



## INCREASE OF SEEDS GERMINATION OF PADDY FROM INDIGENOUS PLANT EXTRACT

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### ABSTRACT

Five different plants extracts *viz.* garlic, onion, neem, datura and castor bean plant extracts had significant effect on germination of paddy seeds from two dilutions 1:1 and 1:2 were tested for seed treatment. The results were obtained best performance of *Allium sativum* 1:1 concentration average value of ten varieties of paddy 92.66 %. In the highest seed germination % of IR -20 and Moti 96.70% while lowest seed germination of four paddy varieties *viz.*: Ratana, Rupali, MTU-7029 and Saket-4 90.00% from *Allium sativum* treated seeds. The results were also obtained best performance of *Allium sativum* 1:2 concentration average value of ten varieties of paddy 91.99%. In the highest seed germination % of Moti variety 96.70% while lowest seed germination of IR -20, Ratana, BPT - 5204, Pusa - 1121 was recorded 93.30%. *Allium sativum* extract 1:1 and 1:2 both most effectively seeds germination of paddy.

**KEYWORDS:** Seeds germination, Plant extract and Paddy.

### INTRODUCTION

Rice (*Oryza sativa*) is one of the most widely grown important cereal crops of the world. In India, rice occupies the first place both in area of about 42.24 million hectares and produces about 82 million tons (Krishnamurthy *et al.*, 2005). Rice is prone to several diseases caused by fungi, bacteria, viral and mycoplasmal pathogens (Agrios, 1997). Seed serves as an important microcosm for saprotrophic and pathogenic microorganisms and paddy seeds are no exception to this (Agrios, 1997; Domijan *et al.*, 2005). More than 50 fungal pathogens have been reported to be seed-borne in paddy (Agrawal, 1999)

Plant extracts have been known for their medicinal and antimicrobial properties since ancient times (Jabeen, R. (2006; Lalitha, V., Raveesha, K.A. and Kiran, B. 2010). They offer a greater scope than synthetic chemicals as they are relatively safe, easily biodegradable and eco-friendly (Sukanya, S.L., Yamini, D. and Fathima, S.K. 2011; Khan, Z.S. and Nasreen, S. 2010; Enikuomehin, O.A. 2005; Gurjar, M.S., Ali, S., Akhtar, M. and Singh, K.S. 2012). Natural plant extracts are important sources of new means and non selective pesticide for control of plant diseases (Tripathi and Dubey, 2004). Many plant and plant products have been reported to be antimicrobials against plant pathogenic fungi (Bowers and Locke, 2000). Leaf extracts of various plants are known to possess antimicrobial activity. Antimicrobial activity of the leaves has been mentioned by Charjan (1995), Abd-Aziz *et al.*, (1994-1996), Suhaila-Mohamed *et al.*, (1996) *etc.*

Seed treatment is the safest and the cheapest way of control of seed-borne fungal diseases and to prevent bio deterioration of grains (Chandler 2005; Bagga and Sharma 2006). It helps to avoid environmental pollution by chemicals. Successful use of plant extracts in controlling fungal pathogens has been demonstrated by a number of authors (Assadi, P. and M. Behroozin. 1987; Singh, R. H.

and R.S. Dwivedi, 1987; Miah, A.T., M.U, 1990; Ashrafuzzaman, M.H. and A.R. Khan, 1992; Hossain, I. and E. Schlosser, 1993). Garlic extract gave the best result in controlling seed borne fungal pathogens and seed germination of rice following neem leaf extract (Riazuddin *et al.*, 2009).

### MATERIALS & METHOD

The present study was conducted in the Bhargava Agricultural Botany laboratory, of the Department of Botany, University of Allahabad, Allahabad INDIA during the period from January to Oct 2014.

#### Collection of Rice Seed Sample

Ten paddy varieties *viz.* IR-20, Cauvery, CR-6, Ratana, Rupali, BPT- 5204, Sweta, Moti, MTU- 7029, Pusa- 1121 and Saket-4 have been selected for the experiment were collected from farmer's storages of Allahabad District in Uttar Pradesh. I have 10 seed each variety of paddy germinates in Petri dish with three replicate concentration of 1:1 and 1:2 of plant extract. Evaluation of seed germination percentage formula given below:

$$\text{Germination \%} = \frac{\text{Germinate seed}}{\text{Total No. of seed}} \times 100$$

#### Collection of Plant Material

Five different plant species *viz.* Garlic, Onion, Neem, Casterbean, and Datura were collected, fresh leaf were chopped after cleaning in running tap water and then rinsed with sterile distilled water.

