wjpls, 2025, Vol. 11, Issue 5, 218-221 Research Article ISSN 2454-2229

World Journal of Pharmaceutical and Life Sciences
WJPLS
www.wjpls.org

SJIF Impact Factor: 7.409

# EFFECT OF LETTUCE LEAF EXTRACT ON GROWTH OF CHICKPEA

**Kapse S. V.[1], Darade Arya M.[2] and Darade M. S.[1*]**

[1]Department of Botany, Government Vidarbha Institute of Science and Humanities, Amravati-444604.
[2]Department of Biotechnology, Shri Shivaji College of Agricultural Biotechnology, Amravati – 444603.

***Corresponding Author: Dr. Darade M. S.**
Department of Botany, Government Vidarbha Institute of Science and Humanities, Amravati-444604.

**Article Received on 25/03/2025** **Article Revised on 13/04/2025** **Article Accepted on 02/05/2025**

## ABSTRACT
The effect of aqueous leaf extract of *Pistia stratiotes* L. on growth of *Cicer arietinum* L. Ver. Vijaya -165 was checked with different concentrations, such as 00% (control), 2%, 4%, 6% and 8%. The growth parameters of Chickpea such as percent seed germination, seedling height, seedling root length, seedling shoot length was recorded experimentally. The maximum percentage (100%) of seed germination observed in 00% and 2% concentration. While minimum percent (60%) was observed in 8% concentration. In terms of seedling height, the maximum height (28.3 cm) was noted in 6% concentration. The maximum root length (11.89 cm) was recorded in 2%. The minimum root length (9.51 cm) was seen in 8%. The maximum shoot length (22.15 cm) was noted in 2% concentration. In terms of weight, the maximum fresh weight (9 gm) was noted in 00 % and (8 gm) in 2%. There found increase in fresh weight at 2% and 4% sequentially. The dry weight of seedling (0.775 gm) noted in control and then in 2% concentration (0.771 gm). The vigour index of seedling was maximum (25065) in 4% concentration. In the experiment it was observed that as the concentration of extract increases then there is decrease in growth parameters.

**KEYWORDS:** *Pistia stratiotes* L, Extract, Chickpea, Seeds, Seedlings, Vigour Index, Biomass.

## INTRODUCTION
The weeds affect adversely on agricultural crops and reduces yield. It is necessary to know about the weeds and its action on physiology and metabolism in plant. The identification of weed species with allelopathic potential and characterization that affect negatively is associated with the better understanding of weed-crop interactions. The seed germination is vital process in growth of plants. The sprouting of a new plant from a seed constitutes the initial step of plant growth and development. The seed germination is the initial stage in plant life. The plant growth constitute of three growth phase and process. In the first stage there is process of imbibitions in which intake of water inside the seed takes place. The imbibitions of water are required to perform metabolic process that is involved in seed germination and growth. The second stage of seed germination is embryo development. The development of embryo begins to from growth of radical. The final stage in the seed germination is emergence of radical. The water lettuce is identified with scientific name *Pistia stratiotes.* The Leaves are pale-green and up to 20 cm long and 10 cm wide, They are mostly spathulate to broadly obovate with a rounded to truncate apex, with 7-15 prominent veins radiating fanwise from the base; both surfaces, in particular the lower surface, covered by a dense mat of white woolly hairs.[1] The Chickpea is the most important pulse crop. It is grown in different parts of the world. It is the most important food source for human being. It is necessary to boost the productivity of chickpea as major agricultural crop. It gives incomes and food security of the small holder farmers in both developed and developing nations will be enhanced.

Considering significance of lettuce and Chickpea present investigation is attempted.

## MATERIAL AND METHODS
**Site of Study:** The study site is Amravati city located in the state of Maharashtra in India.It is located at Latitude approximately 20.93 $^{0}$ N and Longitude approximately 77.75 o E. Average elevation from sea level is 343 meters.

