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In Vitro Evaluation of Antifungal Activity of Series of 2-Phenyl-3-(6-aryl-7H-[1,2,4]triazolo[3,4-b][1,3,4]thiadiazin-3-yl)-4H-4-chromenone Compounds

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ABSTRACT

A new series of 2-phenyl-3-(6-aryl-7H-[1,2,4]triazolo[3,4-b][1,3,4]thiadiazin-3-yl)-4H-4-chromenone 1(a-j) has been synthesized by the reaction of 3(4-amino-5-sulfanyl-4H-1,2,4-triazol-3-yl)-2-phenyl-4H-4-chromenone with a variety of phenacyl bromides in ethanol under reflux. The compound with the 4-bromophenyl (1g) greatest anti A. niger action, while compound (1a) had the least. Except for 1a and 1i, these compounds also shown efficacy against Candida albicans. While others showed moderate to good action, the compound containing the 4-methoxyphenyl (1c) good activity against C. albicans.

INTRODUCTION

Triazoles are the class of heterocyclic compounds[1] their azole ring is readily able to bind with a variety of enzymes and receptors in biological system *via* diverse non-covalent interactions, and thus display versatile biological activities. Among the triazoles, 1,2,4-triazole have drawn great attention due to its wide variety of activities[2], many drugs which containing triazole moiety available in market such as antifungal drugs myclobutanil[3], tebuconazole[4], posaconazole[5], Itraconazole[6], fluconazole[7] and paclobutrazole[8], anticancer drugs anastrazole[9], litrozole[10] and vorozole[11], antimigrain drug rizatriptan[12] and antiviral drug ribavirin[13].

The 1,2,4-triazole substituted with amino and mercapto groups have been reported to possess a variety of biological activities such as antibacterial[14], antifungal[15], antitubercular[16], anticancer[17], diuretic[18], and hypoglycemic[19]. The amino and mercapto groups are readymade nucleophilic centers for synthesis of fused heterocyclic systems[20]. Further, the triazole fused with thiadiazine have promising biological activities such as anti-HIV[21], CNS stimulant[22], antifungal[23], and anti-inflammatory[24] and anti-*Candidal* activity[25].

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MATERIAL AND METHODS:

Using the cup-plate method[26], the compounds **(figure 1) 1(a-j)** were further tested for their antifungal activity against *Aspergillus niger* and *Candida albicans* at 100 g/mL. These compounds antifungal efficacy was compared to that of the accepted reference drug, Amphotericin B. The zones of inhibition that formed are shown in **Table 1** and are measured in millimeters.

RESULTS AND DISCUSSION

Antifungal activity

Using the cup-plate method[26], the compounds **1(a-j)** were further tested for their antifungal activity against *Aspergillus niger* and *Candida albicans* at 100 g/mL. These compounds antifungal efficacy was compared to that of the accepted reference drug, Amphotericin B. The zones of inhibition that formed are shown in **Table 1** and are measured in millimeters. All of the compounds had antifungal activity against *A. niger*, according to the antifungal screening findings. The compound with the 4-bromophenyl (**1g**) had the greatest anti *A. niger* action, while compound (**1a**) had the least. Except for **1a** and **1i**, these compounds also shown efficacy against *Candida albicans*. While others showed moderate to good action, the compound containing the 4-methoxyphenyl (**1c**) good activity against *C. albicans.*

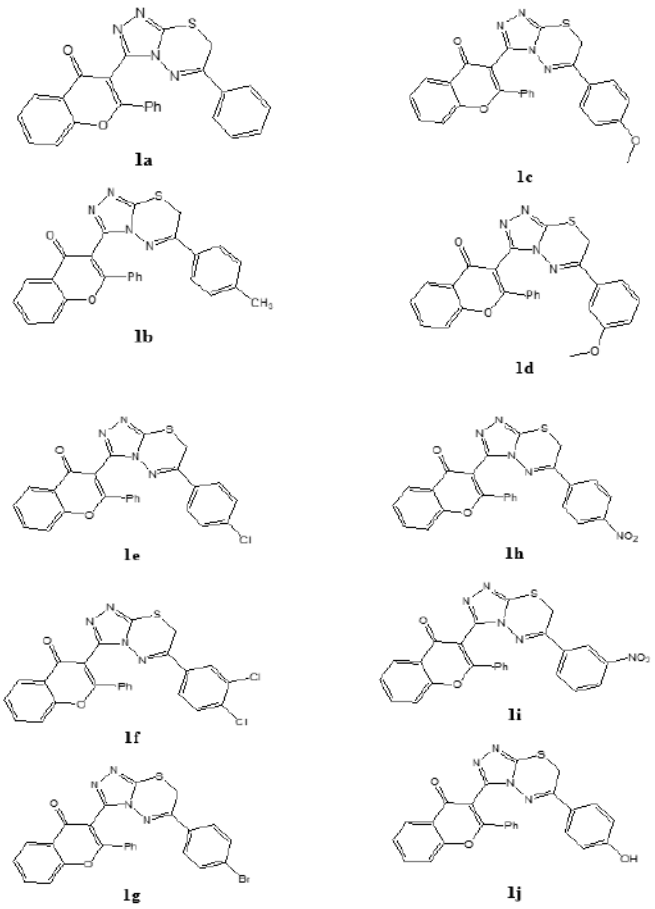

Figure 1: A new series of 2-phenyl-3-(6-aryl-7*H*-[1,2,4]triazolo[3,4-*b*][1,3,4]thiadiazin-3-yl)-4*H*-4-chromenone compounds 1(a-j).

Table 1: Antifungal Activity of Compounds 1(a-j)

Compound	Ar	Zones of inhibition (mm) at 100 g/Ml	
		A. niger	*C. albicans*
1a	**Phenyl**	9	—
1b	**4-methylphenyl**	13	9
1c	**4-methoxyphenyl**	12	14
1d	**3-methoxyphenyl**	10	10
1e	**4-chlorophenyl**	12	13
1f	**3,4-dichlorophenyl**	10	11
1g	**4-bromophenyl**	17	10
1h	**4-nitrophenyl**	14	12
1i	**3-nitrophenyl**	12	—
1j	**4-hydroxyphenyl**	10	12
Amphotericin B	—	18	16

A new series of 2-phenyl-3-(6-aryl-7*H*-[1,2,4]triazolo[3,4-*b*][1,3,4]thiadiazin-3-yl)-4*H*-4-chromenone **1(a-j)** has been synthesized by the reaction of 3(4-amino-5-sulfanyl-4*H*-1,2,4-triazol-3-yl)-2-phenyl-4*H*-4-chromenone with a variety of phenacyl bromides in ethanol under reflux.[27] The compound with the 4-bromophenyl (**1g**) greatest anti *A. niger* action, while compound (**1a**) had the least. Except for **1a** and **1i**, these compounds also shown efficacy against *Candida albicans*. While others showed moderate to good action, the compound containing the 4-methoxyphenyl (**1c**) good activity against *C. albicans*. The investigated compounds' activity, however, are lower than those of the commonly used standard antibacterial agent.

Conflicts of interest

There are no conflicts to declare.

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