#### Preparation of leaf extracts

The five plant Garlic, Onion, Neem, Datura and Castor bean of sterilized plant leaves, leaf extract was prepared by crushing leaves in a grinder with distilled water in 1:1 and 1:2 ratios, and kept in the refrigerator for 24 hours. The extracts were filtered through cheese cloth.

**RESULTS**

Results on the effect of different plant extracts had significant effect on germination of paddy seeds. The results were obtained best performance of *Allium sativum* 1:1 concentration average value of ten varieties of paddy 92.66 % in the table 1. In the highest seed germination %

of IR -20 and Moti 96.70% while lowest seed germination of four paddy varieties viz: Ratana, Rupali, MTU-7029 and Saket-4 90.00% from *Allium sativum* treated seeds. Rahman, G.M.M., M.R. Islam and M.A. Wadud, 1999 who found garlic extract was superior in terms of reducing seed-borne infections.

**TABLE 1:** Effect of plant leaf extract on germination of paddy seed from 1:1 concentration

S. No	Plant Extract	Verities	Total no. of seed germinate in petridises	Seed Germination with three replication			Mean $\pm$ SD	Germination (%)
				P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>		
1	<i>Allium sativum</i>	IR-20	10	10	10	9	9.67 $\pm$ 0.58	96.70
		Cauvery	10	9	10	9	9.33 $\pm$ 0.58	93.30
		CR-6	10	10	8	10	9.33 $\pm$ 1.15	93.30
		Ratana	10	9	10	8	9.00 $\pm$ 1.00	90.00
		Rupali	10	9	9	9	9.00 $\pm$ 0.00	90.00
		BPT - 5204	10	10	9	9	9.33 $\pm$ 0.58	93.30
		Moti	10	10	9	10	9.67 $\pm$ 0.58	96.70
		MTU - 7029	10	9	10	8	9.00 $\pm$ 1.00	90.00
		Pusa - 1121	10	9	9	10	9.33 $\pm$ 0.58	93.30
		Saket - 4	10	10	9	8	9.00 $\pm$ 1.00	90.00
Avarage value of <i>Allium sativum</i>							→	92.66
2	<i>Allium cepa</i>	IR-20	10	10	9	9	9.33 $\pm$ 0.58	93.30
		Cauvery	10	10	9	10	9.67 $\pm$ 0.58	96.70
		CR-6	10	9	10	8	9.00 $\pm$ 1.00	90.00
		Ratana	10	9	9	10	9.33 $\pm$ 0.58	93.30
		Rupali	10	8	10	9	9.00 $\pm$ 1.00	90.00
		BPT - 5204	10	10	8	9	9.00 $\pm$ 1.00	90.00
		Moti	10	10	10	9	9.67 $\pm$ 0.58	96.70
		MTU - 7029	10	9	10	8	9.00 $\pm$ 1.00	90.00
		Pusa - 1121	10	10	9	9	9.33 $\pm$ 0.58	93.30
		Saket - 4	10	10	10	7	9.00 $\pm$ 1.73	90.00
Avarage value of <i>Allium cepa</i>							→	92.33
3	<i>Azadirachta indica</i>	IR-20	10	8	10	10	9.33 $\pm$ 1.15	93.30
		Cauvery	10	10	9	8	9.00 $\pm$ 1.00	90.00
		CR-6	10	9	10	10	9.67 $\pm$ 0.58	96.70
		Ratana	10	8	10	9	9.00 $\pm$ 1.00	90.00
		Rupali	10	10	9	10	9.67 $\pm$ 0.58	96.70
		BPT - 5204	10	9	10	9	9.33 $\pm$ 0.58	93.30
		Moti	10	8	10	9	9.00 $\pm$ 1.00	90.00
		MTU - 7029	10	9	9	8	8.67 $\pm$ 0.58	86.70
		Pusa - 1121	10	10	9	8	9.00 $\pm$ 1.00	90.00
		Saket - 4	10	9	9	10	9.33 $\pm$ 0.58	93.30
Avarage value of <i>Azadirachta indica</i>							→	92.00
4	<i>Datura stramonium</i>	IR-20	10	8	10	10	9.33 $\pm$ 1.15	93.30
		Cauvery	10	8	9	10	9.00 $\pm$ 1.00	90.00
		CR-6	10	10	9	9	9.33 $\pm$ 0.58	93.30
		Ratana	10	10	9	8	9.00 $\pm$ 1.00	90.00
		Rupali	10	9	9	10	9.33 $\pm$ 0.58	93.30
		BPT - 5204	10	8	10	9	9.00 $\pm$ 1.00	90.00
		Moti	10	8	9	10	9.00 $\pm$ 1.00	90.00
		MTU - 7029	10	8	10	10	9.33 $\pm$ 1.15	93.30
		Pusa - 1121	10	9	10	9	9.33 $\pm$ 0.58	93.30
		Saket - 4	10	8	8	10	8.66 $\pm$ 1.15	86.70
Avarage value of <i>Datura stramonium</i>							→	91.32
5	<i>Ricinus communis</i>	IR-20	10	10	8	9	9.00 $\pm$ 1.00	90.00
		Cauvery	10	10	9	9	9.33 $\pm$ 0.58	93.30
		CR-6	10	9	9	8	8.67 $\pm$ 0.58	86.70
		Ratana	10	9	9	10	9.33 $\pm$ 0.58	93.30
		Rupali	10	10	9	9	9.33 $\pm$ 0.58	93.30
		BPT - 5204	10	9	10	8	9.00 $\pm$ 1.00	90.00
		Moti	10	9	9	8	8.67 $\pm$ 0.58	86.70
		MTU - 7029	10	10	8	10	9.33 $\pm$ 1.15	93.30
		Pusa - 1121	10	9	10	9	9.33 $\pm$ 0.58	93.30
		Saket - 4	10	9	9	9	9.00 $\pm$ 0.00	90.00
Avarage value of <i>Ricinus communis</i>							→	90.99

