

Effect of *Ocimum sanctum* L. and *Ocimum basilicum* L. leaves extracts on the Seed germination of *Cicer arietinum* L. and *Vigna radiata* L

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Abstract

The research work was carried out to assess the effect of plant extracts on the seed germination of leguminous plants. *Ocimum sanctum* L. and *Ocimum basilicum* L. were selected for the extraction and different concentration series were prepared and the treatment was provided to the germinated seeds of *Cicer arietinum* L. and *Vigna radiata* L. *In-vitro* seed germination was carried out and the results obtained showed that as compare to control series plant extract treated series which showed better germination rate as well as better growth of primary roots and shoots. So, we can conclude that the *Ocimum sanctum* L. and *Ocimum basilicum* L. leaf aqueous extracts enhances the germination rate and promotes growth of roots and shoots up to certain concentration.

Keywords: *Ocimum sanctum* L., *Ocimum basilicum* L., seed germination, leguminous plants

Introduction

Seed dormancy is a block to the completion of germination of an intact viable seed under favourable conditions. This block to germination has evolved differently across species through adaptation to the prevailing environment, so that germination occurs when conditions for established a new plant generation are likely to be suitable (William E. Finch-Savage., 2006) ^[2]. Seed dormancy is a temporary failure of a viable seed to germinate, after a specific length to time and in a particular set of environmental condition that allow germination after the restrictive state has been terminated by either natural or artificial condition. The term quiescence is some time used incorrectly for dormancy (Michael E. Foley., 2001) ^[1]. Dormancy is a normally associated with intrinsic factors related to the seed itself, such as hardness and impermeability of the integument to water and gases, immature embryos, inhibitor, and abiotic factors such as temperature, light, humidity and substrate (Debora de Oliveira Prudente., 2018) ^[4]. For the sake of simplicity, seed dormancy is regarded here as the failure of an intact viable seed to complete germination under favourable conditions (J. Derek Bewley., 1997) ^[3].

Material & Methodology

Plant Material

The plant material for the preparation of plant extracts was collected from Kheda district Gujarat and the or seeds for the germination were collected (purchased) from D-mart market.



Fig 1

Methodology

Requirements: Plastic Petri plate, Wooden basket, Bloating paper, Filter paper, Black sheets.

Glasswares: Petri plate, Pipette, Beaker.

Chemicals: Methanol, Ethanol.

Instruments: Electric Grinder, Weighing balance, Oven, Distiller, Autoclave, Shaker.

Miscellaneous agents: Forceps, Cotton, Needle, Basket, Newspaper, Black sheet.



Fig 2

Preparation of Plant extracts

The dried plant material (Leaves) were crushed with the help of mixture machine. 10gm power was taken and kept in 100ml solvent (Aqueous) in the beaker. Cover the beaker with help of aluminum foil and put it on the shaker for 24 hours so all the phytochemicals were dissolved gradually. After that the solution was filtered with the help of Whatmann filter no.1 Weight four petri plate were selected and transfer the filtered liquid from in to the petri plate. Then allowed it to evaporate the solvent for 24 hours. After we got a dried or crude extract.

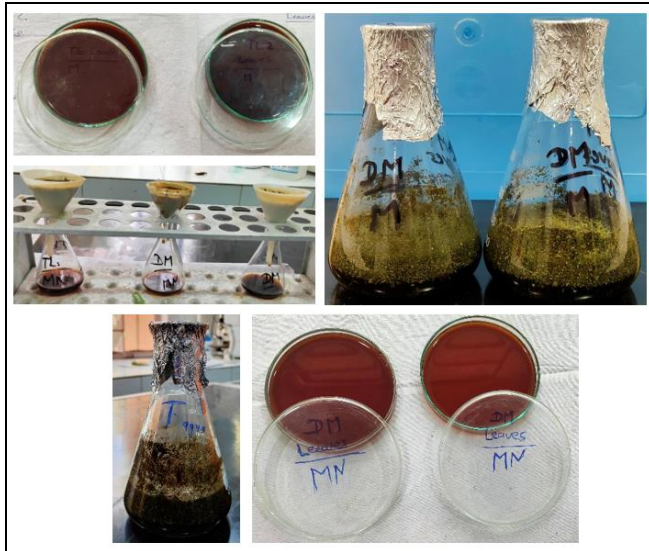


Fig 3



Fig 4

Result and Discussion

As the result tables and graph showed after the incubation time as the *Ocimum sanctum* and *Ocimum basilicum* L. extracts concentration increases the rate of seed germination increases up to certain 15mg/5ml concentration. As the highest concentration data showed the negative results. So, we can say that 15mg/5ml extract concentration was appropriate for both the plant's seed germination. So many scientists worked on the seed germination with different solvents and chemicals but in this research the data showed that extracts also plays role in seed germination and for the growth of roots and shoots.

