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Short Communication

Organic management of Ascochyta blight of chickpea caused by *Ascochyta rabiei*

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Abstract

Organic management components viz., composts and organic formulations were evaluated against the *Ascochyta rabiei* under *in vitro* conditions. Four composts viz., Vermicompost, FYM, Sheep & goat manure and Poultry manure were evaluated against the pathogen at five different concentrations i.e. 5, 10, 15, 20 and 25 per cent using Spore Germination Method. Among composts, Vermicompost at 25 per cent test concentration was found best among all with 67.29 per cent inhibition of spore germination of *A. rabiei* followed by FYM (48.47%). Four organic formulations *viz., Panchgavya, Jeevamrit, Beejamrit* and *Tamarlassi* were procured from Department of Organic Agriculture and Natural Farming, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur and evaluated under *in vitro* conditions at 2, 4, 6, 8 and 10 per cent concentrations using Spore Germination Method. Among organic formulations, *Jeevamrit* at 10 per cent test concentration was found best with 89.16 per cent inhibition of spore germination of *A. rabiei* followed by *Tamarlassi* (33.13%), *Panchgavya* (32.51%) and *Beejamrit* (29.35%).

Key words: Organic inputs, *Ascochyta rabiei*, *in vitro*, spore inhibition

Chickpea (*Cicer arietinum* L.) is an important legume crop and improves soil fertility by fixing atmospheric nitrogen. Chickpea is grown in the semi-arid region of the world. India is the leading chickpea producing country with 73.3% of the world acreage and 67.4% of the production. In India chickpea is grown in an area of about 9.54 M ha with a production of 9.08 MT (Annual Report DPD 2016-17) as compared to 13.54 million hectares in area with corresponding production of 13.90 million tonnes worldwide. It is a rich source of carbohydrate (60.0%), proteins (28.9%), oils (3%), vitamins and minerals (Ibrikci *et al*. 2003 and Kerem *et al*. 2007).

Ascochyta blight of chickpea is caused by *A. rabiei* (Pass.) Lab. which causes huge yield losses in severe infection. Though the disease happens at all growth stages of chickpea plants and on all aerial plant parts but most devastating at the flowering and pod formation stages. It perennates either in the seeds (seed borne) or in the crop debris (soil borne) for several years. Seed infections can be either internal or external on the seed surface. The major signs of infection are pycnidia embedded in necrotic specks. To avoid the use of chemicals in the disease management, the integration of different approaches like evaluation of organic inputs and botanicals can provide eco-friendly disease management module. Therefore, the present study was carried out under *in vitro* conditions to evaluate ecofriendly management components against the pathogen.

All the laboratory experiments were conducted in the Department of Plant Pathology, CSKHPKV, Palampur. Isolations were made from diseased tissue. The infected plant parts cut into small bits of 1-2 mm size were surface sterilized in 1 % sodium hypochlorite solution for 10-15 seconds followed by washing thrice in sterilized distilled water. The sterilized bits were then transferred to PDA slants. The inoculated test tubes were incubated at temperature of 21±2°C.Thepure culture of the pathogen was purified by single spore isolation. The pure cultures were preserved at 4°C in the refrigerator for further studies.

Four composts *viz*., vermicompost, FYM, sheep & goat manure and poultry manure were procured from the Department of Organic Agriculture and Natural Farming, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur and evaluated against *A. rabiei in vitro* conditions at 5 different concentrations i.e. 5, 10, 15, 20 and 25 % using Spore Germination Method. Dey *et al*. (2013) carried out *in vitro* evaluation of the management components at 5 different concentrations using **Spore Germination Method**. The observations were made by counting total number of germinated spores. Spore germination inhibition was worked out as per McKinney (1923) formula.