Germination of paddy from indigenous plant extract

The results were also obtained best performance of *Allium sativum* 1:2 concentration average value of ten varieties of paddy 91.99%, in the table 2. In the highest seed

germination % of Moti variety 96.70% while lowest seed germination of IR -20, Ratana, BPT - 5204, Pusa - 1121 was recorded 93.30%.

**TABLE 2:** Effect of plant leaf extract on germination of paddy seed from 1:2 concentration

S. No	Plant Extract	Varieties	Total no. of seed germinate in petridises	Seed Germination with three replication			Mean ± SD	Germination (%)
				P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>		
1	<i>Allium sativum</i>	IR-20	10	10	8	10	9.33±1.15	93.30
		Cauvery	10	9	10	8	9.00±1.00	90.00
		CR-6	10	10	8	9	9.00±1.00	90.00
		Ratana	10	9	10	9	9.33±0.58	93.30
		Rupali	10	9	8	10	9.00±1.00	90.00
		BPT - 5204	10	10	9	9	9.33±0.58	93.30
		Moti	10	9	10	10	9.67±0.58	96.70
		MTU - 7029	10	8	10	9	9.00±1.00	90.00
		Pusa - 1121	10	10	9	9	9.33±0.58	93.30
		Saket - 4	10	8	9	10	9.00±1.00	90.00
Average value of <i>Allium sativum</i>							→	91.99
2	<i>Allium cepa</i>	IR-20	10	10	9	8	9.00±1.00	90.00
		Cauvery	10	9	9	10	9.33±0.58	93.30
		CR-6	10	8	10	9	9.00±1.00	90.00
		Ratana	10	8	10	10	9.33±0.58	93.30
		Rupali	10	8	10	9	9.00±1.15	90.00
		BPT - 5204	10	10	8	9	9.00±1.00	90.00
		Moti	10	10	10	9	9.67±0.58	96.70
		MTU - 7029	10	9	10	8	9.00±1.00	90.00
		Pusa - 1121	10	10	9	9	9.33±0.58	93.30
		Saket - 4	10	10	10	7	9.00±1.73	90.00
Average value of <i>Allium cepa</i>							→	91.66
3	<i>Azadirachta indica</i>	IR-20	10	10	10	8	9.33±1.15	93.30