**Sample collection:** The material was collected from the campus of parent Institute GVISH. Amravati. The healthy plant of *Pistia stratiotes* L. collected and rought in the laboratory. The healthy and dried seeds of *Cicer arientinum* L.Ver. Vijaya – 165 was collected from Krushi Seva kendra located in Amravati. The sample plant was washed in tap water and it was carefully shade dried for one week. After drying, the plant was cut into

small pieces and then grinded to powder.

**Features of Lettuce:** It is an aquatic inhabitant. The lettuce plant floats on the surface of water in which root system is submerged and hanging. This weed forms a dense mat on the water surface and causes serious clogging on water ways. It is generally found as free floating in water. It grows in lakes, dams, ponds, irrigation channels and slow-moving waterways.

**Features of Chickpea:** It is herbaceous plant, erect or semi erect with a bushy appearance. It consists of tap root system with many lateral roots. The stem is green soft and branched. The leaves are pinnate compound and flowers are solitary,. The fruit is legume or pod bearing small, wrinkled or smooth seeds.

**Plant extract:** 20gm powder of lettuce leaf was weighed and dissolved in 100 ml water in a beaker. Different concentrations of lettuce leaf extract were prepared such as 0 %, 2%, 4%,6% and 8%.The sample extract was kept in laboratory for 24 hours at room temperature. The extract was then filtered through filter paper and transferred into conical flasks as per concentrations.

**Seed soaking:** The seeds of Chickpea were soaked in respective extract of different concentrations for 24 hours. Total 20 seeds were taken and immersed in extract of respective each concentration. The control (0 %) was prepared with the help of water. The treated seeds in conical flasks were kept on rotary shaker for about 5 hours. The seeds were then kept in petriplate containing moist blotting paper as per concentrations.

**Percent Seed germination:** The germination percentage was carried out in petriplates having treated blotting paper. The percent germination was calculated by considering 20 seeds kept in petriplates. The seeds that shown radical and plumule initial are treated as germinated 10 days after treating.

**Growth measurement:** The growth parameters such as seed germination, seedling height, root length, shoot length, fresh weight of seedling, dry weight of seedling and seedling vigour index was determined manually. For measuring growth parameters the treated seeds were kept in slots. After 10 days the growth parameters were measured in centimetre with the help of graph paper.

**Seedling Vigour Index (SVI):** The seedling vigour index was calculated with the help of method proposed by Abdul - Baki and Anderson (1973).

The following formulae are used to calculate vigour Index.
SVI = (Shoot length + Root length) x Germination percentage

**Biomass:** The fresh weight and dry weight of seedling were measured and calculated with the help of weighing balance. The fresh weight and dry weight of seedlings was measured 24 DAS at low temperature.

## RESULT AND DISCUSSION

The different concentrations of leaf extract of *Pistia stratiotes i.e* Lettuce were prepared and used for bioassay on chickpea. The significant results in growth parameters were recorded. The seed germination of gram were observed at different concentration. The maximum percent seed germination (100 %) was noted in control as well in 2 % concentration. It is observed that as there is increase in extract concentration then there is decrease in seed germination rate. Seed germination is the process by which a plant grows from a seed. The sprouting of a new plant from a seed constitutes the initial steps of plant growth and development seed germination is the initial stage of a plant life. The maximum seedling height (28.02 cm) was noted in control and in 6 % (28.33cm). The root length was found maximum (11.89 cm) in 2 %. It is observed that as concentration increased there decreased height parameters. An increased shoot length was 2% concentration (22.15 cm) and minimum shoot length was noted in 8% concentration (14.46 cm) (Table 1)

