Screening and Biological evaluation of fluorinated 1, 8-naphthyridinyl phthalazine -1, 4-dithiones

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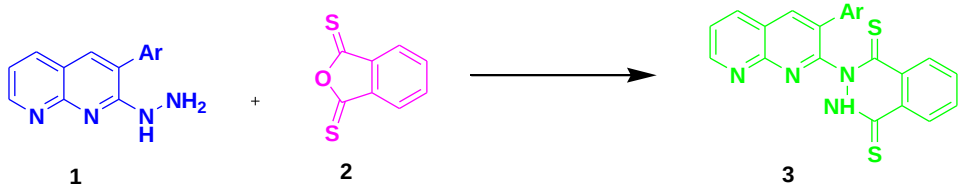
ABSTRACT

A newly synthesized fluorinated 1, 8-naphthyridine -1, 4-dithiones **3(a-l)** were screened for antibacterial activity of the compounds thus prepared was evaluated by the filter paper disc technique of Vincent and Vincent. 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).Potency of compound are displayed in Table-I.

Keywords— 1, 8-naphthyridine, biological evaluation, Vincent and Vincent, naphthyridinyl -1, 4-dithiones.



1 2 3

Scheme I

INTRODUCTION

1,8-Naphthyridines constitute one of the most active class of compounds possessing diverse pharmacological and microbiological activity[1]. Phthalazines represent a heterocyclic system of remarkable biological efficiency[2-5].Fluorine containing organic compounds constitute an area of rapidly growing interest because of their unique physical and biological properties[6-8].

In view of this, we report herein biological activity of the synthesis of fluorinated 2-(3-aryl-1,8-naphthyrdin-2yl)-1,2,3,4-tetrahydrophthalazine-1,4-dithiones **3** (Scheme I). Compared to traditional methods, many organic reactions occur more efficiently in the solid state than in solution and in some cases even more selectively. Furthermore, the solid state reaction has many advantages: reduction pollution, low costs and simplicity in process and handling [9-11].

1,8-Naphthyridine derivatives have attracted a great deal of interest owing to their diverse biological activities. Various 1,3,4-oxadiazoles, pyrazoles and phthalazine-1,4-diones occupy an important place in medicinal chemistry has they show a wide spectrum of pharmacological and microbiological activities. Fused 1,2,4-triazoles have been reported to exhibit interesting and diverse biological and pharmacological activity. Encouraged by these observations a number of new 1,8-naphthyridines (both substituted and fused)(**3a-l**) have been synthesized to evaluate their antimicrobial activity.

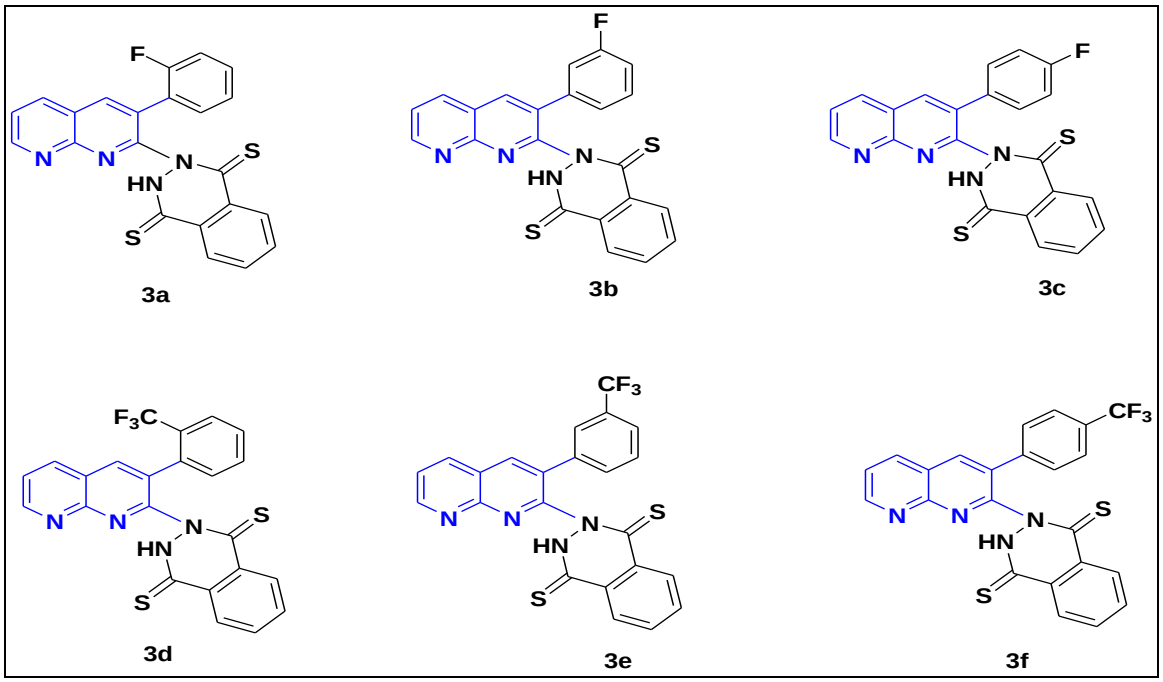


Fig: 1 Structures of fluorinated 1, 8-naphthyridine -1, 4-dithiones (3a-f)