Table 1: Effect of *Ocimum sanctum* L. aqueous extract of leaves on seed germination of *Cicer arietinum* L.

	Plant part	Reading 1	Reading 2	Reading 3	Mean
Control	Root	3.0	4.1	5.6	4.2
	Shoot	1.0	1.5	0.0	1.25
5ml/5mg	Root	6.0	4.4	3.0	13.4
	Shoot	2.0	1.4	3.0	6.4
10mg/5ml	Root	2.4	5.6	5.4	13.4
	Shoot	0.0	0.0	1.4	1.4
15mg/5ml	Root	6.7	4.1	5.2	16
	Shoot	4.0	0.0	0.7	2.35
20mg/5ml	Root	3.3	3.9	3.6	10.8
	Shoot	1.5	1.4	0.9	3.8

Table 2

Treatment	Plant (Growth)	
	Root	Shoot
Control	4.2	1.25
5mg/5ml	13.4	6.4
10mg/5ml	13.4	1.4
15mg/5ml	16.0	2.35
20mg/5ml	10.8	3.8

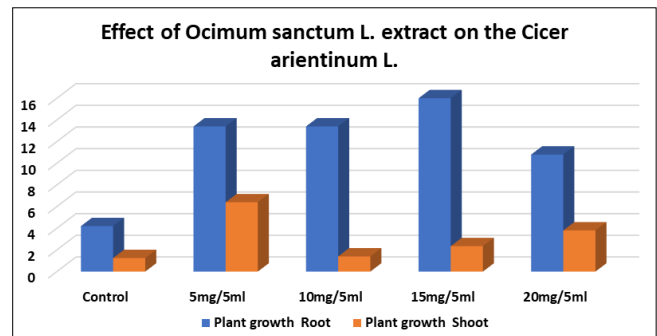


Fig 5

Table 3: Effect of *Ocimum basilicum* L. aqueous extract of leaves on seed germination of *Cicer arietinum* L.

	Plant part	Reading 1	Reading 2	Reading 3	Mean
Control	Root	6.3	3.0	3.6	12.9
	Shoot	1.1	1.0	0.8	2.9
5ml/5mg	Root	4.6	3.9	3.5	12.0
	Shoot	0.0	1.4	0.0	1.4
10mg/5ml	Root	4.1	5.2	3.1	12.4
	Shoot	0.9	0.7	1.7	3.3
15mg/5ml	Root	4.8	4.0	3.0	11.8
	Shoot	0.5	1.3	0.9	2.7
20mg/5ml	Root	7.0	5.1	4.6	16.7
	Shoot	1.3	1.2	3.0	5.5

Table 4

Treatment	Plant (Growth)	
	Root	Shoot
Control	12.9	2.9
5mg/5ml	12.0	1.4
10mg/5ml	12.4	3.3
15mg/5ml	11.8	2.7
20mg/5ml	16.7	5.5

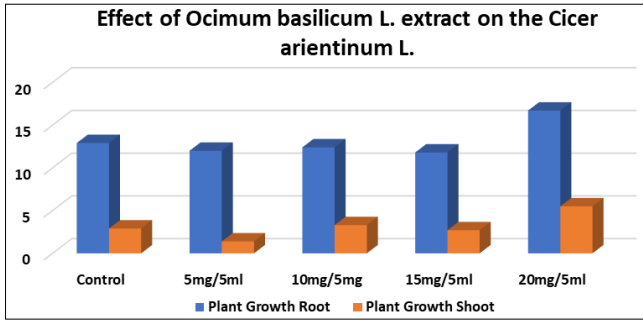


Fig 6

Table 5: Effect of *Ocimum sanctum* L. aqueous extract of leaves on seed germination of *Vigna radiata* L.

