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Research Article

**ALLELO CHEMICALS OF ARTEMISIA VULGARIS AND  
ASTRAGALUS SPECIES EFFECT ON SEED GERMINATION  
OF BRASSICA FAMILY**Mohammad Faheem\*<sup>1</sup>, Nizam Baloch\*\*<sup>1</sup>, Tamoor Khan<sup>2</sup>, Farida Behlil<sup>3</sup>, Samia Urooj<sup>1</sup>,  
Murad Bibi<sup>4</sup>.<sup>1</sup> Department of Chemistry, University of Balochistan, Quetta-Pakistan<sup>2</sup> Faculty of Agriculture, Lasbela University of Agriculture, Water and Marine Sciences,  
Lasbela, Pakistan.<sup>3</sup> Department of Chemistry SBK Women's University Quetta-Pakistan<sup>4</sup> Department of Pharmacology, Faculty of Pharmacy and Health sciences, University of  
Baluchistan, Quetta.**Abstract:**

*The secondary metabolites released and Synthesis having Allelopathic interaction are called allelochemicals, All plants have allelopathic effects on the surrounding plants through releasing allelochemicals in environment, through biochemical reaction several biological changes are introduced such biochemical are released from all parts of plants, that allelochemicals interfere in seed germination.*

*Astragalus and Artemisia Vulgaris both the plants have significant uses medicinally, both the plants showed significant deference in the germination of Brassica family. There have been increase in the germination of all seeds by the concentration of Astragalus with dose 0.5g/100ml, 1g/100ml, 1.5g/100ml, 2g/100ml, and 3g/100ml. Increase in doses showed increase in germination percentage accordingly, the mustard showed increase from 78% to 91% with 3g/100ml meanwhile 68% to 89% was of Rap, 76% to 83% was Turnip and radish also showed increase in germination the minimum was 80% without extract and 84% with 3g/100ml and it was the only one which showed less germination among others.*

*Artemisia Vulgaris also showed significant deference in the germination which was statically proved probation value was less than <0.05 as with Astragalus but in this case the germination was decreased according to increase in Doses, Mustard maximum germination was 78% without extract and the decrease was 39% with 3g/100ml, rap was 64% decreased till 51%, Turnip was 79% which was decreased till 39% accordingly Radish showed decrease in germination from 77% till 31% all brassica family showed significant deference with both plants extracts, the study need farther research on these plants.*

**Keywords;** *Astragalus, Artemisia vulgaris allelo-chemicals effect on plant germination.*

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**INTRODUCTION:**

Plants have interaction with other plants in the environment whether they enhance or reduce the development and growth of other plant, such act of plant is called Allelopathy, in 1937 Hans Molisch introduced this term [1].

The secondary metabolite Release and synthesis are Allelopathic interaction which are also called Allelochemicals (Allelotoxine), from higher plants biochemical reactions several biological changes were introduced, Allelopathy would be from plants all parts flowers, leaves, fruits, roots seeds, stems rhizomes, or pollens and also from surrounding soil, plant material decomposition, volatilization, exudation of root, and leaching from upground the reasons of releasing Allelochemicals in the environment [2]. Such Allelochemicals interfere in seed germination; growth of root, also nutrient uptake is inhibited. Lots of weeds and crops have been reported activities in other plants growth.[3,4] such plants allelopathic effects could be used as herbicides [5,6].

Astragalus had been used in China as medicine for many illnesses, in them cancer therapy is important to give it importance [7] economically some extent help is also reported in Asia are from Astragalus due to its natural products in Chinese Medicine and its deferent uses [8,9].

Astragalus is distributed all over arid regions and temperature there for 2000 to 3000 species are estimated [10-12] there are 135 species in Pakistan according to Flora of Pakistan. Flavonoids, polysaccharides, and Saponins are known to be the major active compounds of Astragalus [13].

Artemisia genus biggest one among Asteraceae Family and spread widely in lots of countries [14]. Mostly it has been studied as medicinal and as a food plant [15, 16]. There have been reports that Artemisia chemical compound and structure of biomass are suited for production of biofuel [17].

Artemisia vulgaris used Acupuncture in the China from a long time [18], and for several treatments and its reported antioxidant [19]. According to flora of Pakistan there are 25 species in Pakistan.

The purpose of this research is to study the Allelochemical effect of Astragalus and Artemisia vulgaris on other plants Allelochemicals of Artemisia vulgaris and Astragalus Species effect on seed germination of Brassica family seed germination as it is known that Pakistan has an Agriculture land and this family is used as food purposes.