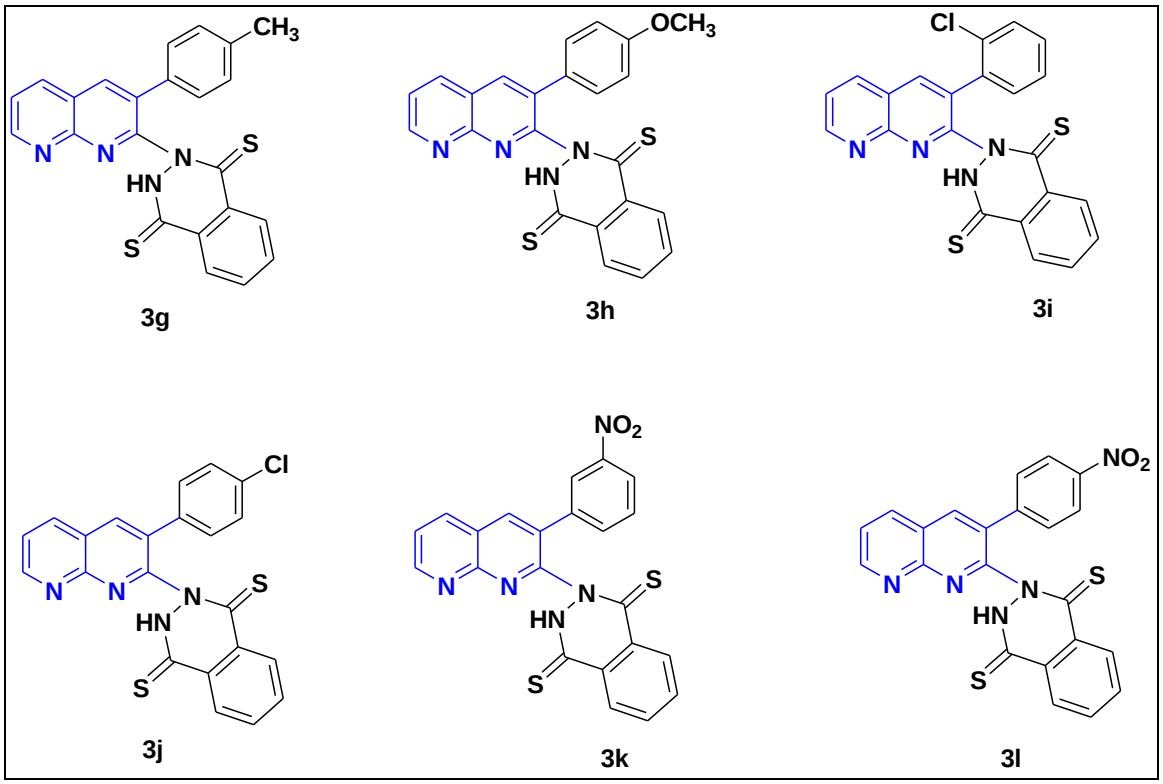


Fig: 2 Structures of fluorinated 1, 8-naphthyridine -1, 4-dithiones (3g-l)

EXPERIMENTAL SECTION

The antibacterial activity of the compounds thus prepared was evaluated by the filter paper disc technique of Vincent and Vincent[12]. 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 hr at 37 ± 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 screening of the compounds **3a-l** (**Table I**) showed that all the compounds were active against both bacteria at the concentration of 250 μg/disc. The activity of the compound depends upon the nature and position of the substituent. The presence of substituents especially methyl, methoxy, fluoro and chloro groups increases the activity remarkably. The most active compound of the series was **3e**, which exhibited activity comparable to that of Gentamycin. All other compounds displayed either good or moderate activity towards both bacteria

Table I — Antibacterial activity data of fluorinated 1, 8-naphthyridine -1, 4-dithiones **3**

Entry	Ar	Inhibition zone (in mm)			
		E. coli at		*B. subtilis* at	
		250 μg/disc	500 μg/disc	250 μg/disc	500 μg/disc
3a	2- F C_6H_4	8.5	8.5	5.5	9.0
3b	3- F C_6H_4	9.5	8.0	6.0	6.5
3c	4- F C_6H_4	10.5	9.5	6.5	8.5
3d	2- CF_3 C_6H_4	11.5	14.0	6.0	8.0
3e	3- CF_3 C_6H_4	6.5	8.5	6.0	7.5
3f	4- CF_3 C_6H_4	7.5	9.5	7.0	9.5
3g	4-$CH_3C_6H_4$	10.0	19.5	6.5	12.0
3h	4-$CH_3OC_6H_4$	9.5	15.0	6.0	9.5
3i	2-ClC_6H_4	10.5	16.5	6.5	10.5
3j	4-ClC_6H_4	11.5	21.0	7.0	13.5
3k	3-$NO_2C_6H_4$	6.5	8.5	6.0	7.5
3l	4-$NO_2C_6H_4$	8.0	11.5	7.0	9.5
	Gentamycin	12.0	22.0	8.0	15.0

CONCLUSION

2-(3-aryl-1,8-naphthyrdin-2yl)-1,2,3,4-tetrahydrophthalazine-1,4-dithiones are screened for anti bacterial studies gentamycin as the reference standard. Most of the compounds showed potent activity.

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