

Bharate S.R and Bhavsar D.V / Elixir Biosciences 189 (2025) 55036-55038 Available online at www.elixirpublishers.com (Elixir International Journal)



Elixir Biosciences



Elixir Biosciences 189 (2025) 55036-55038

Effect of aqueous extract of Leaf, Stem and Root of Bahunia racemosa Lam., and Seedling Growth on Raphanus sativus L., Variety Japani

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ARTICLE INFO

Article history: Received: 3 March 2025; Received in revised form: 16 April 2025; Accepted: 28 April 2025;

Keywords

Extract, Germination, Seedling Growth, Bahunia racemosa lam, Raphanus Sativus L. (Variety-Japani)

ABSTRACT

The effects of aqueous leaf root and stem extracts of different concentrations (2.5%, 5% and 7.5%) of plant parts of *Bahunia racemose* Lam Common deciduous tree from Garbhagiri hills of pathardi Tahsil (longitude19° 09'N, laditude 75° 10'E) were tested on germination and seedling growth of *Raphanus sativus L*(Variety- Japani) Family Brassicaceae; Bahunia racemose Lam on germination and seedling growth of *Raphanus sativus L*, variety Japani, Leaf extract of *Bahunia* shows inhibition was not concentration co-related while stem and Root extract shows inhibition at higher concentration and promotion at lower concentration' Data were analyzed by appropriate statistical method.

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INTRODUCTION

Molisch (1937) introduced the word 'Allelopathy' (Greek words: 'allelon' means reciprocal and 'pathos' means that happens to one) for harmful as well as beneficial, biochemical and reciprocal interactions among plants including microorganisms. Allelopathy is defined as "any direct or indirect harmful/useful effect by one plant on another through the synthesis and secretion of chemicals into the environment." Allelopathy is a current area of research. It may be useful in agriculture to increase yield, minimize some problems related to multiple cropping systems, soil productivity and availability of nutrients in soil. Allelopathy, a multidisciplinary subject and research in it will definitely establish a boon in agricultural and forestry production (Narwal and Tauro, 1994). Higher plants release phytotoxins into the soil which adversely affect the germination and final yield of associated crop plants. Such interactions in agro forestry system may affect the crop production (Todaria et al, 2005). Bauhinia racemosa Lam. and Bauhinia purpurea Linn. contain phenols, saponins, flavonoids, glycosides and tannins (Santosh et al, 2007). Tannins, saponins and alkaloids are present in Bauhinia variegata L. and possess antibacterial properties (Parekh and Chanda, 2007).

MATERIAL & METHODS

Extracts were obtained by crushing plant materials.10% aqueous extracts (stock solution) obtained from inflorescence of trees viz. *Mangifera indica* L.Extracts were filtered with muslin cloth and Whatman filter paper No.1, stored in refrigerator and further diluted with distilled water to get extracts of 2.5 %, 5 %, and 7.5 % (Narwal, 1994). Extracts were further used for bioassay in laboratory conditions

Effect of these three concentrations on seedling growth parameters viz. seed germination (Ger), Shoot growth (Sg), Root growth (Rg) and Total seedling growth (TSg) of test crop plants viz. Raphanus sativus L. 'Japani' were recorded after 5th day. Seeds of test plants were surface sterilized with 0.01% Mercuric chloride followed by washing with distilled water before use. Ten seeds/ plastic container were germinated in sterilized containers of 12cm diameter, using germination paper or Whatman No.1 filter paper. Triplicates of the containers were maintained. 10 ml of extract was added in the Petri dishes/containers containing 10 seeds each. The slight emergence of radical was considered as a sign of germination. Germination percentage was calculated. Photographs were taken with digital camera ('Sony'make). Percentage inhibition or stimulation of 'Ger' (seed Germination), 'Rg' (Root growth), 'Sg' (Shoot growth) and 'TSg' (Total seedling growth) over control was calculated from which graphs were drawn. Effect of inflorescence extract, were assessed separately. Statistical analysis were made. Percentage inhibition or stimulation over control and ANOVA variance was calculated. % Inhibition or stimulation: (C-T/C) X100 (Where C: control, T: treatment). **RESULT AND DISCUSSION**

1. Effect of leaf extracts of Bauhinia on 'Japani' variety

Leaf extract of *Bauhinia* inhibited seedling growth parameters of 'Japani' variety. 'Ger', 'Rg', 'Sg' and 'TSg' were inhibited by 4.15 to 7.70%, 57.62 to 70.35%, 0.51 to 19.76% and 33.94 to 48.95% over control respectively. Inhibition was not concentration correlated. 'Rg' and 'TSg' were significantly inhibited at 0.05% P-level (Table NO 1, Graph NO 1A).

