise new 1H-Imidazo[4,5-b] pyridine derivatives. The present study is to aim at the antimicrobial activity of the newly synthesised 1H-Imidazo[4,5-b] pyridine derivatives.

Antimicrobial Activity

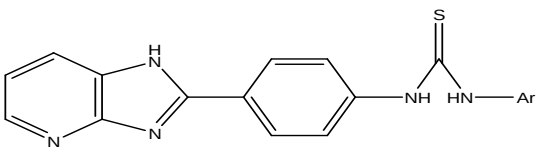
The antimicrobial activity of synthesised comounds II (a-f) and III (a-f) was determined *in vitro* against six bacterial strains.(Table 1). For this study,the test cultures of bacterial strains *Staphylococcus aereus, Esterichia coli, Klebsiella pneumoniae, Salmonella paratyphi A, Salmonella paratyphi B, Micrococcus luteus* were maintained in nutrient agar slants at 37^0c. The antimicrobial activity of compounds against test bacteria were determined. All the compounds were dissolved in 5% aqueous DMF and used for testing their activity.Tetracycline (100 µg/mL) was used as a standard drug for comparision. The zone of inhibition was given in millimetres(mm).

Experimental

MATERIALS AND METHODS

Invitro antibacterial assay

A loopful of culture was taken from the slants of individual bacterial strain and inoculated in 25 mL of sterile nutrient broth. Inoculation was carried out by dipping a sterile cotton-wool swab into the suspension and spread evenly over the entire surface of the petriplate by swabbing in three directions. The plates were allowed to dry for sometime before applying discs. Cultures were incubated at 37^0c and 120 rpm in an orbital shaker for 10 hr. A volume of 100 µL of actively growing culture was evenly spread on to the surface of the nutrient agar plate. Imprenated discs were forced on the agar surface with sterile forceps and gently pressed down to ensure contact. A concentration of 1000 µg/µL of the compounds in ethyl alcohol was added to each disc (20 µL/disc) placed on a sterile Petri plate. The imprenated discs were dried for 3-5 min and placed on pre-inoculated agar surface. A control was also established by using just the solvent in which each compound was dissolved. The plates were incubated at 37^0c for 24 hr. The degree of inhibition of the test compounds was observed by the formation of zones around the impregnated discs. It was measured in mm.



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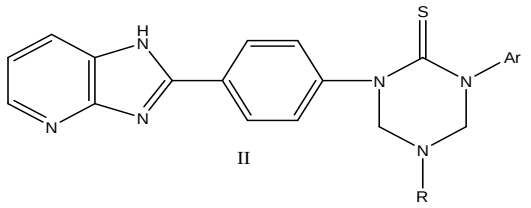

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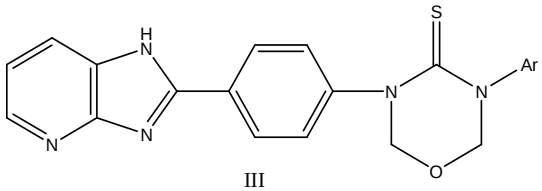

III

The above compounds with various substituents were taken as under.

Compound	AR
a	4-chlorophenyl
b	2-chlorophenyl
c	3-hydroxyphenyl
d	4-methoxyphenyl
e	4-bromophenyl
f	phenyl

Table 1: Antimicrobial activity of 1-(4-(1H-imidazo[4,5-b]pyridin-2-yl)phenyl)-5-methyl-3-aryl-1,3,5-triazinane-2-thiones and 3-(4-(1H-imidazo[4,5-b]pyridine-2-yl)phenyl)-5-aryl-1,3,5-oxadiazinane-4-thiones.

Compound	S. aureus	E. Coli	Klebsiella pneumonie	Salmonella Paratyphia	Salmonella Paratyphib	Micrococcus Luteus
I	4	3	7	1	1	2
II a	9	6	18	1	-	1
II b	10	8	6	6	4	1
II c	6	4	6	5	1	1
II d	4	1	1	10	8	6
II e	12	11	15	9	6	4
II f	8	6	4	2	4	1
III a	6	4	1	1	1	2
III b	10	8	6	4	2	3
III c	12	11	15	9	2	4
III d	9	8	6	5	1	2
III e	10	9	5	6	2	3
III f	6	5	1	5	1	1
Tetracycline	25	15	18	16	10	17

RESULTS

Perusal of the above table reveals that the derivatives having methoxy as substituent is more toxic than simple hydroxy compound and chloro compound to all six bacteria. Among all

compounds, the oxadiazinanes were found to be more toxic than Schiff bases. Schiff bases were also toxic towards all bacteria. The compounds which have methoxy substituent have shown versatile toxicity to all bacteria.

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