CHAPTER - III

Screening of Antibacterial Activity

Results And Discussion

SCREENING OF ANTIBACTERIAL ACTIVITY

All the compounds in the present study were tested for their antibacterial activity using Kirby-Baur* diffusion method against various gram positive and gram negative bacteria. The gram (+ve) bacteria studied were - Staphylococcus citreus; Staphylococus aureus; Staphylococcus albus and gram (-ve) included Escherichia coli (E.coli); Pseudomonas aerugenosa Klebsiella pneumoniae.

All the above mentioned bacteria are pathogenic. Staph. citreus; Staph aureus and Staph albus cause sepsis in wounds and burns. They cause the majority of acute pyogenic lesions in man. Staph. aureus causes tonsillitis, pharyngitis, sinusitis, and pneumonia.

E. coli (-ve) causes diarrhoea or gastroenteritis particularly in infants, old children and adults. It also causes urinary tract infections, pyogenic infections and septicaemia; whereas pseudomonas (-ve) causes chronic diseases which are in the form of localised or generalised infections. Localised infections are common in wounds, bedsores, eye infections and urinary tract infections; Klebsiella pneumoniae causes urinary infections, abscesses, meningitis and septicaemia.

* Text Book of Microbiology
by R. Anantnarayan & Jayram Panikar
Orient Longman, 2nd Edn.

Experimental

The compounds reported in the present study were screened for their antimicrobial activity by Kirby-Bauer disc diffusion method.

The principle involved in this method is the diffusion of compound through a solid medium so that a gradient is established, the concentration being highest near the site of application and decreasing with distance.

Preparation of culture media :

All glasswares and other materials were sterilised. All media were adjusted to a correct H^+ ion concentration (pH). Since most of the bacteria grow in a slightly alkaline medium; the pH was adjusted between pH 7.2 - pH 7.6.

Nutrient broth :

i) Peptone 10 gm.
ii) Meat extract (Lablemco): 10 g.
iii) Water 1,000 ml.

These ingredients were mixed and allowed to dissolve. A precipitate of phosphate was removed by filteration. The medium was then sterilised at 15 lb for 20 minutes.

Nutrient agar :

To the nutrient broth 2 percent of agar was added at 15 lb for 20 mints. Autoclaved and filtered and sterlised.

A filter paper disc 6 mm in diameter available commercially was charged with the compound at 0.2 mg/ml concentration in acetone as solvent. After overnight incubation, the degree of sensitivity was determined by measuring the zones of inhibition in mm. Acetone was

The sensitivity of the tested compounds was expressed as follows:

i) Strong growth inhibitor (zone size 15-20 mm) + + +

ii) Moderate growth inhibitor (zone size 9-14 mm) + +

iii) Less growth inhibitor (zone size 6-8 mm) +

iv) No growth inhibitor -

The results of screening of antibacterial activity are presented in table : 2

ANTIBACTERIAL SCREENING RESULTS

Type of Microorganism (Bacteria)

a) SC - Staphylococcus citreus (gram +ve)

b) SA - Staphylococcus aureus (gram +ve)

c) SAL - Staphylococcus albus (gram +ve)

d) EC - Escherichia coli (gram -ve)

e) PA - Pseudomonas aerugenosa (gram -ve)

f) KP - Klebsiella pneumoniae (gram -ve)

Table No. 2.

Compound No.	Name of the compound	Antibacterial activity					
		SC	SA	SAL	EC	PA	KP
Series-I							
IIa	N_{10}- [Hydrazido]-Phenothiazine	+	+	++	-	-	-
IIIa	4-Aryl-1-(N_{10}-Phenothizinoyl)thiosemi--carbazide	+	-	++	+	-	-
IVa	1-Phenyl-2-(N_{10}-Phenothiazinyl)-5-mercapto-1,3,4 triazole	+	++	++	-	++	-
Va	5-Anilino-2-(N_{10}-Phenothiazinyl)-1,3,4-oxadiazole	-	++	-	-	-	-
VIa	5-Anilino-2-(N_{10}-Phenothiazinyl)-1,3,4-thiadiazcle	+	-	+	++	+	-
Series-II							
IIb	N_{10}-(Hydrazido methyl)-Phenothiazine	+	+	-	-	-	-
IIIb	4-Phenyl-1-[2-(10-phenothiazinyl) acetyl]thiosemicarbazide	-	-	-	-	-	-
IVb	1-Phenyl-2-[N_{10}-Phenothiazinyl methyl] -5-mercapto-1,3,4-triazole	++	++	-	-	++	-

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Compound No.	Name of the compound	Antibacterial activity					
		SC	SA	SAL	EC	PA	KP
Vb	5-Anilino-2-[N_{10}-phenothiazinyl methyl] 1,3,4-Oxadiazole.	+	–	–	–	–	–
VIb	5-Anilino-2-[N_{10}-phenothiazinyl methyl] -1,3,4-thiadiazole.	+	–	–	–	–	–
Series-III							
IIC	N_{10}-[-Hydrazido-ethyl]Phenothiazine	–	+	–	–	–	–
IIIc	4-Phenyl-1-[1-oxo-2-(10-phenothiazinyl) -ethyl]-thiosemicarbazide	–	+	++	–	+++	–
IVc	1-Phenyl-2-[-10-phenothiazinyl-ethyl] -5-mercapto-1,3,4-triazole	+	+	–	–	–	–
Vc	5-Anilino-2-[-10-phenothiazinyl ethyl] -1,3,4-oxadiazole	–	–	–	–	–	–
VIc	5-Anilino-2-[-10-phenothiazinyl ethyl] -1,3,4-thiadiazole	++	–	–	+	–	–
Series-IV							
IId	N_{10}-[Malonyl hydrazido] phenothiazine	+	–	–	–	++	–
IIId	Bis-[4-phenyl-1-(1-oxo-2-N_{10}-phenothiazinyl methyl] thiosemicarbazide	+	+	+	+	+	–
IVd	N_{10}-[Bis(1-Phenyl-5-mercapto-1,3,4-triazolyl)methyl]phenothiazine	++	–	+	++	++	–
Vd	10-[Bis(5-Anilino-1,3,4-oxadiazolyl) methyl]phenothiazine	–	–	++	++	–	–
VId	N_{10}-[Bis(5-Anilino-1,3,4-thiadiazolyl)-phenothiazine	++	–	–	++	++	+
Series - V :							
I_f	N_{10}-[4-Acetamido-2-methyl phenyl sulphonamidoacetyl] phenothiazine	++	–	–	–	+	–
I_g	N_{10}-[4-Acetamido-3-Methyl phenyl sulphonamido-acetyl]phenothiazine	+	–	++	–	++	–

Compound No.	Name of the compound	Antibacterial activity					
		SC	SA	SAL	EC	PA	KP
I_h	N_{10}-[4-Methyl phenyl sulphonamido-acetyl] phenothiazine	-	++	-	++	++	++
I_i	N_{10}-[Phenyl sulphonamido acetyl] phenothiazine	+	+++	-	++	++	+