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Synthesis and Antimicrobial activity of new series of s-triazines and its derivatives

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ABSTRACT

Some series of N^2-(aryl) N^4 ,N^6-bis (1,3 benzothiazol-2-yl)-1,3,5 triazine -2,4,6 triamines (4a-m) have been synthesized from the 2,4, 6, trichloro-triamine and 2-amino benzothiazoles. They are characterized by the IR , NMR Spectra. The product has been tested for their antimicrobial activities against gram + ve and gram – ve bacteria.

Key words : 2,4,6, trichloro triamines, 2-amino benzothiazoles, antimicrobial activities.

INTRODUCTION

Cyanuric chloride (2,4,6 trichloro 1,3,5 triazine) is an extremely important compounds that find wide spread application in dye chemistry[1], agriculture[2] textile industry. The displacement of chlorine atom by the nucleophile such as amine, alcohol and Phenol has been well documented[3] and wide substituted product be prepared.The s triazine based chalcone and their derivatives have been their own important in heterocyclic chemistry due to their good biological activities[4].

Severals derivatives of s triazines show antibacterials[5], Antimicrobial[6], herbicidal[7] activities. The replacement of a Cl atom in cyanuric chloride by basic group is greatly facillated by the ring N atom. The symmetrically build s triazine nucleus. The s triazine have been shows a wide range of therapeutic activities[8-11] such as antibacterial, fungicidal, antimalerial, anticancer ,antiviral, antiulcer, antiarthritic ,local anesthetic, anticonvulsant, algaecide, disinfactant, hypoglycerimic , analgesic, sedative, anti-inflammatory, anthelmintic and antitubercular activities.

2-(4-methoxy/2-methyl-phenyl)4-phenylacetylhydrozino-6- isonicotinyl hydrazine-s-triazine have been synthesized by Desai[12] and tested against susceptible human host cell over a wide range of concentration. Shestakova et.al [13] synthesized label azolo-1,2,4 triazine with ^{15}N isotope in the azole and azine ring. The synthesis, characterization of new series of s triazine derived with quinoline was studied by Vora et.al[14]. Baldaniya et.al[15] synthesisized s triazine derivatives and their characterization. Baldaniya[16] can synthesized some novel s triazine as

biological potent agent. Patel et.al.[17] Synthesized novel s triazinyl piperazines . Dawane et.al [18] synthesized 1,2,4 triazine and their derivatives. Desai[19] et.al synthesized some novel class of 1,3,5 triazine and shows anti HIV activity

MATERIALS AND METHODS

Experimental:
Melting point were taken in open capillaries using paraffin bath and uncorrected .IR spectra were recorded on FTIR Perkin Elmer spectrometer, ^{1}H NMR spectra were recorded on FTNMR Spectrometer using $CDCl_3$as a solvent.

Step -I Synthesis of 2 chloro –N-N,bis (1,3 benzothia2-yl)-1,3,5,triazine ,2,4,6 diamine (3)
In conical flask ,2,4,6 tricloro,1,3,5 triazine (1)0.01M was taken in acetone (20ml)and 2-amino benzothiazole (2)0.01M was added to it .to this mixture ,4%NaOH was added drop wise at room temperatue .The solution was stirred for 4 hrs . The reaction mixture pour into crushed ice with constant stirring .the solution was neutralized with dil. HCL. The solid filtered and washed with water. The product was recrystalised from acetone.

M.P: 200^{0}C, Yield : 60% , M.F: C_{17} $H_{10}N_7ClS_2$

Table 1: Physical Parameter of Synthesized Compound

Comp.	-Ar	Molecular Formula	Melting Point ^{0}C	% Yield
4a	-C_6H_5	$C_{23}H_{12}N_8S_2$	215	60
4b	-2-$OCH_3C_6H_4$	$C_{24}H_{14}N_8OS_2$	169	70
4c	-2-OH-C_6H_4	$C_{23}H_{12}N_8OS_2$	168	65
4d	-3-NO_2-C_6H_4	$C_{23}H_{11}N_9O_2S_2$	205	70
4e	4-NO_2-C_6H_4	$C_{23}H_{11}N_9O_2S_2$	220	72
4f	-3,4$(Cl)_2$-C_6H_4	$C_{23}H_{10}Cl_2N_8S_2$	160	75
4g	-4-CH_3-C_6H_4	$C_{24}H_{14}N_8S_2$	180	75
4h	-4-OCH_3-C_6H_4	$C_{24}H_{14}N_8OS_2$	175	70
4i	-2-OH-4NO_2	$C_{23}H_{11}N_9O_3S_2$	180	72
4j	2,4,5$(Cl)_3C_6H_2$	$C_{23}H_9C_{l3}N_8S_2$	140	75
4k	-3Cl-C_6H_4	$C_{23}H_{11}ClN_8S_2$	170	65
4l	-2-Cl-C_6H_4	$C_{23}H_{11}ClN_8S_2$	225	70
4m	-2-$C_4H_3N_2$	$C_{21}H_{10}N_{10}S_2$	235	80

Step – II Synthesis of N^2–Aryl N^4N^6-bis(1, 3 benzothiazo2-yl),1,3,5 triazine ,2,4,6 triamine (4a)
In round bottom flask compound (3) (.01M) and 1,4 dioxane 20ml was taken to this mixture anline 0.01M was added. The pH was adjusted to neutral by adding standard NaOH. This reaction mixture was refluxed for 2-5 hrs and was poured into crushed ice with constant stirring the reaction mixture was then neutralised with dilute HCl. The product was filtered and washed with ice cold water. The product was recrystalised from methanol.

M.P: 215^{0}C,Yield: 65%, M.F; $C_{23}H_{12}N_8S_2$

Spectral analysis 4a:
IR(KBr) :3454 (-N-H-Stretching, secondary amine), 3083 (-C-H-Strecing aromatic), 1527 (>C=N- Stretching terminal amine), 808 (disubstituted aromatic), 1431 (C=N- Stretching sec. amine), 1122 (-C-S-C- Stretching thiazole)

NMR($CDCl_3$): 10.08 δ (s,-NH-,2H), 9.44 δ(s -NH- ,1H), 6.54-7.68 δ(m, Ar-H-8H)

The compound 4b-m similarly prepared, their m,p, yield m.f, are given in Table 1.

***In vitro* antimicrobial activity:**
The synthesized compound was subjected to antimicrobial screening by cup plate method for zone of inhibition. The antimicrobial activity was tested against various gram + ve and gram –ve bacteria .The results are described in the table 2.

Table 2: Antimicrobial Activites of Synthesized Compound

Compound	Zone of inhibition in mm			
	S.aureus	*B*.substalis	*E*.coli	*S*.typhi
4a	15	10	10	15
4b	12	11	12	12
4c	--	17	18	20
4d	21	19	17	17
4e	11	10	10	15
4f	15	18	15	11
4g	--	--	--	21
4h	18	17	21	22
4i	10	10	12	10
4j	08	08	10	12
4k	--	---	--	15
4l	10	15	15	20
4m	15	10	12	15

--- Indicate no activity

RESULTS AND DISCUSSION

s-Triazines has three active chlorine atom at position 2,4,6 which can be replaced by bases . various derivatives are prepare as shown in scheme .N-H-Stretching for secondary amine appers at 3454. C-H-Streching of aromatic at 3083, >C=N- Stretching for terminal amine appers at1527, In NMR Spectra , δ value at 10.08 for NH- group indicates 2 H and 9.44 δ value 9.44 for –NH group indicates 1H and δ value 6.54-7.68 for Ar-Hgroups indicates -8H

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