
Comparative Efficacy of Different Oil Cakes as a Soil Amendments against *M. Incognita* on the Yield of Soyabean

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Abstract: *The root knot nematode Meloidogyne incognita infest soyabean (Glycine max) along with other vegetable and Leguminous crops causes serious reduction in the growth and yield of crops. The experiment were carried out as a soil amendment with neem cake, mustard cake and castor cake at the rate of 5, 10, 15 gm/ pot and found that all the oil cake superior over untreated control but neem cake 15gm/pot provide best result to increase yield of soyabean crops and reduce the number of second stage juvenile J2 of M.incognita and number of galls in the roots of soyabean.*

Keyword: *M.incognita, Oil Cake, Soyabean.*

1. INTRODUCTION

Meloidogyne incognita is root knot nematode which infest wide variety of crops and causes huge loss in production. They are obligate parasites that causes significant damage to a broad range of host plants. About 2000 plants are susceptible to infection by root knot nematodes (Hussey & Janssen 2002). It infect vegetable crops, agricultural crops, flowering plants and even grasses ie almost all the families of diacots and monocots and limiting world agricultural productivity. Soyabean (*Glycine max*) is a high protein contain leguminous crop also infested by *M.incognita* which reduce the yield of crop. The experiment were carried out to determine the efficacy of different oil cakes as a soil amendments to reduce the effect of *M.incognita* and increase the yield of Soyabean crops.

2. MATERIAL METHOD

The experiment was carried out in earthen pot to determine the efficacy of Neem cake, Mustard cake and Castor cake at the rate of 5, 10, 15, gm/pot against *Meloidogyne incognita*. 2kg sterilized soil filled in disinfested earthen pots with finely powdered oil cake as per doses mentioned above. These pots were exposed for two weeks to allow decomposition of oil cakes before sowing. The seeds of soyabean were sown in each pot after 15 days of soil amendment. One week old seedlings were the recommended inoculated with 2000 J2/pot. Agronomic practices were adopted through out the experimentation. Each treatment including untreated checks were replicated three times. Three months after sowing the plants were depotted, washed and observations recorded were subjected to statistical analysis.

3. RESULT

The comparison of different doses of all the oil cakes were based on the value of three replication of test plants. Further, the comparative trends emerging from ANOVA were substantiated by the evaluation of efficiency of all three oil cakes in terms of growth parameters. The tool of Critical Difference (CD) was employed. The mean values of the three replicates have been mentioned in the parenthesis in the foregoing text.

3.1. Effect of Number of Pods

All the treatments of oil cakes were significantly superior over untreated control (5.00) except 5 gm/pot dosage of castor cake (5.00 gm) and 5 gm/pot dosage of Mustard cake (5.00). The pots applied with 15 gm/pot dosage of Neem cake produce maximum number of pods (16.00). $CD_{5\%}=0.832$. Fig-1

SOURCE	DF	SS	MS	FCAL	FTAB
REP	2	301.636	150.818	474.000	3.1
VARIETIES	10	742.909	74.291	233.486	2.32
ERROR	20	6.364	0.318		
	32	1050.909			
SEM=	0.282	SE=	0.399	CD5%=	0.832

