

## NOTE

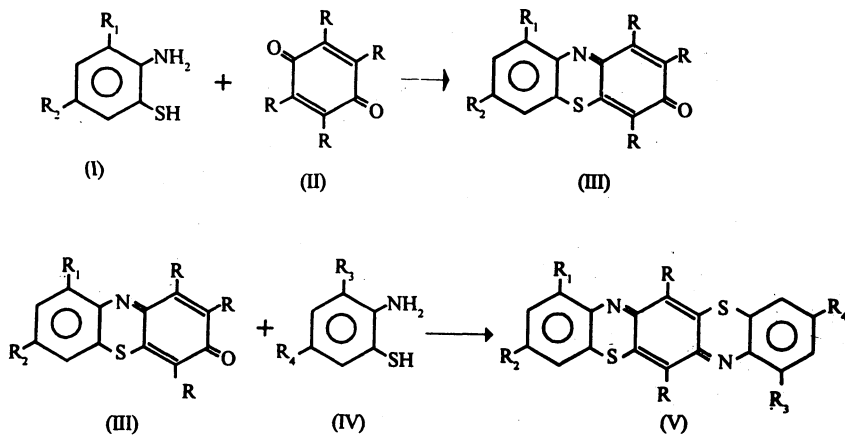
## Antibacterial Activity of Some Substituted (1,4)-Benzothiazino-(2,3-b)-Phenothiazines

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The title compounds [1,4-benzothiazino-(2,3-b)-phenothiazines] were synthesised by condensing 2-aminothiophenols with halogeno-*p*-benzoquinones in presence of anhydrous sodium acetate. The compounds were screened for their antibacterial activity against *Pseudomonas solanaceacum*, *Pseudomonas syringae* and *Pseudomonas viridiflava*. Some of these compounds show significant antibacterial activity.

Phenothiazines and 1,4-benzothiazines display diverse biological activities<sup>1</sup>. 1,4-Benzothiazino-(2,3-b)-phenothiazines form an important class of compounds among the dyes of thiazine series<sup>2</sup>. Since these compounds contain both phenothiazine and 1,4-benzothiazine nuclei are also expected to possess pharmacological properties. In continuation of our studies on the synthesis of such compounds, we now report the antibacterial activity of these compounds.



SCHEME-1

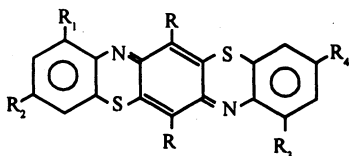
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The synthesis of 1,4-benzothiazino-(2,3-b)-phenothiazines was achieved (Scheme-1) by the condensation of 2-aminobenzene thiol (I) and halogeno-*p*-benzoquinone (II) in 1 : 1 molar ratio to get 1,2,4-trihalophenothiazine-3-ones (III). 1,2,4-Triphenothiazine-3-one (III) was further condensed with same or different 2-aminobenzene thiol (IV) which resulted in the formation of 1,4-benzothiazino-(2,3-b)-phenothiazines (V)<sup>3</sup>.

The compounds were screened for their antibacterial activity against the bacteria *Pseudomonas solanaceacum*, *Pseudomonas syringae* and *Pseudomonas viridiflava* by paper disc method<sup>4</sup>. The results of the antibacterial activity are presented in Table-1.

The data given in Table-1 reveal that compounds are active against most of the bacteria employed. No structure activity relationship can be established looking to these results.

TABLE-1  
PHARMACOLOGICAL DATA OF SOME (1,4)-  
BENZOTHAZINO-(2,3-b)-PHENOTHIAZINES



Compound	R	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	Antibacterial activity		
						A	B	C
I.	Br	H	H	H	H	+	-	-
II.	Cl	NO <sub>2</sub>	CH <sub>3</sub>	H	H	++	++	++
III.	Br	NO <sub>2</sub>	CH <sub>3</sub>	NO <sub>2</sub>	CH <sub>3</sub>	+	-	+
IV.	Cl	NO <sub>2</sub>	CH <sub>3</sub>	NO <sub>2</sub>	CH <sub>3</sub>	+	-	+
V.	Cl	OCH <sub>3</sub>	NO <sub>2</sub>	H	H	+	-	+

A = *Pseudomonas solanaceacum*, B = *Pseudomonas syringae* and C = *Pseudomonas viridiflava*.

Inhibition zone diameter: + = < 10 mm; ++ = > 10 mm and - = no inhibition.

## REFERENCES

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4. A.A. Dean, Laboratory Instructions in Microbiology, Mosby Company, London (1974).