

# Impact of cow urine and composted cow dung on the incidence of seed borne Phytopathogenic fungi

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## SUMMARY

There are five major substances obtained from cow. All these have medicinal properties against various diseases. Materials obtained from cow viz., cow urine and cow dung in non composted and composted form (vermicompost), respectively were used in varying concentration (0.5%, 2%, 3.5% and 5%) for observing the spore germination behaviour of four fungal species of phytopathogenic behavior. The conidia of *Alternaria alternata*, *Fusarium oxysporum*, *Colletotrichum capsici* and *Curvularia lunata* were used for their germination attributes. Both the cow products posed inhibitory impact towards germination, however, degree of inhibition increased with the improvement of concentration dose

**Key words :** *A. alternata*, Vermicompost, *Curvularia lunata*

**S**eed health is very important for the successful cultivation and yield exploitation of crop. Among various factors that affect seed health, the most important are seed borne fungi that not only lower the seed germination but also reduce seedling vigour. Surapala (1000 B.C.) in his text has stressed the use of suitable cultivars, use of good seeds, pre sowing treatment of seeds, use of suitable soils, growing intercrops, having optimum use of water, timely weeding, protection from disorders using herbal products/ dead animal wastes, harvest at right stage and seed drying and storage.

## MATERIALS AND METHODS

Spore germination behaviour of chosen phytopathogenic fungi was assayed by cavity slide technique as followed by (Ganeshan, 1993). Four fungal species (phytopathogenic) were selected, which cause diseases in spice crops and its pure cultures were obtained from IARI, New Delhi. viz., *Alternaria alternata* Fr. Keissler, *Colletotrichum capsici* syd. Bult, *Fusarium oxysporum* Schlechtendahl and *Curvularia Lunata* Boedijn. Aqueous extracts of chosen organic material were used for antifungal activity to evaluate the effect of extracts on spore germination behaviour. 0.5%, 2.0%, 3.5% and 5% (w/v) concentration of solution were made in sterilized distilled water.

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Spore suspension of all the four selected cultures were made separately with sterilized distilled water in a test tube. The concentration of spore/ ml was adjusted with the help of haemocytometer. Two drops (0.2 ml) of extracts and one drop (0.1 ml) of spore suspension was placed in a clean cavity slide. The slides in duplicate were incubated in moist chamber. A suitable control in sterile water was also maintained. Germination count was made after 24 hrs of incubation.

## RESULTS AND DISCUSSION

Effect of different concentrations of cow urine on the germination behaviour of spores of selected fungal species showed the decrease in percentage of germination with increase in concentration (Table 1, Fig. 1). It is evident from the Table 1 that the percentage germination was minimum (average with respect to concentration is 5.75%) at 5% concentration while it was maximum (87.5%) at 0.5% concentration of cow urine.

*Fusarium oxysporum* showed 100% germination at 0.5% concentration while it was 90% in the control condition. Which further reduced to 4% at 5% concentration. *Alternaria alternata* also showed 4% germination at 5% concentration of cow urine, which was minimum.

Data shown in Table 2 and Fig. 2 represent the effect of different concentrations of vermicompost extract on the germination behaviour of selected phytopathogenic fungi. The mean values shows that 5% concentration of vermicompost showed the 6.25% (minimum) of spore germination, while 0.5% concentration of vermicompost showed 37.5% (maximum) of spore germination, however, different fungal species did not show much significant

**Table 1 : Effect of different concentration of cow urine on the percentage germination of spores of chosen phytopathogenic fungi**

Sr. No.	Name of fungal species	Control	Concentration				Average
			0.50%	2.0%	3.5%	5%	
1.	<i>Alternaria alternata</i>	95	80	20	15	4	29.75
2.	<i>Fusarium oxysporum</i>	90	100	80	70	4	63.50
3.	<i>Colletotrichum capsici</i>	100	75	10	09	7	25.25
4.	<i>Curvularia lunata</i>	100	95	15	12	8	32.5
	Average	96.25	87.5	31.25	26.5	5.75	

ANOVA

Source of variation	SS	Df	MS	F-ratio
Fungal species	3643.5	3	1214.5	4.2797*
Concentration	14671.5	3	4890.5	17.2335**
Error	2554	9	283.77	
Total	20869	15		

\* and \*\* indicate significance of values at P=0.05 and 0.01, respectively

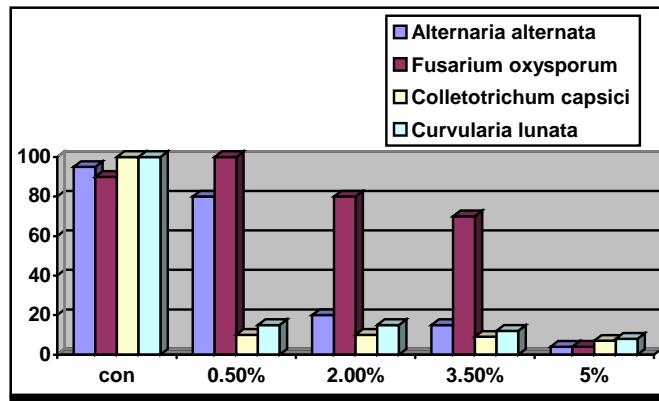
**Table 2 : Effect of different concentration of vermicompost on the percentage germination of spores of chosen phytopathogenic fungi**