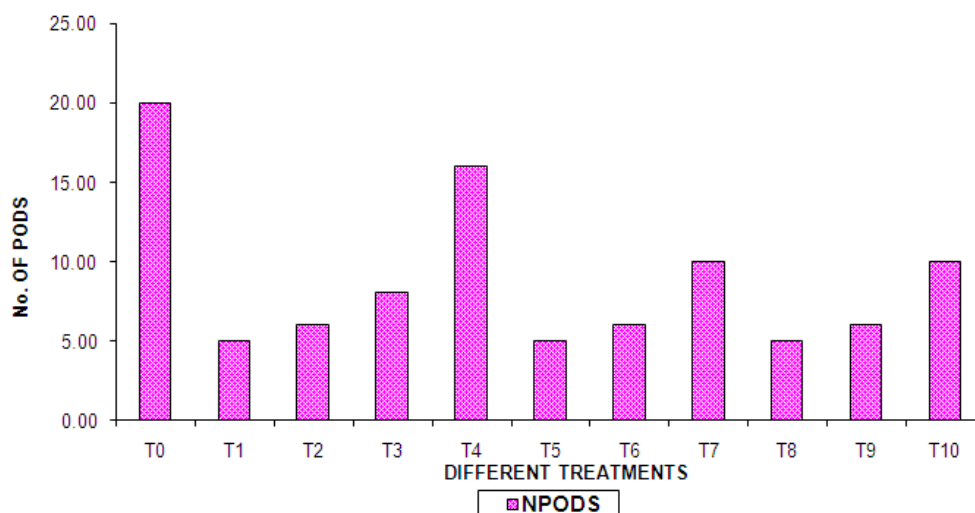


Fig1. Efficacy of different oil cakes – no of pods

3.2. Weight of Pods

The result of AVOVA pertaining to the weight of pods revealed that 15gm/pot dose was efficient to increase the weight of pods. The order of their efficacy was Neem cake (17.80gm)>Castor cake (11.50gm)> Mustard cake (10.60gm). The pods of minimum weight were recorded at the doses of 5gm/pot mustard cake over untreated control (6.40gm). CD5%=1.116. Fig-2

SOURCE	DF	SS	MS	FCAL	FTAB
REP	2	276.545	138.273	241.429	3.1
VARIETIES	10	933.901	93.930	163.062	2.32
ERROR	20	11.455	0.573		
	32	1221.901			
SEM=	0.378	SE=	0.535	CD5%=	1.116

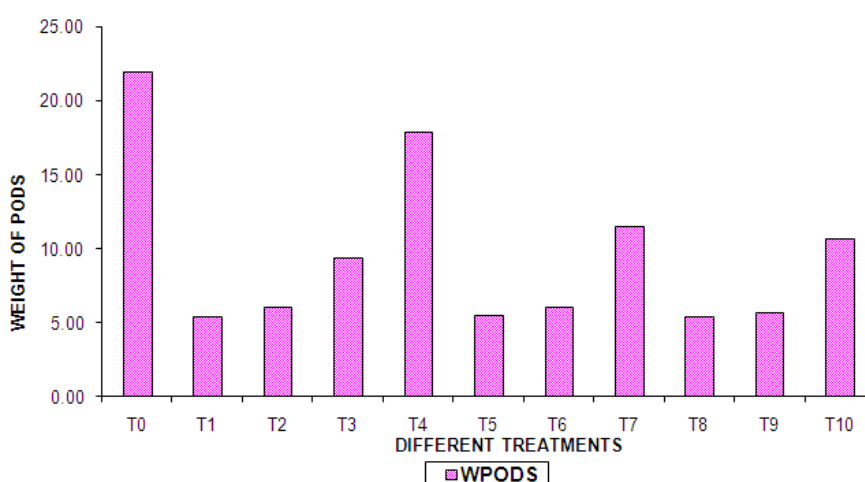


Fig2. Efficacy of different oil cakes-weight of pods

3.3. Fresh Seed Weight

The data on the fresh seed weight of Potted plants showed that 15 gm/pot dosage of Neem cake was more effective (9.40 gm) followed by 15 gm/pot dosage of Castor cake (6.80 gm) and 15 gm/pot dosage of Mustard cake (6.20 gm). The least effective dose was 5 gm/pot Castor cake (2.70 gm) over untreated control (2.60 gm).CD5%=1670. Fig-3

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SOURCE	DF	SS	MS	FCAL	FTAB
REP	2	83.697	41.848	32.648	3.1
VARIETIES	10	267.457	26.746	20.865	2.32
ERROR	20	25.636	1.282		
	32	376.791			
SEM=	0.566	SE=	0.801	CD5%=	1.670