Germination was calculated by following formula:

Per cent spore germination = A/B x 100

Where A = No. of spores germinated; B = No. of spores observed

Per cent spore germination inhibition was also calculated as per McKinney (1923) formula

I= C-T/C × 100

Where

I= Per cent growth inhibition (%)

C= Spore germination in control (%)

T= Spore germination in treatment (%)

Four organic formulations viz., *Panchgavya, Jeevamrit, Beejamrit* and *Tamarlasi* were procured from Department of Organic Agriculture and Natural Farming, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur and evaluated under *in vitro* conditions at 2, 4, 6, 8 and 10 % concentrations using Spore Germination Method. Four composts *viz*., vermicompost, Farm Yard Manure (FYM), sheep & goat manure and poultry manure at 5, 10, 15, 20 and 25 per cent concentrations were evaluated against *A. rabiei* through spore germination method.

The data in the table 1 revealed that vermicompost at 25 per cent test concentration was found best among all with 67.29 % inhibition of spore germination of *Ascochyta rabiei* followed by FYM (48.47%), sheep & goat manure (43.97%) and poultry manure (20.06%). Sinha *et al*. (2010) also studied the antifungal properties of vermicompost and vermi wash against soil borne pathogens and recorded 51 to 72 per cent mycelial inhibition of the pathogens. Hence, studies revealed that vermicompost was best among all the composts to be used in the management of the disease. Four organic inputs *viz., Jeevamrit, Beejamrit, Tamarlassi* and *Panchgavya* (1:1 w/v) were evaluated against *A. rabiei at* 2, 4, 6, 8 and 10 % test concentrations for their antifungal properties through spore germination method.

Table 1. Effect of composts on spore germination of *A. rabiei*

Composts	*A. Rabiei*									
	Spore germination (%) at different concentrations (%)					Inhibition of spore germination (%) at different concentrations (%)				
	5	10	15	20	25	5	10	15	20	25
Vermicompost	74.49	68.71	43.97	37.09	28.19	13.55	20.26	48.97	56.98	67.29
Sheep-Goat manure	73.20	69.43	63.08	61.70	48.28	15.05	19.43	26.80	28.40	43.97
FYM	83.25	78.68	55.19	48.65	44.40	3.39	8.70	35.95	43.54	48.47
Poultry manure	75.47	72.06	71.74	69.47	68.88	12.40	16.37	16.75	19.38	20.06
Control	86.17	86.17	86.17	86.17	86.17	_	_	_	_	_
CD (P= 0.05)	2.95	4.56	4.26	3.60	4.52	_	_	_	_	_

The data in the table 2 and fig.1 revealed that *Jeevamrit* was found best among all the organic inputs with 89.16 % inhibition of spore germination of *A.rabiei* followed by *Tamarlassi* (33.13%), *Panchgavya* (32.51%) and *Beejamrit* (29.35%) at 10 % test concentration. Ashlesha and Paul (2014) also evaluated five organic inputs *viz*., panchgavya, vermiwash, biosol, cow urine and butter milk against major pathogens (*F. solani, F. oxysporum* f. sp. *capsici, S. sclerotiorum, R. solani, Colletotrichum capsici, Phytophthora nicotianae* and *S. rolfsii*) of bell paper under *in vitro* and *in vivo* conditions. Under *in vitro* conditions, fermented cow urine showed maximum mycelial inhibition of 99.0 per cent against *S. rolfsii, F. solani* and *P. nicotianae*. Whereas, under *in vivo* conditions, a combination of *panchgavya* (5%) + fermented cow urine (5%) yielded maximum disease control of Fusarium wilt, stem rot and root rot.

Table 2. Effect of organic formulations on spore germination of *Ascochyta rabiei*

Organic formulations	Spore germination (%) at different concentrations (%)					Spore germination inhibition (%) at different concentrations (%)				
	2	4	6	8	10	2	4	6	8	10
Jeevamrit	24.34	19.39	14.88	8.82	8.51	68.99	75.29	81.04	88.76	89.16
Beejamrit	62.74	62.35	61.40	56.51	55.45	20.06	20.55	21.76	27.99	29.35
Tamarlassi	70.77	65.68	62.52	62.06	52.48	9.82	16.31	20.34	20.92	33.13
Panchgavya	77.36	73.67	73.11	54.61	52.97	1.43	6.13	6.84	30.42	32.51
Control	78.48	78.48	78.48	78.48	78.48	-	-	-	-	-
CD (P= 0.05)	3.26	4.34	3.97	4.56	4.60	_	_	_	_	_

