Alcohol Extract of Neem (*Azadirachta indica* L.) Seed as Nitrification Inhibitor

Alcohol extract of neem (*Azadirachta indica* L.) has been reported to possess nitrification regulatory property (Sinha 1964; Singh 1966). The effect of different concentrations of this material on the period of effectiveness has been investigated in incubation studies using ammonium sulphate and urea as nitrogen sources.

The defatted neem seed cake was extracted with 95 per cent ethanol, the solvent removed and the extractive (soluble in acetone), which is rich in lipid associates, was used in the present study. Five, 10, 20 and 30 per cent doses (NH_4-N basis) of the material were incubated with 200 g soil at room temperature (30 ± 2° C) and 1/3 water holding capacity in two replications. I.A.R.I. Farm soil, with the characteristics given in table 1 was used. Ammonium

TABLE 1

Characteristics of the soil used

Characteristic	Value
pH (1 : 2.5)	7.7
Total N (%)	0.07
Ammoniacal N (ppm)	4.4
Nitrite N (ppm)	Traces
Nitrate N (ppm)	9.0
Electrical conductivity [(1 : 2.5) m mhos/cm at 25°C]	0.90
W. H. C. (%)	38.4
Mechanical analysis (%)	
Sand	61.0
Silt	15.0
Clay	24.0
Textural class	Sandy clay loam
Cation exchange capacity (m. e./100 g soil)	11.6
Organic C (%)	0.60
Avail. N (kg/ha)	24.4
Avail. P_2O_5 (kg/ha)	62.3
Avail. K_2O (kg/ha)	353.0

TABLE 2

Effect of alcohol extract of neem (Azadirachta indica L.) *seed on the production of ammoniacal, nitrite and nitrate N* (ppm, oven dry basis) *in incubated soil, using ammonium sulphate as the source of N*

N dose : 200 ppm

Level of alcohol extract of neem (% NH_4-N)	Ammoniacal N (ppm) at days					Nitrite N (ppm) at days					Nitrate N (ppm) at days				
	15	30	45	60	75	15	30	45	60	75	15	30	45	60	75
0	94.0	60.2	33.4	21.8	10.3	0.80	0.50	0.25	Traces	—	18.1	46.6	91.0	130.8	155.0
5	100.3	70.4	47.5	24.0	11.4	1.10	1.20	0.75	0 55	—	21.4	40.3	88.7	124.3	158.2
10	109.3	90.9	50.7	24.8	17.7	1.25	0.85	1.00	0.60	—	20.0	37.4	84.3	120.0	120.1
20	115.5	100.7	68.8	26.3	18.4	2.00	1.65	0.90	0.45	—	16.7	27.6	60.7	116.0	144.7
30	125.5	116.6	74.1	30.7	21.0	2.20	1.70	0.90	0.60	—	12.0	20.0	44.1	70.9	110.3

(—) =Not detectable

TABLE 3

Effect of alcohol extract of neem (Azadirachta indica L.) *seed on the production of ammoniacal, nitrite and nitrate N* (ppm, oven dry basis) *in incubated soil using urea as the source of N*

N dose : 200 ppm

Level of alcohol extract of neem (% NH_4–N)	Ammoniacal N (ppm) at days					Nitrite N (ppm) at days					Nitrate N (ppm) at days				
	15	30	45	60	75	15	30	45	60	75	15	30	45	60	75
0	100.8	65.0	31.1	18.4	18.3	0.80	0.65	0.25	—	—	15.4	40.7	94.1	120.4	160.3
5	104.4	100.0	45.5	20.0	11.7	1.20	1.10	0.50	Traces	—	16.7	40.3	90.0	119.0	159.4
10	120.7	111.7	55.4	23.7	17.9	1.26	1.00	0.62	Traces	—	17.0	30.4	84.3	110.3	150.1
20	125.5	118.3	70.3	28.2	20.8	1.75	1.75	0.75	Traces	—	14.3	24.9	60.1	100.0	144.3
30	138.3	120.4	70.9	30.4	22.4	1.75	1.00	0.75	Traces	—	10.0	19.8	45.6	69.3	111.7

(—) = Not detectable

sulphate and urea were used as sources of nitrogen to supply 200 ppm NH_4-N Ten grams each of the representative soil samples were drawn at 15. 30, 45, 60 and 75 days interval, extracted with Morgan's reagent (Prasad 1968) and colorimetrically analysed for ammoniacal (Schuffelen *et al.* 1961) and nitrite and nitrate (Prince 1945) nitrogen.

It is seen from the results reported in table 2 and 3 that the alcohol extract of neem effectively conserves ammoniacal nitrogen. The effect is more pronounced at higher levels of the material. The amount of nitrate, however, increased with time, showing that the material was effectively inhibiting the nitrification process only upto a particular period which is governed by the concentration of the test material. Thirty per cent dose of the material was effective upto 75 days.

The results show that the lipid associates of neem check the conversion of ammonium to nitrite and the subsequent nitrate. A remunerative outlet for these 10-12 per cent of the biologically active components of the seed can be of help in strengthening the economy of neem seed.

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