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Antibacterial activity of 9-Aryl-6-(2-methoxyphenyl)-[1,2,4] triazolo [4,3-*a*][1,8]naphthyridines

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Abstract-

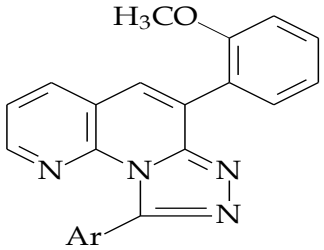
In this paper we describe the anti bacterial activity of newly synthesized derivatives of 9-Aryl-6-(2-methoxyphenyl)-[1,2,4]triazolo[4,3-a][1,8]naphthyridines(a-j) evaluated by the filter paper disc technique of Vincent and Vincent. The compounds were dissolved in acetone and tried at two different concentrations (250 and 500 μg/disc). The Whatman filter paper discs (6 mm diameter) with different compounds were placed aseptically on seeded nutrient agar plates with different bacteria. The presence of substituents especially methyl, chloro, fluoro and dimethoxy groups when attached to phenyl ring increases the activity notably. Zone of inhibition was screened in mm.

Keywords- triazolo[1,8]naphthyridines, anti bacterial activity, inhibition.

INTRODUCTION

1,8-Naphthyridines have gained considerable attention because of their wide biological and pharmacological activities[1-7]. Nalidixic acid (1-ethyl-3-carboxy-7-methyl-1,8-naphthyridin-4-one) has been found to be particularly effective against Gram-negative bacteria found in chronic urinary tract infections.[8] In addition, certain members of this class display antibacterial[9], acetylcholinesterase inhibitory[10], topoisomerase-I inhibitory[11], antitumor[12], antimycobacterial[13], anti-inflammatory[14], HIV-1 replication[15] activities.

1,2,4-Triazole moiety is probably the most well known heterocycle, it is a common and important feature of a variety of medicinal agents. Heterocyclic ring fused on 1,2,4-triazoles have become attractive targets in organic synthesis due to their significant biological properties. Fused 1,2,4-triazoles are the biologically interesting molecules and their chemistry has received considerable interest[10-12]. The synthesis of a fused 1,2,4-triazole system is possible by two distinct routes either by treatment of a suitably substituted 1,2,4-triazole with appropriate reagents to give rise either to the fused 1,2,4-triazole system as such or an intermediary product which may be cyclized subsequently[13] or more conventionally by starting from a suitable α-hydrazino heterocycle and creating the triazole unit thereon.



Ar		Ar	
a :	C_6H_5	**f** :	4 -F C_6H_4
b :	4–$CH_3C_6H_4$	**g** :	2-NO_2 C_6H_4
c :	4–$CH_3OC_6H_4$	**h** :	3-NO_2 C_6H_4
d :	2-Cl C_6H_4	**i** :	4-NO_2 C_6H_4
e :	4-Cl C_6H_4	**j** :	3,4-$(CH_3O)_2C_6H_3$

EXPERIMENTAL SECTION

Antibacterial activity

The antibacterial activity of the compounds thus prepared was evaluated by the filter paper disc technique of Vincent and Vincent[20]. The bacteria used in the present study were *Escherichia coli*, (Gram-negative) and *Bacillus subtilis* (Gram-positive). The compounds were dissolved in acetone and tried at two different concentrations (250 and 500 μg/disc). The Whatman filter paper discs (6 mm diameter) with different compounds were placed aseptically on seeded nutrient agar plates with different bacteria and incubated for 72 hours at 37 $\pm$ 1°C. At the end of the incubation period, the diameter of the growth inhibition zones was measured. At least 10 paper discs were observed and repeated twice.

RESULTS AND DISCUSSION

The antibacterial data indicate that all the compounds were active against both Gram-negative and Gram-positive bacteria at the concentration of 250 μg/disc (**Table I**). The activity of the compound depends upon the nature and position of the substituent at the phenyl group. The presence of substituents especially methyl, chloro, fluoro and dimethoxy groups when attached to phenyl ring increases the activity remarkably. Compounds **b**, **e**, **f** and **j** showed promising activity. Introduction of nitro group at aryl moiety decreases the activity of the compounds. The most active compound of the series was **e**, which exhibited activity comparable to that of Gentamycin.

Table I - Antibacterial activity data of 9-Aryl-6-(2-methoxyphenyl)-[1,2,4]triazolo[4,3-*a*][1,8]naphthyridines

Compd	Ar	Inhibition zone (in mm)			
		E. coli at		*B. subtilis* at	
		250 μg/disc	500 μg/disc	250 μg/disc	500 μg/disc
a	C_6H_5	9.0	17.5	6.5	9.5
b	4-$CH_3C_6H_4$	11.0	15.5	7.5	12.5
c	4-$CH_3OC_6H_4$	9.5	13.5	6.0	11.5
d	2-ClC_6H_4	10.5	19.5	6.5	12.5
e	4-ClC_6H_4	11.5	21.5	7.5	14.5
f	4-FC_6H_4	11.0	21.0	7.5	13.5
g	2-$NO_2C_6H_4$	8.5	14.0	5.5	8.5
h	3-$NO_2C_6H_4$	8.0	12.0	6.0	10.5
i	4-$NO_2C_6H_4$	9.0	14.5	7.0	11.0
j	3,4-$(CH_3O)_2C_6H_3$	10.5	18.5	7.0	12.5
	Gentamycin	12.0	22.0	8.0	15.0

CONCLUSION

We have described anti bacterial activity of 9-Aryl-6-(2-methoxyphenyl)-[1,2,4]triazolo[4,3-*a*][1,8]naphthyridines(a-j) newly synthesised compounds were shown potent when compared to that of Gentamycin as standard drug.

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