**MATERIALS AND METHODS:**

The Artemisia vulgaris was completely collected from mountains area and Astragalus was collected from Harboby Kalat District both plants were identified by the help of local persons of the area later taxonomically identification was confirmed by

Department of Botany University of Balochistan Quetta. These plant materials were dried under shade to protected from sunlight exposure, before drying plant materials were washed with tap water. The both dried plants were grinded to make powder and kept in Air tight bottles for further process

**Preparation of extracts**

500 grams each plant dehydrated powder were dissolved for 10 days in Analytical grade methanol under  $25 \pm 30^\circ\text{C}$  in room temperature after that extracts were filtered through 2 number Whatman filter paper, later these filtrate of methanolic extracts were kept for 2 days on rotary evaporator the temperature was  $30$  to  $35^\circ\text{C}$  maintained [21].

**Preparation for seed germination**

Seeds of Mustard, Rap, Turnip and Radish were dipped in sodium hypochlorite solution 10% for 10 mint for insuring sterility after this all tested seeds were washed with deionised water 3 times then soaked overnight in incubator at  $25 \pm 0.7^\circ\text{C}$  [21], after this filter papers were placed in petri dishes, 7ml of different concentrations of both medicinal plants crude extracts solution and control without plant extract was added in each petri dish, then 25 tested seeds transferred in to different concentrated petri dish, insuring  $1 \pm 0.5$  cm distance in all seeds [22] petri dishes were sealed and covered with tape for insuring the moisture to remain, all petri dishes were kept in dark under room temperature 24-28 hours

**Test for seed germination**

All the seed of Brassica family Mustard, Rap, Turnip, and Radish, were collected from market. Then treated with deferent concentration of plants crude extracts of Artemisia vulgaris and Astragalus the concentration are followed by

For crude extract...

- a) 0.5gm/100ml H<sub>2</sub>O
- b) 1.0gm/100ml H<sub>2</sub>O
- c) 1.5gm/100ml H<sub>2</sub>O
- d) 2.0gm/100ml H<sub>2</sub>O
- e) 2.5gm/100ml H<sub>2</sub>O
- f) 3.0gm/100ml H<sub>2</sub>O
- g) Control 100ml H<sub>2</sub>O

**RESULTS:**

the result of Astragalus showed increase in seed germination of Brassica family as Mustard, Rap, Turnip and Radish with increase in concentration 0.5g/100ml, 1g/100ml, 1.5g/100ml, 2g/100ml, 2.5g/100ml and 3g/100ml was treated with seeds the germination was increase according to it, the control was without crude extract. Mustard showed minimum germination with control 78% which was increased according to concentration doses of Astragalus crude extract. The maximum germination was observed 91% with 3g/100ml H<sub>2</sub>O.

Rap also showed significant deference in germination the minimum percentage was observed with control 68% and the maximum was 89% with 3g/100ml H<sub>2</sub>O its germination also showed increase with increase in concentration.

Turnip showed significant deference in seed germination with increase in concentration the control germinated 76%, and the maximum was observed with 3g/100ml H<sub>2</sub>O was 83% germination it also showed increase according to increase in concentration.

Radish also showed significant deference in seed germination the minimum was with control 80% and the maximum was 84% with 3g/100ml H<sub>2</sub>O. Increase in concentration showed increase in seed germination but it was not as more reactive as Mustard, Rap, and turnip showed increase in germination.

According to results all above plants showed significant deference in the Brassica family plants seed germination all the above result is describe in table 1.

The result of *Artemisia Vulgaris* showed significant decrease in seed germination of Brassica family as Mustard, Rap, Turnip and Radish with increase in concentration 0.5g/100ml, 1g/100ml, 1.5g/100ml, 2g/100ml, 2.5g/100ml and 3g/100ml was treated with seeds, the germination

was Decrease according to it, the control was without crud extract. Mustard showed maximum germination with control 78% which was decrease according to concentration doses of *Artemisia Vulgaris* crud extract. The minimum germination was observed 39% with 3g/100ml H<sub>2</sub>O.

Rap also showed significant deference in germination the maximum percentage was observed with control 64% and the minimum was 51% with 3g/100ml H<sub>2</sub>O its germination also showed decrease with increase in concentration.

Turnip showed significant deference in seed germination with increase in concentration the control germinated 79%, and the minimum was observed with 3g/100ml H<sub>2</sub>O, 39% germination it also showed decrease according to increase in concentration.

