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IMPACT OF COMBINING APPLICATION OF ORGANIC AND INORGANIC NITROGEN AMENDMENT ON SOIL MICROBIAL DIVERSITY, ENZYME AND BIOCHEMICAL REACTION

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ABSTRACT

Man has added organic and inorganic amendment to soil for coteries to improve the soil fertility and increase the crop yield pesticides are extremely used in agricultural as a port of post control strategies outing to theta xenobiotic characteristic pesticide may adversely affect the proliferation of beneficial soil micro-organism and their associated biotransformation in the soil. Inactivation of nitrogen fixing and phosphorus solublizing microorganism is observed in pesticide contaminated soils. Recent show that some pesticides disturbed molecular interaction between plant and nitrogen fixation similarly, many study show that pesticides reduce the activity of soil enzyme that are key indicator to soil health .The applied pesticides may also influence biochemical reaction such as mineralization of organic matter, nitrification, denitrification, ammonification, redox reaction methanogenesis etc, however a few reports, reveals some positive effect of applied pesticides on soil health in this study we attempt to analysis the impact of pesticides on soil microbial communities soil biochemical reaction and soil enzyme.

KEYWORDS: Proliferation , biotransfarmation, Cantamination , denitrification , melhanogenesis.

I. INTRODUCTION

Inorganic and organic fertilizer containing ammonical nitrogen or formulation releasing this form of N in the soil are more effective for suppressing the soil microbial population. In this study we are study about the application of organic manure either alone or combination with inorganic fertilizers improve the nutrient status, soil, enzyme and also growth of young plants.

In the addition to these combination treatment stimulated microbial activity resulting in marked increased not only increase activity but also in other soil enzymatic activity activated with microbial metabolism dissimilatory nitrate reductase in soil is the enzyme that catalyzes reduction of NO_3^{-3} to NO_2^{-2} N . Under anaerobic condition The detection of this enzyme in soil reported. Nitrate reductase catalysed the reduction of NO_3 to NO_2 under oxygen stress condition (Abdelmagid and Tabatabai, 1987). This enzyme is important in the process of dentrification leading to appreciable loss of fertilizer N under waterlogged soil especially in wetland paddy cultivation. The high N fertilization especially urea is associated with ecological problems such as NO_3 contamination of the ground water and N_2 emission to the atmosphere Jackson, M. L. (1973). Use of organic matter to improve the soil properties and its increases nitrate reductase activity in both flooded and non-flooding soil but the nitrification inhibitors *viz.* PMA, HQ and neem cake directly decrease NR activity (Reddy and Chhonkar, 1990) also. There is divergence of finding regarding the aerobic condition and neem oil effect. However, the urea coated with neem cake and neem oil based products on nitrate reductase activity in different types of soil in semiarid climale is little known. Thus the effect of neem product is defferent submerged and aerable soil condition of paddy and wheat grawn was studied.

II. MATERIAL AND METHODS

Inorganic fertilizer cantaining ammoniacial nitrogen ort formation releasing this form of N in the soil most effective for surpressing microbial population.

A pot culture experiments were studied to evaluate the effect of different neem products and their formation on change in nitrate reductase actoivity (NRA) in different submerged and aerobic soil under paddy wheat grown of oxygen unstresses and stresses condition of vertisols, inceptisols and alfisols. The inhibitors used were all the

product viz. (@20% w/w of urea, neem oil @1.0% w.v of urea) Nimco @2% w/w of urea) and Neemagold (@1.0 % w/w of urea) respectively to the applied urea. NRA signifivantly decreased in inhibitors coated treatment samples than the control, but the activity was high in submerged soil than aerobic and decreased in both condition from tillering to harvesting stage of crop. Neem oil coating of 1% applied urea to curtail the loss of N due to limits the NRA in all the soil at every among the neem products. NR activity was considerably low in Inceptisols than Vertisols and alfisols also. A pot experiment was conducte, during kharif and rabi season 2014-2015 using three soils, vertosols-Typic haplustert-clay loam, Inceptisols-Aridic haplusteps-sandy loam and Alfisols-Typic haplustalfs-sandy loam with paddy and wheat crop. Karanj oilseed cake 20% of urea, (Reddy and Prasad, 1975) neem oil (NO) @ 1% v.w of urea, Nimco (NI) @ 2% and Neemagold (NG) @ 1% w/w along with prilled urea alone were tested in a factorial randomized block design with 3 replication. The required quantity of urea prilled (PU) (120 mg urea/kg soil) as per treatment was added and thoroughly mixed. Phosphorus and Potassium were applied @ 80 mg kg^{-1} soil as single super phosphate and murate of potash, respectively.