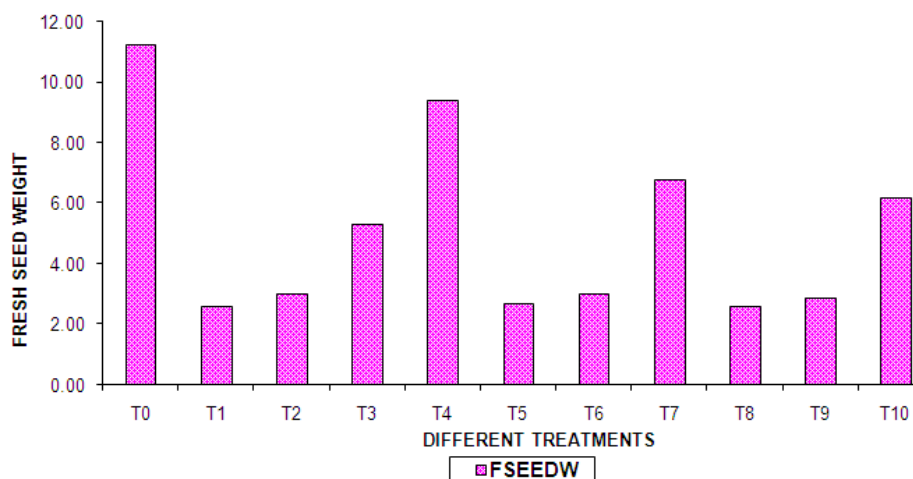


Fig3. Efficacy of different oil cakes-fresh seed weight

3.4. Effect on Dry Seed Weight

All the treatment of oil cakes were significantly superior over untreated control except 5 gm/pot dose of mustard cake (1.40 gm) which was at par with untreated control (1.40 gm). The effectiveness of 15 gm/pot dosage of different oil cakes were as follows: Neem cake (3.57 gm) > Mustard cake (3.00 gm) > Castor cake (2.90 gm). CD5% = 0.871. **Fig-4**

SOURCE	DF	SS	MS	FCAL	FTAB
REP	2	35.697	17.848	51.217	3.1
VARIETIES	10	32.296	3.230	9.268	2.32
ERROR	20	6.970	0.348		
	32	74.693			
SEM=	0.295	SE=	0.417	CD5%=	0.871

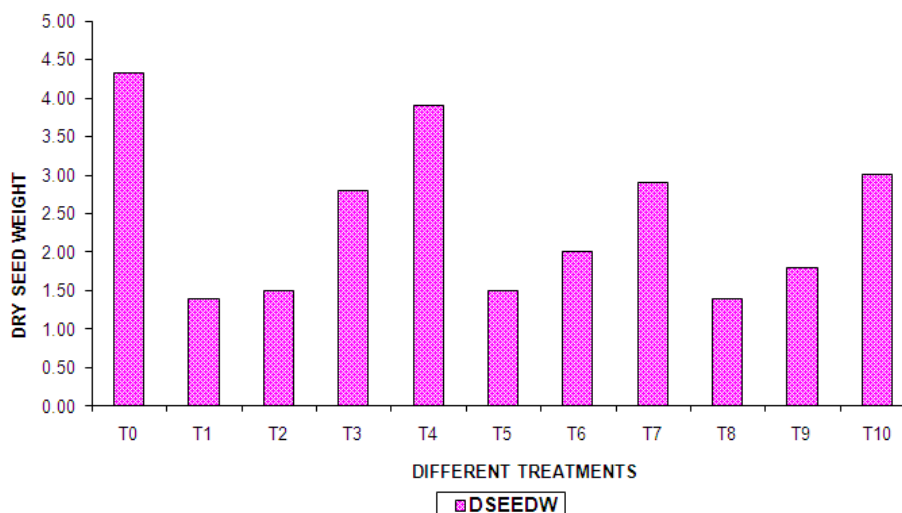


Fig4. Efficacy of different oil cakes-dry seed weight

3.5. Effect on Number of J_2 /ml Soil

The oil cakes at 15 gm/pot exhibited highest adverse effect of their nematicidal effect was under. Neem cake (6.00) > Mustard cake (15.00) > Castor cake (17.33). The non-effective dose was 5gm/pot mustard cake (50.33) over untreated control (48.00). CD5% = 4.764. **Fig-5**

SOURCE	DF	SS	MS	FCAL	FTAB
REP	2	38.061	19.030	1.825	3.1
VARIETIES	10	10569.394	1056.939	101.334	2.32
ERROR	20	208.606	10.430		
	32	10816.061			
SEM=	1.615	SE=	2.284	CD5%=	4.764

