

SYNTHESIS AND SCREENING OF BIOLOGICAL ACTIVITY OF TRIAZOLO-THIADIAZINES AND TRIAZOLO-THIADIAZOLES

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s-Triazolo [3,4-b] [1,3,4] thiadiazines (II) and s-triazolo [3,4-b] [1,3,4] thiadiazoles (III) have been synthesized and tested as plant growth inhibitors on *Phaseolus aconitifolius* Jacb.

Keywords : Growth inhibitor; *Phaseolus aconitifolius* Jacb.; Triazolo-thiadiazines, Triazolo-thiadiazoles.

1,2,4-Triazoles and 1,3,4-thiadiazoles nucleus are associated with diverse biological activities. 3-Amino-1,2,4-triazole (Weedazole) is a potent herbicide and reduced the percentage germination of *Borreria articularis* and *T.portulacastrum* Linn^{1,2} and pigweed *amaranthus viridis*³. In the present communication 2,3,6-trisubstituted-(7H)-s-triazolo [3,4-b] [1,3,4] thiadiazines (II) and 3,6-disubstituted-s-triazolo [3,4-b] [1,3,4] thiadiazoles (III) have been synthesized and a few compounds on a representative scale have been tested as a plant growth inhibitors on *Phaseolus aconitifolius* Jacb.

Biological activity : Three different compounds were tested in order to study their effect on germination percentage and further growth on the seedling of *Phaseolus aconitifolius* Jacb as test material which was used by Mc Calla *et al*⁴. for cytokinin metabolism studies.

For germination studies, seeds were surface sterilized with 70% ethanol for one minute followed by treatment with 0.1% mercuric chloride for 10 minutes⁵, washed three times with autoclaved distilled water and immersed in standard test solutions for 6 hrs. The concentrations ranging from 50 mg/l to 250 mg/l. Seeds were germinated under continuous light (2.6×10^{-4} ergs/MM/Sec) in sterilized petridishes on Whatman No. 1 filter paper, kept moist with distilled water and test solutions. The entire sets with three replicates

for 10 seeds each, was repeated for three times at $28 \pm 1^\circ\text{C}$. Germination was recorded after 48 hrs while morphological variations were taken after 7 days. Final observation was taken after 15 days of germination.

Experimental : 2,3-Diphenyl-6-substituted (R)-(7H)-s-triazolo [3,4-b] [1,3,4] thiadiazine hydrochlorides (II).

They were synthesized according to the method already reported⁶. Thus a mixture of 5-substituted (R) -4-amino-3-mercapto-1,2,4-triazoles (I) (0.005 moles), desyl chloride (0.005 moles) in anhydrous ethanol (40 ml) was refluxed on a steam for 6-7 hrs. The solid obtained on a steam bath for 6-7 hrs. The solid obtained on cooling was crystallized from ethanol. 1. (R=C₆H₅) m.p. 215°C, Yield 0.61 g (60%) (Found : S, 7.69 Calcd. for C₁₂H₁₇N₄ SCl; S, (7.91%). 2. (R=CH₃) m.p. 225°C (Dec.) Yield 1.1 g (65%) (Found : S, 9.23 Calcd. for C₁₇H₁₅N₄ SCl; S, 9.34%). 3. (R=C₂H₅) m.p. 218°C (Dec.) Yield 0.85 g (72%) (Found : S, 8.42 Calcd. for C₁₈H₁₇N₄ SCl; S, 8.97%). 4. (R=C₃H₇) m.p. 200°C (dec.), Yield 0.65 g (52.4%) Found : S, 8.38 Calcd. for C₁₉H₁₉N₄ SCl; S, 8.64).

3-Methyl-6-chlorophenyl-s-triazolo [3,4-b] [1,3,4] thiadiazole (5) and 3-Methyl-6-phenyl-s-triazolo [3,4-b] [1,3,4] thiadiazole (6) were prepared by the literature methods^{6,7}.

Table 1. Effect of different concentrations of Triazolo [3,4-b] [1,3,4] thiadiazines (II) and Triazolo [3,4-b] [1,3,4] thiadiazoles (III) on percentage germination, root and shoot of 15 days old seedlings of *Phaseolus aconitifolius*.

Compound No.	Conc. (mg/l)	Percent germination	Root Length (cm)	Shoot Length (cm)
2	Control	90.0 + 0.816	8.5 + 1.547	4.4 + 0.534
	50	90.3 + 0.658	4.8 + 0.176	1.8 + 0.881
	100	90.0 + 1.414	6.0 + 0.930	1.8 + 0.804
	250	70.0 + 1.632	6.5 + 1.374	1.5 + 0.969
4	50	70.0 + 0.816	2.6 + 1.512	3.3 + 0.380
	100	60.5 + 4.084	4.1 + 1.489	2.1 + 0.380
	250	60.3 + 1.048	3.1 + 1.154	0.8 + 0.798
6	50	60.6 + 2.558	3.7 + 0.418	2.0 + 0.790
	100	60.5 + 3.500	0.6 + 0.699	0.00 + 0.000
	250	40.6 + 3.501	0.1 + 0.291	0.04 + 0.080

Results obtained are indicated in Table 1. All the three concentrations of triazolo [3,4-b][1,3,4] thiadiazine 2 and 4 were found inactive as far as germination percentage is concerned. In general a gradual decline in percentage germination was observed with increasing concentration with respect to compound 2, 4 and 6 100 mg/l concentration of 3 seems to be more effective (Table1).

The effect of all the three compounds on seedling growth was noticeable. Low as well as high concentrations seem to effect both root and shoot growth in length. A gradual decrease in root length increasing concentration was recorded for all the three compounds tested. It was interesting to note that growth response of shoot were more profound as compared to root. 250 mg/l concentration of 6 completely blocked the

shoot growth in length. Treated seedling showed greater number of lateral roots.

Acknowledgements

The authors wish to express their sincere thanks to Prof. B.C. Pant, Principal, Lohia Govt. (PG) College, Churu for encouragement and to the University Grants Commission, New Delhi for financial assistance.

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