Radish also showed significant deference in seed germination the maximum was with control 77% and the minimum was 31% with 3g/100ml H<sub>2</sub>O. Increase in concentration showed increase in seed germination but it was not as more reactive as Mustard, Rap, and turnip showed increase in germination.

According to results all above plants showed significant deference in the Brassica family plants seed germination all the above result is describe in table 2.

**Table 1: Allelopathic Effect of *Astragalus* on Seed germination of Brassica Family**

Doses in 100ml	Astragalus			
	Mustard	Rap	Turnip	Radish
0.5g	84 <sub>cd</sub>	78 <sub>bd</sub>	73 <sub>eb</sub>	79 <sub>af</sub>
1g	85 <sub>cc</sub>	80 <sub>bc</sub>	75 <sub>ea</sub>	80 <sub>ae</sub>
1.5g	86 <sub>cb</sub>	82 <sub>bb</sub>	77 <sub>d</sub>	80 <sub>ad</sub>
2g	87 <sub>ca</sub>	84 <sub>ba</sub>	79 <sub>c</sub>	81 <sub>ac</sub>
2.5g	89 <sub>b</sub>	87 <sub>ab</sub>	81 <sub>b</sub>	82 <sub>ab</sub>
3g	91 <sub>a</sub>	89 <sub>aa</sub>	83 <sub>a</sub>	84 <sub>aa</sub>
0g	78 <sub>d</sub>	68 <sub>c</sub>	76 <sub>f</sub>	80 <sub>ab</sub>
LSD	1.257	2.263	1.736	2.408

**Table 2: Allelopathic Effect of *Artemisia Vulgaris* on Seed germination of Brassica Family**

Doses in 100ml	Artemisia Vulgaris			
	Mustard	Rap	Turnip	Radish
0.5g	69 <sub>b</sub>	60 <sub>ba</sub>	46 <sub>ba</sub>	44 <sub>ba</sub>
1g	62 <sub>c</sub>	59 <sub>bb</sub>	45 <sub>bb</sub>	42 <sub>bb</sub>
1.5g	55 <sub>d</sub>	58 <sub>bc</sub>	44 <sub>bc</sub>	40 <sub>bc</sub>
2g	48 <sub>e</sub>	57 <sub>bd</sub>	43 <sub>bd</sub>	38 <sub>bd</sub>
2.5g	43 <sub>f</sub>	54 <sub>be</sub>	41 <sub>be</sub>	34 <sub>be</sub>
3g	39 <sub>g</sub>	51 <sub>bf</sub>	39 <sub>bf</sub>	31 <sub>bf</sub>
0g	78 <sub>a</sub>	64 <sub>a</sub>	79 <sub>a</sub>	77 <sub>a</sub>
LSD	3.129	3.007	2.785	3.105

**Statistical analysis**

The result was in mean  $\pm$  standard deviation. All experiment data was statically analyzed by using standard ANOVA with significance  $> 0.05$  probability level.

**DISCUSSION:**

Both tested plant showed significant differences in germination *Artemisia vulgaris* decreased the seed germination percentage and *Astragalus* increased the seed germination according to increase in their concentration.

Turkish plants necessary oil and its phenolic compound restrain the roots and shoots sprouting [23], *Datura alba* and *With aniasomnifera* water extract also have bioactivity which inhibited shoots and root growth [24], deferent four species of medicinal plants for their allelopathic activity by sandwich method [25].

*Artemisia Vulgaris* was tested in replacement of a drug combination of nitrazepam and sodium valproate which is used for tuberous sclerosis and it showed positive replacement [26] it is also used in chine Acupuncture therapy [18] and used in different treatments.

*Astragalus* contain Various biological effect due to presence of flavonoids, sponin triterpene polysaccharides [27] and some more compounds were also reported which are responsible for allelochemicals activity [28], *Astragalus* is also being use as medicine in china from incant times [29]. Moreover in my study showed both tested plants significant differences in the seed germination *Artemisia Vulgaris* decrease the germination of all four tested seed of Mustard, Rap, Turnip and Radish, *Astragalus* had a positive effect by increasing the germination percentage of all four tested seed according to its increase in concentration

**CONCLUSION:**

Both the tested plants showed significant deference in seed germination of Brassica family according to increase in the concentration, *Astragalus* increase the germination percentage and *Artemisia vulgaris* significantly decreased the germination according to its concentration.

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