Sr. No.	Name of fungal species	Control	Concentration				Average
			0.50%	2.0%	3.5%	5%	
1.	<i>Alternaria alternata</i>	95	70	15	2	2	22.25
2.	<i>Fusarium oxysporum</i>	90	30	15	10	8	15.75
3.	<i>Colletotrichum capsici</i>	100	25	19	16	15	18.75
4.	<i>Curvularia lunata</i>	100	25	20	12	0	14.25
	Average	96.25	37.50	17.25	10	6.25	

ANOVA

Source of variation	SS	Df	MS	F-ratio
Fungal species	3643.5	3	50	0.2928
Concentration	14671.5	3	776.83	4.5502*
Error	2554	9	170.72	
Total	20869	15		

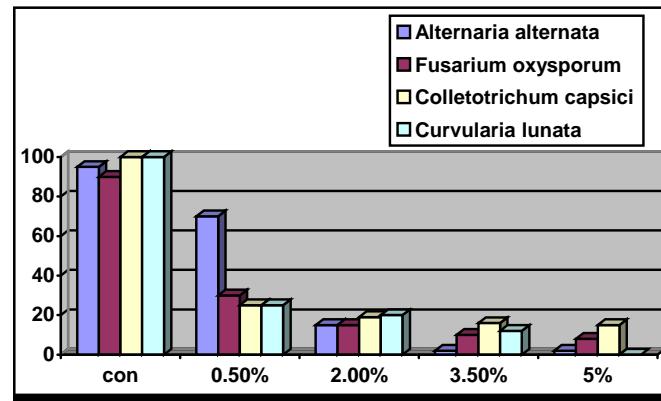
\* and \*\* indicate significance of values at P=0.05 and 0.01, respectively

**Fig. 1 : Effect of different concentration of cow urine on the percentage germination of spores of chosen phytopathogenic fungi**

variation.

*Alternaria alternata* (22.5%) > *Colletotrichum capsici* (18.75%) > *Fusarium oxysporum* (15.75%) > *Curvularia lunata* (14.25%)

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**Fig. 2 : Effect of different concentration of vermicompost on the percentage germination of spores of chosen phytopathogenic fungi**

Germination of spores of *C. lunata* was totally inhibited (0%) at 5% concentration of vermicompost extract, while maximum germination was observed at 0.5% concentration of vermicompost. In case of cow

urine, analysis of variance showed that fungal species and concentration both variables gave the significant impact with the spore germination behaviour, while in case of vermicompost statistical analysis of the data reveals that spore germination was significantly affected by the percentage of concentration of vermicompost extract, however, fungal species did not show any significant effect. By comparing the overall result of the experiments on spore germination behaviour, it can be concluded that all the organic materials had immense capability of inhibiting the growth of phytopathogenic fungi viz., *Alternaria alternata*, *Fusarium oxysporum*, *Curvularia lunata* and *Colletotrichum capsici*.

The different concentration of aqueous extracts of chosen organic materials exhibited positive influence in reducing the percentage of germination of spores of all the four test fungi. However, test fungi also exhibited their variable sensitivity in relation with earlier workers Kuruvilla and Shivprakashan (1987) who found that *Bougainvillea* sp. *glabra* leaf extract was not effective against *Pythium aphanidermatum* while Alice(1984) found the same extract very effective against *P. monosporum*. Thus it is due to the specificity of antifungal compounds by fungi. Since fungal spores of different species differ in size, structure and composition, they are likely to take up different amounts of the toxicants from the solution. The relation between uptake, binding and toxicity of oxathins to its selective antifungal was explained by Nene and Thapliyal (1979).

Sundriyal (1991) also noted the effect of flower extracts of five plant species on spore germination behaviour of *Alternaria solani* and found that all the

extracts inhibited spore germination and germ tube growth of *Alternaria solani* *in vitro*.

It can be concluded that average data exhibited trend of inhibition of spore germination with respect to concentration percentage as under:

$$5(5.75\%) > 3.5(26.5\%) > 2(31.25\%) > 0.5(87.5\%)$$

Ganeshan (1993) observed the effect of wild plant leaf extracts on *Drechslera oryzae*, an important rice pathogen and found that all the plant extracts were not equally toxic to conidial germination. Basak and Lee (2001, 2002) reported that fresh cow urine and cow dung has positive response in suppression of mycelial growth of *F. solani*, *F. oxysporum* and *S. sclerotiorum*.

Akhtar *et al.* (2006), also studied the inhibitory effect of plant extracts, cow dung and cow urine on conidial germination of *Bipolaris sorokiniana* and concluded that the extracts of *Adhota vasica*, *Zingiber officinale*, *Piper betle*, *Vinca rosea* and *Azadirachta indica* extracts in combination with cow dung, and *Calotropis procera* extract in combination with cow urine possess high ability to inhibit conidial germination of *B. sorokiniana*, which might be used for controlling phytopathogens of crop plants. In cow urine, *Alternaria alternata* and *Fusarium oxysporum* both showed same kind of spore germination behaviour at 5% concentration. While in vermicompost *A. alternata* showed same impact.

So it can be concluded from the data obtained in the present study that effective control of *Alternaria alternata* can be obtained from 5% concentration of composted cow dung (vermicompost) and spore germination behaviour of *Curvularia lunata* was totally inhibited at 5% concentration of vermicompost.

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