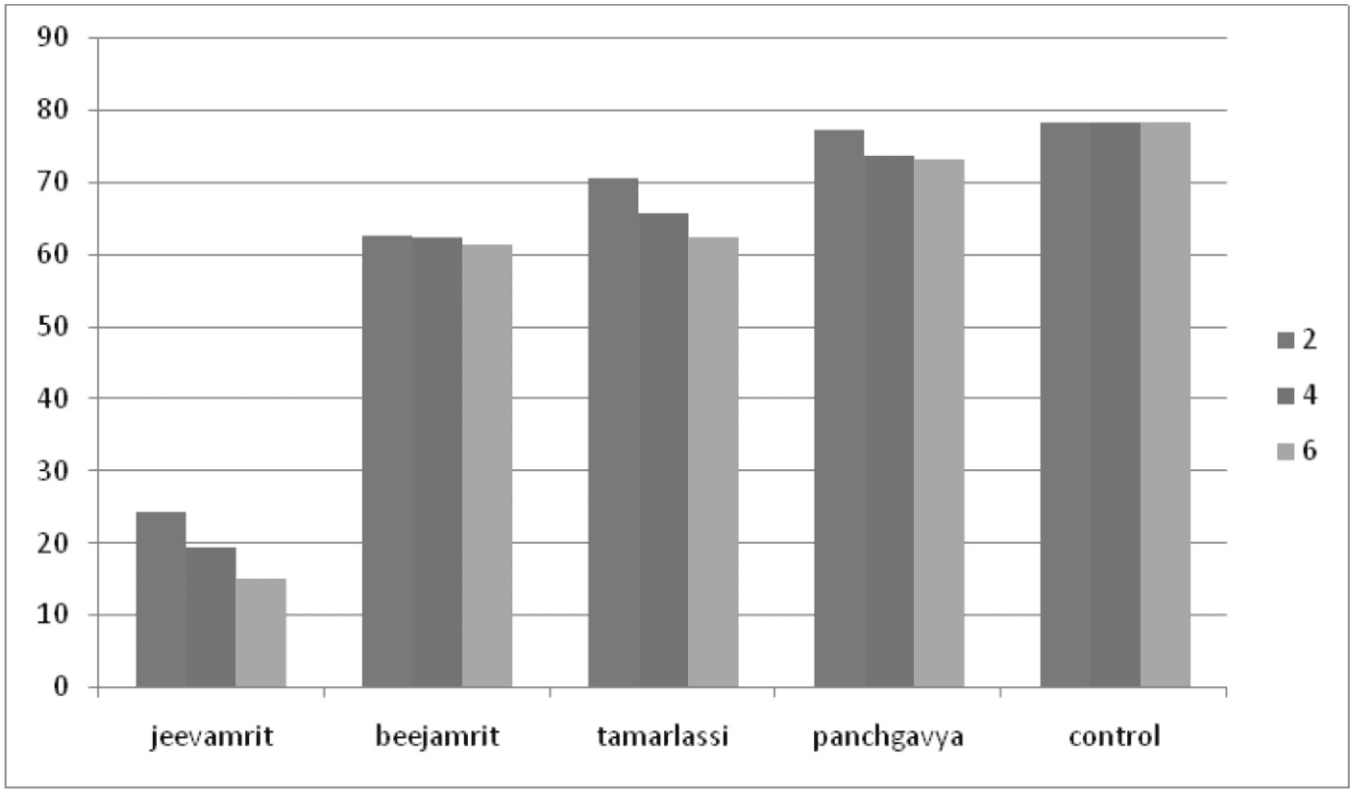

Fig.1 Effect of organic formulations on spore germination of *Ascochyta raviei*

Hence, the studies revealed that *Jeevamrit* was best among all the organic inputs against *A. rabiei*.

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