	Plant part	Reading 1	Reading 2	Reading 3	Mean
Control	Root	7.9	7.5	6.0	7.13
	Shoot	1.9	1.7	2.0	1.86
5ml/5mg	Root	12.4	12.0	8.0	10.8
	Shoot	2.3	2.0	0.0	2.15
10mg/5ml	Root	9.4	9.2	7.3	8.63
	Shoot	2.2	0.0	0.0	2.2
15mg/5ml	Root	14	13.8	12	13.26
	Shoot	3.0	4.0	3.4	3.46
20mg/5ml	Root	3.5	3.2	2.1	2.93
	Shoot	2.1	0.0	0.9	1.5

Table 6

Treatment	Plant (Growth)	
	Root	Shoot
Control	7.13	1.86
5mg/5ml	10.8	2.15
10mg/5ml	8.63	2.2
15mg/5ml	13.26	3.46
20mg/5ml	2.93	1.5

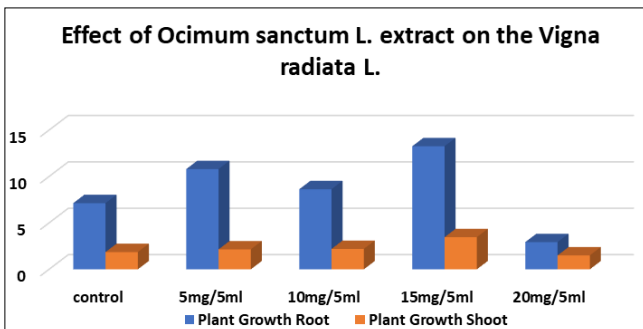


Fig 7

Table 7: Effect of *Ocimum basilicum* L. aqueous extract of leaves on seed germination of *Vigna radiata* L.

	Plant part	Reading 1	Reading 2	Reading 3	Mean
Control	Plant part	Reading 1	Reading 2	Reading 3	Mean
	Root	9.0	8.5	7.1	8.2
5ml/5mg	Shoot	3.4	3.0	2.0	2.8
	Root	1.4	1.0	2.0	1.46
5ml/5mg	Shoot	7.6	0.0	2.0	4.8
	Root	13	12.5	9.2	11.56
10mg/5ml	Shoot	2.6	2.2	2.1	2.3
	Root	11	10.5	7.1	9.53
15mg/5ml	Shoot	7.9	7.0	4.0	6.3
	Root	13.0	11.0	4.9	9.63

Table 8

Treatment	Plant (Growth)	
	Root	Shoot
Control	8.2	2.8
5mg/5ml	1.46	4.8
10mg/5ml	11.56	2.3
15mg/5ml	9.53	6.3
20mg/5ml	9.63	0.0

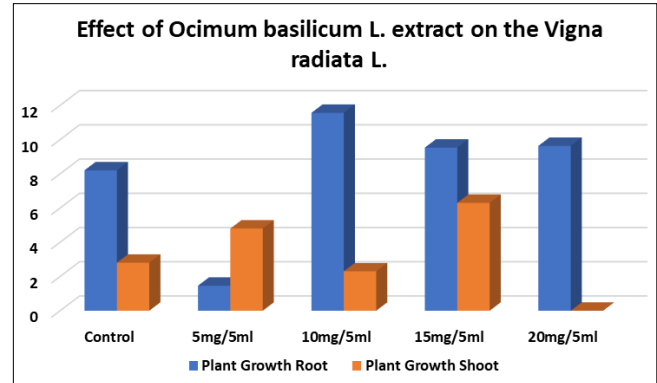


Fig 8

Conclusion

Aqueous extracts of *Ocimum sanctum* L. and *Ocimum basilicum* L. can be enhanced the seed germination of *Vigna radiata* L. and *Cicer arietinum* L. So, in future the phytochemicals which are responsible for the seed germination can be identified and for the *In-vivo* experiments it can be applicable for the seed germination of different leguminous plants. Even the extracts also showed the effect on the growth parameters of the plant so, for that to increase the production of the plant and fast growth of the plant it can be implemented.

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