**Table 1: Effect of leaf extract of lettuce on growth of *Cicer arietinum* L. Ver. – Vijaya – 165.**

| Sr. No. | Concentration Of extract | % Seed germination | Seedling Height (cm) | Root length (cm) | Shoot length (cm) |
|---|---|---|---|---|---|
| 1 | 00 % (Control) | 100 | 28.02 | 8.39 | 19.63 |
| 2 | 2% | 100 | 23.20 | 11.89 | 22.15 |
| 3 | 4% | 90 | 27.85 | 10.61 | 17.24 |
| 4 | 6% | 70 | 28.33 | 10.54 | 17.79 |
| 5 | 8% | 60 | 23.97 | 9.51 | 14.46 |

The similar kind of results were found to some researchers where they found that, the extract of *Pistia stratiotes* on germination of wheat plant was significant. They also soaked seeds in different concentrations of extract of lettuce. They found that the growth parameters has shown significant enhancement in growth. They recorded that as there is increase in concentration there is enhancement of growth. As there is increase in concentration beyond 4 % concentration there decreased growth parameters.[2] The different concentration extract of Pistia *stratiotes* extract showed significant effect on percentage seed germination. At low concentration there seen increase germination percentage and high concentration show decreased germination percentage as

compared to control. The allelopathic effect of leaf, root and bark extract of *Guaiacum officinale* on seed germination of *Pennisetum glauccum* (commonly called as Millet) was studied with three treatments 10 %, 25% and 50 %.[3] The maximum seeds germination was observed in 50% leaf extract. In y 10% seeds were germinated, compared to bark 70% and root 70.33% respectively. The average root length was decreased with the increasing concentration of root and leaves extract. The lowest root length was observed in root extract (0.59 cm) as compared to bark and leaves extract (3.43 and 1.33 cm respectively). The lowest shoot lengths were observed in root extract (1.96 cm) as compared to bark and leaves extracts of the plant. There are researchers they studied allelopathic effect of a weed *Parthenium hysterophorus* aqueous extract on seed germination and seedling growth of selected eight plants viz. Garlic, Mustard, Coriander, Cucumber, Tomato, Clover and Wheat. He observed that the leaf extract of Perthenium made at different concentrations like 0%, 25%, 50%, 75% and 100%. He observed that aqueous leaf extract significantly reduced the germination and suppresses the growth parameters of tested species. He noted the highest inhibitory effects. The maximum deleterious effects were recorded at higher concentration.

**Table 2: Effect of leaf extract of lettuce on biomass and vigour of *Cicer arietinum* L. Ver. Vijaya – 165.**

| Sr. No. | Concentration of extract | Fresh weight of seedling(gm) | Dry weight of seedling(gm) | Vigour Index of Seedling |
|---|---|---|---|---|
| 1 | 00 % (Control) | 9 | 0.775 | 22,020 |
| 2 | 2% | 8 | 0.771 | 23,040 |
| 3 | 4% | 8 | 0.750 | 25,065 |
| 4 | 6% | 7 | 0.687 | 19,831 |
| 5 | 8% | 6 | 0.592 | 14,382 |

The significant effect on growth parameters were seen on gram. The maximum fresh weight (9 gm) was recorded In control. The fresh weight was decreased from 2 % to 8 % concentration. Dry weight of seedling was recorded maximum (0.775) in control. At 2 % concentration it was found 0.771 gm. The minimum dry weight (0.592 gm) was noted at 8 % concentration. The vigour Index of seedling was found maximum (25065) at 4 % concentration. The minimum vigour index (14382) was recorded at 8 % concentration (Table 2). The Among organic fractions, n-hexane was more suppressive to test species. Chromatographic analysis revealed the presence of four phytotoxins, furoic, p-coumaric, syringic, and caffeic acids, in aqueous whole plant (1:10) fractions. This study determined the phytotoxic allelopathic activity of E. dracunculoides against wheat and chickpea. The effect of various aqueous extracts of some weeds like *Hyptis sauveolens (L.), Ricinus communis (L.), Alternanthera sessilis (L.), Ipomoea carnea (Jacq), Malachra capitata (L.) and Cymbopogon citrutus (*Stapf), on seed germination of *Triticum aestivum* L. ver. k9 were studied.[4] They prepared extracts in different concentrations like 1%, 2%, 3% & 5%. The seeds of wheat were germinated in petridishes and their different growth parameters were recorded at the end of 7 days. The control of kept by means of water. They found significant reduction in all the growth parameters as concentration of extract increases.