Table 1 Physico-chemical properties of experimental soil

Properties	Typic haplusterts	Aredic haplustepts	Typic haplustalfs
pH (1:2.5)	7.92	7.80	7.51
EC (dSm^{-1})	0.30	0.32	0.32
Organic C (%)	0.72	0.49	0.54
CEC (cmol (+) kg^{-1}	38.52	21.25	28.70
Sand %	28.50	59.5	58.6
Silt %	26.50	20.8	17.5
Clay %	44.50	18.5	22.8
Texture	Silty clay loam	Sandy loam	Sandy loam
$Kmno_4$ extractable-N ($kgha^{-1}$)	279.5	228.5	222.5
Olson-P ($kgha^{-1}$)	17.5	19.7	11.5
NH_4OAc-K ($kgha^{-1}$)	205.8	275.0	230.2
Nitrate reductase activity(¶mol.NO_2 g^{-1} soil hr^{-1})	143.50	128.20	121.50

Nitrate reductase activity was analysed by the method of Roberge (1978) and described by Aslam (1981) which is to monitor the rate of formation of NO_2N in the reaction mixture incubated at 28+-0.5^{0}C using 0.1 M KNO^3 SOLUTION IN BLACK COLOURED GLASS VIAL 2 HR. The nitrite formed was estimated by the method described by Nicholas et al. (1976) by measuring absorbance of the pink colour of solution at 540 ¶m wavelenth using Spectrophotometer. Nitrate reductase activity was calculated as mol NO_2 –N g^{-1} hr^{-1} by calibration curve of standard series prepared with $NaNO_2$ standard solution. The experiment data was statistically analyzed under the Randomized Block Design of factorial experiment in order to judge the significance of treatment different at 5 % level of significance as descrived by Gomez and Gomez (1984).

III. OBSERVATION AND RESULT

Result from the chilin studies have demonstrated that it is passible to choose the composition of an amendment to be added to soil so as to stimulated the development of microflora parasitic or destructive to nematode conceivably organic amendment could be developed to select the micro-organism capable of decomposing the protein or other material. Anaerobic condition as a submerged leads to increase the concentration of nitrate reductase throughout the crops growth period of paddy (anaerobic)and wheat (aerobic) in all types of soil.

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Table 2- Effect of Karanj oil seed cake and other products on nitrate reductase activity of different Soil under the paddy and wheat grown soil

Soils ⇨ Neem Products ⇩	Wheat grown			Paddy grown		
	Vertisols	Inceptisols	Alfisols	Vrtisols	Inceptisols	Alisols
Tillering stage						
Control	352	418	352	452	436	460
NC	318	353	332	360	416	365
NO	298	304	310	339	339	330
Ni	338	348	340	342	352	345
NG	339	350	343	348	345	360
C.D. (p=0.05)	S-NS, P-13.96, SxP-40.31			S-6.45, P-6.89, SxP-8.34		
Booting stage						
Control	308	298	226	292	300	282
NC	234	285	208	248	288	268
NO	190	193	191	210	245	204
Ni	226	270	210	260	276	270
NG	211	243	224	280	284	275
C.D. (p=0.05)	S-7.83, P-17.51, SxP-22.61			S-NS, P-12.76, SxP-17.76		
Harvesting stage						
Control	104	108	101	185	198	193
NC	100	102	95	110	163	129
NO	92	98	90	107	153	110
Ni	102	101	92	159	178	111
NG	94	104	94	166	171	122
C.D. (p=0.05)	S-NS, P-3.74, SxP-4.83			S-3.18, P-7.11, SxP-9.18		

S=Soils, P= Products, SxP= Soil X products

The NRA in vertisols, inceptisols and asfisols was decreased under the treatment of neem products than the control (PU) treatments. It is face that moisture in excess of half of water holding capacity and very poor aeration leads to enhance nitrate reductase (Roberg, 1978). The reductase NRA by the application of neem oil in aerobic condition of wheat grown but in anaerobic condition of paddy grown was higher than the aerobic condition due to nitrate accumulation persist up to prolong duration (Gill et al. 1991). In submerged condition of paddy grown soil NRA was significantly decreased by the application of neem products coated urea but the urea prilled was coated with neem oil resulting the greater decreased in NRA in both aerobic and anaerobic condition of paddy and wheat than the other products might be persistent capacity of oil prolong the effectiveness to maximum decrease as well as control also. In both the situation on the NRA has left to decline from begning to harvesting stage of crops might be availability and moisture condition with time with crop paddy wheat can be attributed to reduction in nitrate and moisture condition and can be attributed to reduction in nitrate nitrogen concentration due to uptake by crop plant or transformation in the other forms .In respect to different soil coated urea @1.0% w/v neem oil represented the very low.

IV. CONCLUSION

It is evident from this study that the application of organic manure either alone or combination with inorganic fertilizers improve the nutrient status, soil enzyme and also growth of young plants. The Study showed that neem oil coating is beneficial than others formulation of neem and its restricts the NR activity and consequently ensure slow release of nitrogen (Hulagen and Shinde, 1984) will be promising for losses of N and Their pollution in submerged and wetting drying condition of cultivation as well as plant growth and development. Nitrate reductase enzyme is important to the process of dentrification, leading to appreciable losses of N fertilizer under wet waterlogged soil, especially paddy cultivation in wetland but in aerobic condition of wheat cultivation could be attention for losses of N In all cases, soil receving the combination treatment has much grater enzymatic activity than soil treated with urea alone the observed increase in number microorganism relative of soil trialed with urea only reflected the increase in microbial acclivity of soil trialed with combination treatment in both aerobic and anaerobic condition of pedal and wheat than the other product might

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