STUDIES ON *s*-TRIAZINYL ARYL/ALKYL SULPHONES PART-III

Preparation and Study of (antibacterial) activity of 2-α-Glutarylamino-4-Aryl/alkylamino-*s*-triazin-6-yl *p*-chlorophenyl sulphones

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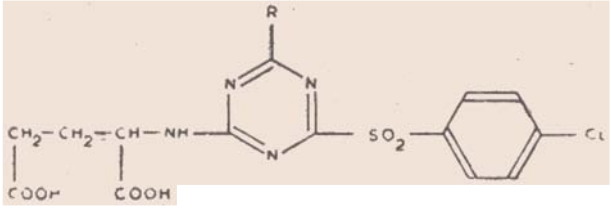
2-α-Glutarylamino-4-aryl/alkylamino-*s*-triazin-6-yl-*p*-chlorophenyl sulphones have been prepared and tested for antibacterial activity against *Salmonella typhi*. Phenol co-efficients of sulphones were determined The haloanilino compounds have been found to possess high phenol co-efficient.

Several derivatives and analogues of phenylsulphones have been shown to possess strong tuberculostatic[1,2], antileprotic[3, 4], and anticonvulsant[5] actions and to be of potential therapeutical use. *s*-Triazine derivatives[5–10] also possess wide therapeutic activity [11, 12]. We have prepared substituted 2-α-Glutarylamino-4-aryl/alkylamino-*s*-triazin-6-yl *p*-chlorophenyl sulphones of the type I.



(I)

R = Anylamino, substituted arylamino, alkylamino, arylalkylamino, Pyridyl mino, etc.,

The first chlorine of 2,4,6-trichloro-*s*-triazine was reacted with 4-chlorothiophenol[13] at 0° leading to the formation of 2, 4-dichloro-*s*-triazin-6-yl *p*-chlorophenyl sulphide. The second chlorine reacted with L(+)-Glutamic acid ($[\alpha]^{20°}_D = +32°$) as sodium salt at room temperature and third chlorine at 80-90° with different bases using dioxane as solvent. The product obtained was then oxidised to corresponding sulphone[14]. The sulphones were tested for their bactericidal activity against *Salmonella typhi*.

EXPERIMENTAL PROCEDURE

Preparation of 2, 4-Dichloro-s-Triazin-6-yl-p-Chlorophenyl Sulphide

It was prepared by condensing cyanuric chloride with 4-chlorothiophenol using acetone as solvent[13].

Preparation of 2-α-Glutarylamino-4-Chloro-s-Triazin-6-yl-p-chlorophenyl Sulphide

L(+)-Glutamic acid ($[\alpha]^{20°}_D = +32°$), (14.7g) dissolved in aqueous sodium hydroxide solution (10ml, 40%) was added to the suspension of 2,4-dichloro-*s*-triazin-6-yl *p*-chlorophenyl sulphide (28.25g) in dioxane (50 ml) at 30-35°. The contents were stirred for an hour with the gradual addition of an aqueous sodium hydroxide solution (10ml, 40%) and diluted with ice-water. The solution thus obtained was acidified with concentrated hydrochloric acid (congored) followed by the addition of sodium acetate solution. The product was filtered and dried. (Yield 28g (70%), m.p. 195-97°]

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Preparation of 2-α-Glutarylamino-4-Aryl/Alkylamino-s-Triazin-6-yl-p-chlorophenyl Sulphide

2-α-Glutarylamino-4-chloro-*s*-triazin-6-yl *p*-chlorophenyl sulphide (0.01 mole) dissolved in aqueous sodium hydroxide solution (5 ml, 8%) was added to the solution of base (0.01 mole) in dioxane (10 ml) and refluxed in water bath for 1½ hour with the addition of aqueous sodium hydroxide solution (10 ml, 4%). The contents were poured into crushed ice and the product was isolated as usual. (Physical constants of these compounds are recorded in Table 1).