## CONCLUSION

The aqueous extract of Lettuce affect significantly on growth parameters of *C*hick pea. The variation in concentration of leaf extract affect on Percentage of seed germination, speed of germination, seedling height, Root length, Fresh weight, Dry weight, Seedling vigour index etc. It is found that as concentration of extract increases then there is decrease in growth parameters. The leaf extract may affect significantly due to presence of certain medicinally important alkaloids, glycosides, flavonoids and phytosterols. The Leaves are rich in stigma-sterol, stigma-steryl, stigma-sterate and palmitic acids are found in abundance. The leaves powder can be applied to wounds and sores for disinfection. It can be applied to syphilitic eruptions and skin infections. The *Pistia stratiotes* has often been grown as an ornamental in lakes, ponds, aquaria and gardens and can be used as fodder for cattle and pigs. There are some species that purify water and heavy metals are accumulated in foliage. It has potential as a fuel source due to release of methane gas after decomposition of foliages. It can be used as biodegradable oil sorbent in marine oil spills. The Lettuce is a weed and it rapidly releases of allelochemical compounds that affect on growth of chickpea.

## REFERENCES


1. Cook, P. M., Glass, G. E., & Tucker, J. H. (1974). Asbestiform amphibole minerals: Detection and measurement of high concentrations in municipal water supplies. *Science*, *185*(4154): 853-855.
2. Gul, B., Saeed, M., Khan, H., Khan, M. I., & Khan, I. (2017). Impact of water hyacinth and water lettuce aqueous extracts on growth and germination of wheat and its associated troublesome weeds. *Applied Ecology & Environmental Research*, *15*(3).
3. Bhadha, J. H., Lang, T. A., Alvarez, O. M., Giurcanu, M. C., Johnson, J. V., Odero, D. C., & Daroub, S. H. (2014). Allelopathic effects of Pistia stratiotes (Araceae) and Lyngbya wollei Farlow ex Gomont (Oscillariaceae) on seed germination and root growth. *Sustainable Agriculture Research*, *3*(4): 121-130.
4. Joshi, N., & Joshi, A. (2016). Allelopathic effects of weed extracts on germination of wheat. *Ann. Plant*

*Sci*, *5*(5): 1330-1334.

5. Akbar, K., Baber Khan, S. S., Ahmed, W., Abbas, Y., Karim, R., Shehzad, K., & Ali, F. Allelopathic effects of bark, leaf and root exduate of Guaiacum Officinale (Lignum) on seed germination, root length, shoot length, dry weight of Pennisetum Glauccum (Millet).
6. De Albuquerque, M. B., dos Santo, R. C., Lima, L. M., Melo, F. P. A., Nogueria, R. J. M. C., Camara, C. A. G., Romos., A. R. (2010): Allelopathy, an alternative tool to improve cropping systems. A review. – Agronomy for
1. Sustainable Development, 31(2): 379-395.
7. Imad, M., Idrees, M., Hadi, F., Memon, N. H., & Zhang, Z. (2021). Allelopathic effect of parthenium hysterophorus extract on seed ger mination and seedling growth of selected plants. *Pak. J. Bot*, *53*(6): 2187-2197.
8. Tripathi, P., Kumar, R., Sharma, A. K., Mishra, A., & Gupta, R. (2010). Pistia stratiotes (Jalkumbhi). *Pharmacognosy Reviews*, *4*(8): 153.
9. Watakhere, D. N., Jakhi, P. S., & Choudhari, S. S. (2023). Study of Allelopathic Effects of Argemone mexicana L. Root Extract on Seed Germination and Growth of Triticum aestivum L. Under in vitro Condition. *Current Agriculture Research Journal*, *11*.