		Cauvery	10	10	9	8	9.00±1.00	90.00
		CR-6	10	9	10	9	9.33±0.58	93.30
		Ratana	10	8	10	9	9.00±1.00	90.00
		Rupali	10	10	9	10	9.67±0.58	96.70
		BPT - 5204	10	9	8	9	8.67±0.58	86.70
		Moti	10	8	10	9	9.00±1.00	90.00
		MTU - 7029	10	9	8	9	8.67±0.58	86.70
		Pusa - 1121	10	10	9	8	9.00±1.00	90.00
		Saket - 4	10	9	9	10	9.33±0.58	93.30
Average value of <i>Azadirachta indica</i>							→	91.00
4	<i>Datura stramonium</i>	IR-20	10	8	10	9	9.00±1.00	90.00
		Cauvery	10	8	9	10	9.00±1.00	90.00
		CR-6	10	10	9	9	9.33±0.58	93.30
		Ratana	10	10	9	8	9.00±1.00	90.00
		Rupali	10	9	9	10	9.33±0.58	93.30
		BPT - 5204	10	8	10	8	8.67±1.15	86.70
		Moti	10	9	9	10	9.33±0.58	93.30
		MTU - 7029	10	8	9	10	9.00±1.00	90.00
		Pusa - 1121	10	9	10	9	9.33±0.58	93.30
		Saket - 4	10	8	8	10	8.66±1.15	86.70
Average value of <i>Datura stramonium</i>							→	90.66
5	<i>Ricinus communis</i>	IR-20	10	10	8	9	9.00±1.00	90.00
		Cauvery	10	10	8	9	9.00±1.00	90.00
		CR-6	10	9	9	8	8.67±0.58	86.70
		Ratana	10	9	9	10	9.33±0.58	93.30
		Rupali	10	10	9	9	9.33±0.58	93.30
		BPT - 5204	10	9	10	8	9.00±1.00	90.00
		Moti	10	9	9	8	8.67±0.58	86.70
		MTU - 7029	10	9	8	10	9.00±1.00	90.00
		Pusa - 1121	10	9	9	9	9.00±0.00	90.00
		Saket - 4	10	9	9	9	9.00±0.00	90.00
Average value of <i>Ricinus communis</i>							→	90.00

**DISCUSSION**

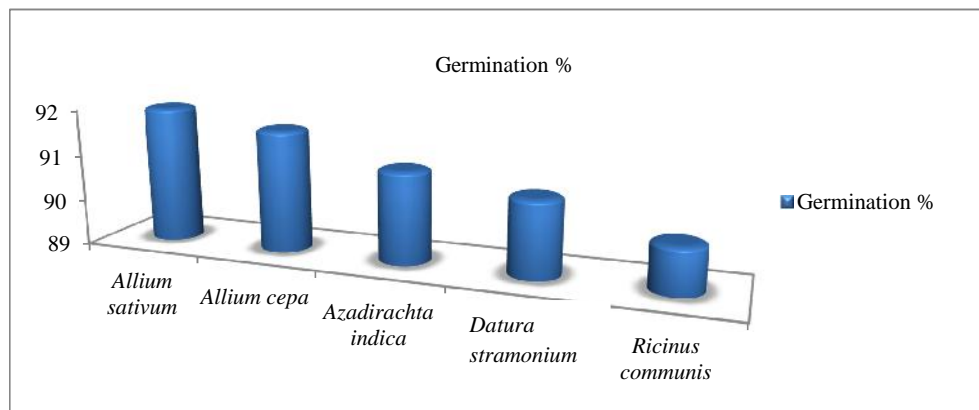
Seeds were treated with garlic extract *Allium sativum* 1:1 solution average value of seed germination 92.66%,

*Allium cepa* 92.33%, *Azadirachta indica* 92.00%, *Datura stramonium* 91.32%, *Ricinus communis* 90.99 % respectively. The highest seed germination % of IR -20