Preparation of 2-α-Glutarylamino-4-Aryl/Alkylamino-s-Triazin-6-yl-p-chlorophenyl Sulphone

2-α-Glutarylamino-4-aryl/alkylamino-*s*-triazin-6-yl *p*-chlorophenyl sulphide (1 g) dissolved in acetone and glacial acetic acid (10 ml), aqueous potassium permanganate solution (6%) was added gradually with constant stirring till its colour persisted and kept for 3-4 hr. at room temperature. The solution was decolourised by passing sulphur dioxide gas. The product obtained was filtered, dried and crystallised from ethanol (Physical constants of the compounds are recorded in table 1.)

TABLE 1

PHYSICAL DATA AND ANTIBACTERIAL ACTIVITY OF *s*-TRIAZINYL PHENYL SULPHONES (TYPE I)

Serial No.	*R*	Sulphides		Sulphones		Min. % concn. in gm.	Phenol co-efficient
		Yield (%)	M.P. (°C)	M.P. (%)	Yield (°C)		
1	Anilino	62	216–18	59	233–35	0·05	6·66
2	*o*–Toluidino	82	236–38	53	225–27	0·05	6·66
3	*m*–Toludino	74	226–28	60	239–41	0·10	3·33
4	*p*–Toludino	64	248–50	58	253–55	0·05	6·66
5	*o*–Anisidino	74	228–30	48	218–20	0·10	3·33
6	*m*–Anisidino	79	250–52	63	229–31		
7	*p*–Anisidino	79	241–43	67	240–42	0·05	6·66
8	*o*–Chloroanilino	54	230–32	61	235–37	0·05	6·66
9	*m*–Chloroanilino	60	205–07	64	236–38	0·05	6·66
10	*p*–Chloroanilino	64	235–37	60	242–44	0·05	6·66
11	*o*–Nitroanilino	89	227–29	63	231–33	0·10	3·33
12	*m*–Nitroanilino	61	238–40	60	244–46	0·10	3·33
13	*p*–Nitroanilino	96	215–17	57	227–29	0·10	3·33
14	*o*–Phenetidino	60	170–72	63	144–46	0·05	6·66
15	Benzylamino	85	115–17	73	320d		
16	α–Naphthylamino	69	214–16	70	205–07	0·10	3·33
17	α–Phenethylamino	97	150–52	76	210–13		

Serial No.	R	Sulphides		Sulphones		Min. % concn. in gm.	Phenol co-efficient
		Yield (%)	M.P. (°C)	Yield (%)	M.P. (°C)		
18	4-Acylaminoanilino	53	178-80	67	200-02	0·10	3·33
19	2,4,6-Tribromoanilino	55	163-65	62	190-92	0·05	6·66
20	*p*-Bromoanilinio	53	225-27	65	217-19	0·05	6·66
21	*p*-Iodoanilino	66	207-09	70	214-16	0·05	6·66
22	*n*-Butylamino	82	108-10	71	148-50	0·10	3·33
23	Cyclohexylamino	97	223-25	69	211-13	0·10	3·33
24	2-Pyridylamino	98	212-15	59	190-92	0·05	6·66
25	α-Glutaryla mino	37	133-35	58	170-72	0·10	3·33

All the above compounds gave correct *N* analysis.

ANTIBACTERIAL ACTIVITY

L(+)-Glutamic acid has no antibacterial activity. The antibacterial properties of the above sulphones were determined by standard method of phenol co-efficient [15]. The minimum concentration of phenol required for bactericidal activity against *Salmonella typhi* is 0.71%. The exposure period was 15 minutes. The minimum percent concentration of sulphones required for the same are recorded in Table 1. The phenol co-efficient of anilino, *o*-and *p*-toluidino, *p*-anisidino, *o*-phenetidino, haloanilino and pyridylamino derivatives have identical phenol co-efficient which is higher than other substituted anilino, α-naphthylamino, butylamino, cyclohexylamino and glutarylamino derivatives.

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