

A STUDY ON THE COMPARATIVE EFFICACY OF NEEM AND GROUND-
NUT OIL CAKES AGAINST ROOT-KNOT NEMATODE,
MELOIDOGYNE INCOGNITA AS INFLUENCED BY
MICROORGANISMS ON STERILIZED AND
UNSTERILIZED SOIL

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Abstract : Role of Microorganisms in the decomposition of *neem* and groundnut cakes and their effect on nematode penetration, development and population build up of *Meloidogyne incognita* has been studied. Efficacy of the cakes was better in unsterilized soil than sterilized soil, in terms of plant response and low nematode population. Groundnut cakes was more effective in unsterilized soil than sterilized one.

Key words : *Meloidogyne incognita*, *Azadirachta indica*, *Arachis hypogea*, oil-cakes organic amendments.

Microbes have been reported to take part in the degradation of amendments. Further, the metabolites of microbes active during decomposition of organic matter have been proved to be toxic to nematodes (Mankau & Das, 1969; Tomerlin & Smart, 1967 and Walker *et al.*, 1966). In the present experiment, test was conducted to observe variations, if any, in the behaviour of oil-cakes in sterilized and unsterilized soil.

MATERIALS AND METHODS

Calculated amounts of finely powdered oil-cakes (4 per cent *neem* and 1 per cent groundnut w/w determined as optimum in a preliminary experiment) were added to 10 cm earthen pots containing 500 g autoclaved and unautoclaved sand soil (1 : 3) mixture separately. The pots were watered regularly so as to allow the cakes to decompose. At the end of three weeks, just before transplantation of tomato seedlings, another treatment with required amount of aldicarb 10 G (2 kg. a.i./ha) was mixed in both autoclaved and unautoclaved soils.

After the establishment of seedlings, 2 larvae/g soil were added in each treatment including control. Observations on plant growth characters including shoot length, shoot weight, root length, root weight, and root and soil populations of nematodes were taken 35 days after inoculations.

RESULTS AND DISCUSSION

In the present investigation when growth response of tomato was compared in sterilized and unsterilized soil under the influence of oil-cakes and aldicarb, unsterilized soil showed better response, particularly so in case of groundnut, where in some of the growth parameters it was either at par with aldicarb or superseded it. In sterilized soil, groundnut showed much poorer response than aldicarb (Table 1).

The overall better performance of plants in unsterilized soil over sterilized soil is attributed to loss of fertility value on autoclaving the soil. Remarkable increase of plant heights in *neem* and

TABLE 1. *Effect of groundnut, neem and aldicarb treatments in autoclaved vs. non-autoclaved soil and nematode inoculated vs. uninoculated soil, on growth of tomato and M. incognita population*

Treatment	Shoot				Root				Gall count		Nematode population			
	Length (cm)		Weight (g)		Length (cm)		Weight (g)		S	US	Root		Soil	
	S	US	S	US	S	US	S	US			S	US	S	US
G	22.28	24.40	7.56	9.68	9.80	11.40	1.36	2.46						
G+C ₂	17.90	22.20	6.24	8.24	9.40	11.20	2.22	2.54	236.0 (15.35)	189.00 (13.71)	621.00	499.61	3216.20 (54.87)	1820.40 (42.63)
N	27.20	28.50	10.50	10.56	12.40	10.20	3.22	3.24						
N+C ₁	24.00	25.92	9.10	9.10	13.20	12.40	3.34	3.14	198.0 (14.06)	173.4 (13.15)	424.60	351.20	2016.60 (44.90)	1362.80 (36.59)
A	24.40	24.10	8.78	7.76	12.60	14.00	1.86	2.06						
A+C ₂	21.80	22.60	7.52	7.64	13.20	14.14	2.50	2.10	172.8 (13.14)	177.8 (13.32)	364.0	290.0	1532.80 (39.09)	1381.80 (37.16)
C ₁	19.20	20.00	6.36	5.02	11.60	12.80	1.60	1.62						
C ₂	14.60	15.80	4.32	4.44	10.08	12.60	1.86	1.80	260.0 (16.07)	254.8 (15.95)	992.0	871.20	4325.46 (65.69)	3499.53 (58.90)
	S.Em.	CD 5%	S.Em.	CD 5%	S.Em.	CD 5%	S.Em.	CD 5%	S.Em.	CD 5%	S.Em.	CD 5%	S.Em.	CD 5%
Soils	0.28	0.78	0.16	0.44	0.18	0.51	0.06	0.17	0.19	0.55	9.49	27.49	0.80	2.30
Treatment	0.55	1.56	0.31	0.89	0.36	1.02	0.12	0.33	0.27	0.78	13.42	38.87	1.13	3.25
Soils × treatment	0.78	2.20	0.44	1.26	0.51	1.44	0.17	0.47	0.38	1.10	18.98	54.97	1.59	4.60

Each figure is an average of five replications.

Figures in parentheses are square root transformed data.

G = Groundnut; G+C₂ = Groundnut+nematode; N = *Neem*; N+C₂ = *Neem*+nematode; A = Aldicarb;
 A+C₂ = Aldicarb+nematode; C₁ = Non-amended uninoculated; C₂ = Non-amended inoculated; S = Sterilized;
 US = Unsterilized.

groundnut amended soils, especially in the latter, is attributed to faster and complete nitrification by microorganisms which are otherwise destroyed partially on autoclaving the soil.

With regard to nematode population also, groundnut and neem cakes performed much better in unsterilized soil. This can be explained on the basis of microbial decomposition as also proposed by Singh & Sitaramaiah (1973). Certain microorganisms including various rhizosphere microflora and fauna, bring about decomposition of oil-cakes during which certain products like ammonia (Khan *et al.*, 1974); fatty acids (Singh & Sitaramaiah, 1973); formaldehyde (Alam *et al.*, 1977; Singh & Sitaramaiah, 1978 a, b and (Alam *et al.*, 1980) are released. These may be either toxic to the nematodes or increase the resistance mechanism of host. During autoclaving of soil at high pressure and it is proposed that there is temperature destruction of some of the essential microbes which cause imbalance of entire process and result in slow or incomplete decomposition, thus releasing lesser amount of above mentioned toxic substances. This is also supported by Singh & Sitaramaiah (1973).

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