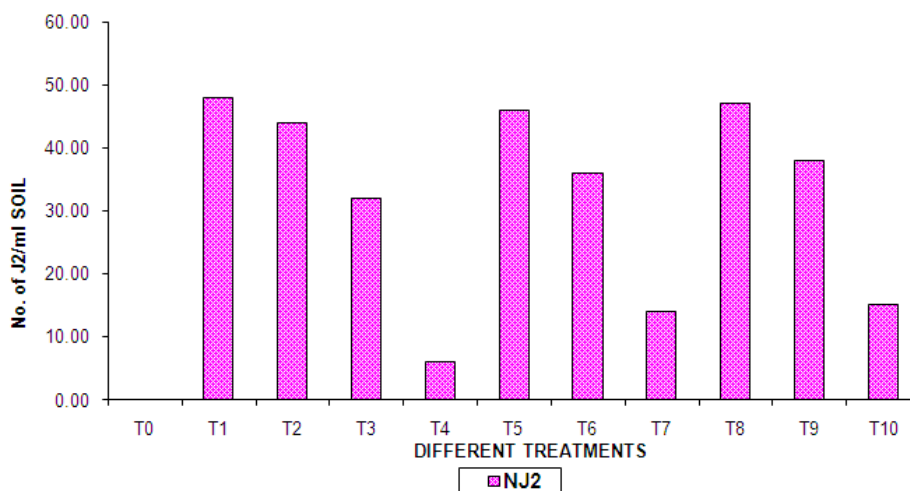


Fig5. Efficacy of different oil cakes-no. of J2/ml soil

3.6. Effect on Number of Galls

The nematicidal efficacy of oil cake was found to be highest at 15 gm/pot dosage. The order of their efficiency was Neem cake (4.00) > Mustard cake (11.00) > Castor cake (13.00). The minimum reduction in number of galls was noticed at 5 gm/pot , Castor cake (76.00) over untreated control (121.00).CD5%=2.535. Fig-6

SOURCE	DF	SS	MS	FCAL	FTAB
REP	2	428.909	214.455	72.585	3.1
VARIETIES	10	42782.182	4278.218	1448.012	2.32
ERROR	20	59.091	2.955		
	32	43270.182			
SEM=	0.859	SE=	1.215	CD5%=	2.535

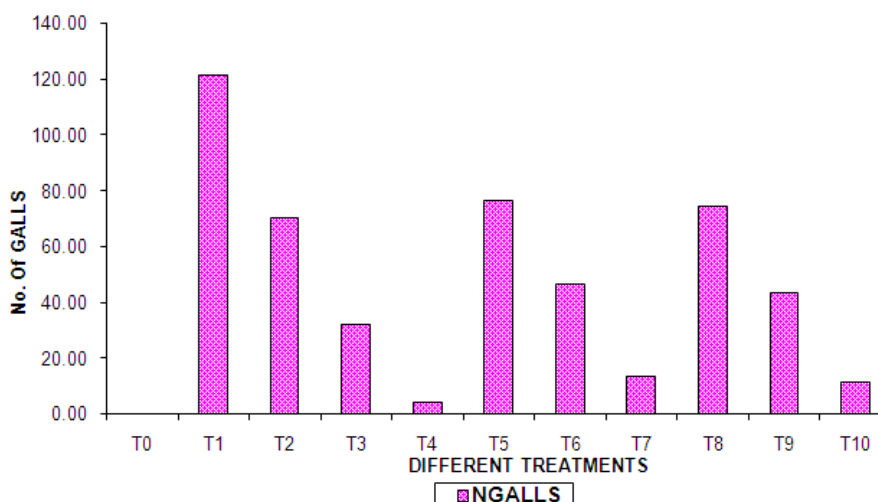


Fig6. Efficacy of different oil cakes-no. of Galls

4. DISCUSSION

The experiment illustrated that all the treatment were superior over untreated inoculated control. Application of organic amendments (oil cake) result in the release of plant nutrients which accelerate root development and over all plant growth and thus helping the plants to escape nematode attack. Nematicidal and Nutritive value indicated by organic amendment would have promoted plant growth

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Zaiyd (1977). Result of the present investigation were in conformity with the finding of Mishra and Prasad (1974), Pandey and Singh (1990) who had also applied the oil cakes of Neem, castor and mustard in soil and observed a significant increases in plant growth characters and reduced nematodes population of *M.incognita*, *Retylenchulus reniformis* and *Tylenchorhynchus brassicae*. Addition of organic amendment also resulted in accumulation of nitrates and ammonia in high concentration, which was highly injurious to several nematodes in soil (Singh & Sitaramiah 1973). Addition of organic matter to soil as an alternative means of nematode control was also explored by Suhail & Anvar (2006).

The results of our study suggest that the application of oil cakes can control root knot nematodes effectively thus resulting in increased plant growth. Among the three oil cakes neem cake proved to be the most beneficial followed by mustard and Castor in improving plant growth characters and suppressing nematode population. Mukesh Sehgal et al (2014) reported that castor cake and neem oil combination increase the pod yield in groundnut.

Vaitheeswaran et al. (2005) found that growth was maximum in Neem oil cake treated infected plant of *Phaseolus mungo*. Manju Meena, S. Bhargava, M.K. Sharma and H.R. Gurjar (2013) reported that leaf extract of neem at 20% was found to be the best treatment in improving plant growth characters and in reducing nematode population on tomato. Seenivasan, (2010) also found that Neem cake was more efficacious than castor cake in reducing nematode population in medicinal coleus.

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