## Germination of paddy from indigenous plant extract

and Moti 96.70% while lowest seed germination of four paddy varieties viz: Ratana, Rupali, MTU-7029 and Saket-4 90.00% from *Allium sativum* treated seeds, In case of variety Cauvery and Moti highest seed germination of 96.70% while variety CR-6, Rupali, MTU-7029, Saket-4 90.00% lowest germination from 1:1 solution of *Allium cepa* extract, The highest seed germination variety CR-6,

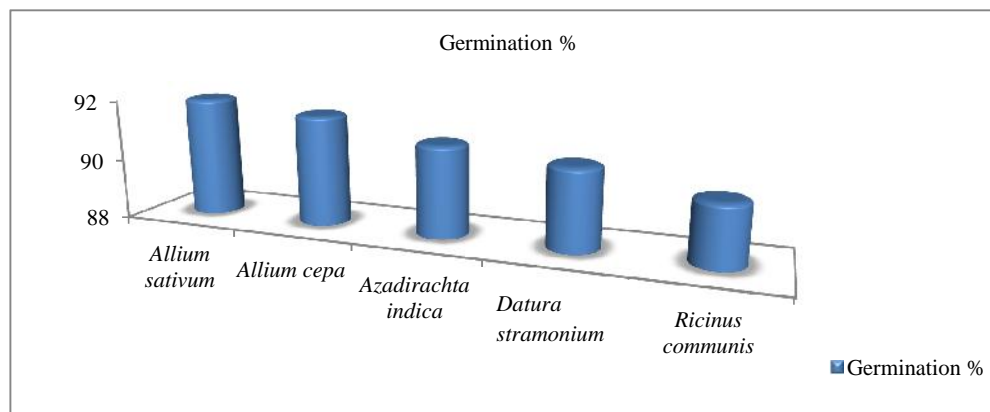
Rupali 96.70%. and lowest germination 86.70 was found is MTU-7029 from 1:1 solution of *Azadirachta indica* extract, Highest seed germination variety IR-20, CR-6, Rupali, MTU-7029 and Pusa-1121 93.30%. While lowest germination 86.70 was found is Saket-4 from 1:1 solution of *Datura stramonium* extract.



**FIGURE 1:** Average value of Germination (%) of ten Paddy varieties from each plant extract of concentration 1:1

The highest seed germination variety Cauvery, Ratana, Rupali, MTU-7029 and Pusa-1121 93.30%. while lowest

germination 86.70 was found is CR-6, Moti from 1:1 solution of *Ricinus communis* extract.



**FIGURE 2:** Average value of Germination (%) of ten Paddy varieties from each plant extract of concentration 1:2

Germination of the seeds of paddy varieties from *Allium sativum* 1:2 solution average value of seed germination was recorded 91.99%, *Allium cepa* 91.66%, *Azadirachta indica* 91.00%, *Datura stramonium* 90.60%, *Ricinus communis* 90.00% respectively. The highest seed germination of Moti variety 96.70% and lowest seed germination of IR -20, Ratana, BPT - 5204, Pusa -1121 93.30% from 1:2 concentration of *Allium sativum* extract, The highest seed germination variety Moti 96.70% while variety IR-6, CR-6, Rupali, BPT-5204, MTU-7029, Saket-4 90.00% lowest germination from 1:2 solution of *Allium cepa* extract, In case of highest seed germination of variety Rupali 96.70% and lowest germination 86.70% variety BPT-5204 and MTU-7029 was recorded from 1:2 solution of *Azadirachta indica* extract, Highest seed germination variety CR-6, Rupali, Moti, Pusa-1121 93.30%. while lowest germination 86.70 was found is BPT-5204 and Saket-4 from 1:2 solution of *Datura stramonium* extract, The highest seed germination variety Ratana, Rupali,

93.30% while lowest germination 86.70 was found in CR-6, Moti from 1:2 solution of *Ricinus communis* extract.

## CONCLUSION

Seed treatment with plant extracts is an eco-friendly measure in controlling seed-borne pathogens. Seed treatment from *Allium sativum* extracts 1:1 dilution significantly increases seed germination of ten paddy varieties average value 92.66% and 1:2 dilution of *Allium sativum* extract, average value of seed germination 91.99%. *Allium sativum* extract 1:1 and 1:2 both most effectively seeds germination of paddy.

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