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2. Effect of stem extracts of *Bauhinia* on 'Japani' variety

Stem extracts of 7.50% concentration *Bauhinia* inhibited 'Rg' (by 28.83%) and 'TSg' (by 9.00%) over control. extracts of lower (2.50 to5.00%) conc. promoted 'Rg', 'Sg' and 'TSg' by 2.15 to 34.66%, 20.26 to 49.87% and 11.95 to 42.90 % over control respectively. (Table No. 1, Graph No 2 B)

3. Effect of root extracts of Bauhinia on 'Japani variety

Similarly, root extracts of *Bauhinia* inhibited as well as promoted seedling growth parameters of *Bauhinia* 'Japani' variety. Extracts of 2.50% conc. promoted 'Rg', 'Sg' and 'TSg' by 26.11%, 5.38 to 73.54% and 50.23% while extracts of 5.00 to 7.50% conc. inhibited 'Rg', 'Sg' and 'TSg' by

30.11 to 44.66%, 19.28% and 11.86 to 31.63% over control respectively. Inhibition and promotion were concentration correlated and significant at 0.05% P-level (Table NO 1, Graph NO 3 C).

CONCLUSION

Leaf extracts of *Bauhinia racemosa* Lam. inhibited seedling growth parameters of the *Raphanus sativus* L. variety 'Japani' of Stem extract promoted 'Sg' and root extracts of higher concentration exerted inhibition but lower 2.50% promoted seedling growth parameters in Japani varieties.



Graph No: 1 A, Effect of leaf extract of *Bauhinia racemosa* Lam. on seedling growth of varieties *Raphanus sativus* Linn. Var. 'Japani'



Graph No: 2B & 3C Effect of stem & root extract of *Bauhinia racemosa* Lam. on seedling growth of varieties of *Raphanus sativus* Linn. Variety-'Japani'

[Where Rg: root growth, Sg: shoot growth, TSg: total seedling growth, figures indicate % inhibition (-) and % promotion (+) over control (C), 2.50 to 7.50% : Extract concentration]

	Raphanus	Growth		Extract concentration			CD at	P-value
Extract	Variety	Parameters	Control	2.50%	5%	7.50%	0.05%	at 0.05%
Leaf	Japani	Rg	8.33a ± 1.07	$\begin{array}{c} 3.53b \pm 0.45 \\ (-57.62) \end{array}$	$\begin{array}{c} 2.53b \pm 0.37 \\ (-69.63) \end{array}$	$\begin{array}{c} 2.47b \pm 0.27 \\ (-70.35) \end{array}$	1.17	1.96E-10
		Sg	$5.92a\pm0.62$	5.89a ± 0.66 (-0.51)	4.75ab±0.61 (-19.76)	5.49a ± 0.52 (-7.26)	1.13	0.49
		TSg	14.26a ± 1.52	9.42b ± 1.05 (-33.94)	$7.28b \pm 0.91 \\ (-48.95)$	$7.96b \pm 0.74 \\ (-44.18)$	2.05	4.88E-05
		Ger %	93.33	90.00 (-4.15)	86.67 (-7.70)	90.00 (-4.15)		
Stem		Rg	$3.26a\pm0.56$	4.39b±0.62 (34.66)	3.33a ± 0.51 (2.15)	$\begin{array}{c} 2.32c \pm 0.34 \\ (-28.83) \end{array}$	0.97	0.05
		Sg	3.85a± 0.61	5.77ab±0.60 (49.87)	$4.63a \pm 0.70$ (20.26)	$4.16a \pm 0.59$ (8.05)	1.17	0.15
		TSg	7.11a ± 1.08	10.16b±1.15 (42.90)	7.96a ± 1.17 (11.95)	$6.47a \pm 0.87$ (-9.00)	2.01	0.09
		Ger %	80.00	83.33 (4.16)	73.33 (-8.34)	80.00 (0.00)		
Root		Rg	2.06a ± 0.41	$2.60a \pm 0.37$ (26.21)	$\begin{array}{c} 1.44b \pm 0.30 \\ (-30.10) \end{array}$	1.14b ± 0.19 (-44.66)	0.62	0.011
		Sg	$2.23a\pm0.51$	3.87ab±0.54 (73.54)	2.35c ±0.54 (5.38)	1.80a ± 0.37 (-19.28)	0.93	0.02
		TSg	4.30a ± 0.89	6.46ab±0.84 (50.23)	$3.79c \pm 0.81$ (-11.86)	2.94ad±0.54 (-31.63)	1.46	0.014
		Ger %	66.67	86.67 (30.00)	63.33 (-5.01)	70.00 (4.99)		

Table NO: 1 Effect of extracts of Bauhinia racemosa Lam. on germination & seedling gr	owth							
of varieties of Raphanus sativus Linn. Variety- Japani								

Data presented are means of three replicates; values within the same row with different letters are significantly different at 0.05% P-level by Single factor ANOVA test followed by CD & Tukey's test. [Figures in parentheses indicate % stimulation (+) and % inhibition (-)over control; Sg: shoot growth, Rg: root growth, TSg: total seedling growth and Ger: seed germination

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