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Impact Of Urea Treated With Plant Residue On The Growth And Nitrogen Uptake Of Wheat (Triticum Asetivum)

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A pot experiment was conducted to investigate the impact of urea fertilizer treated with corn or conocarpus residues on the growth and nitrogen uptake of wheat plants. Three kilograms of dry sandy loam soil were placed in plastic pots, and four nitrogen levels (0, 60, 120, and 180 kg N ha -1) were applied in the form of urea. The urea was treated using one of the following methods: mixed with conocarpus leaf powder at a rate of 3% of the dry soil weight, mixed with conocarpus root powder at a rate of 3% of the dry soil weight dissolved in an aqueous extract of corn roots at a rate of 1/4 of the field capacity, or coated with dried aqueous extract of corn roots at a ratio of 9% of the urea weight. Additionally, urea treated with a standard chemical inhibitor (PMA) was included in the treatments. Measurements of shoot dry weight, nitrogen concentration, nitrogen uptake, and nitrogen recovery were taken. The results indicated that treating urea fertilizer with water extract or coating it with corn root extract led to enhanced growth parameters compared to the PMA and control treatments. However, treating urea with leaf or root powders resulted in a decrease in plant growth parameters. Urea coated with 9% dried corn root extract produced the highest dry matter of 2.98 g pot^{-1} and nitrogen uptake of 66.95 mg pot^{-1}, achieving a reduction of 50 kg N ha^{-1} while yielding similar results to the control and PMA treatments.

Key words : Wheat, Corn Buildup , Conocarpus Buildup, Dry Matter ,N-Uptake

INTRODUCTION:-

The generation of cereals in the world is around 2961 million tons in 2025 .The share of wheat generation is 800 million tons, this expended approximately 289.3 million tons of nitrogen fertilizer which with yearly increment of 1.5% . The urea is one of the most strong nitrogen fertilizers devoured around the world (more than 50% of add up to nitrogen fertilizers) due to its high N contant (46%),reasonable low manufacturing cost , easy storage and handling. In any case, the fast hydrolysis of-NH_2 containing urea by urease leads to a few issues counting misfortunes (volatilization, filtering and denitrification), harmfulness of seeds and seedling when included in tall measurements , as well as conceivable defilement of water, and soil.One of the imperative approaches to minimize N misfortunes from urea and diminish the poisonous quality and contamination consequently, rise urea fertilizer proficiency is utilizing compounds hinder urease action in soil and delay urea hydrolysis. Numbers of chemical and natural compounds are accessible as urease inhibitors.The harm caused by utilize of chemical inhibitors, as well as its tall taken a toll of fabricating in spite of of their tall proficiency at low concentrations, incited the interested to look for elective characteristic materials as urease inhibitors. The extraordinary challenge is to discover characteristic substances with great properties that are nontoxic ,viable at low concentrations ,chemically steady when blended with urea and urea arrangements, exceedingly debased in soil and with competitive costs . Numerous plant buildups have been tried as urease inhibitors in soil and have succeeded in

decreasing urea hydrolysis, diminishing nitrogen misfortune and progressing plant development . The inhibitory impact of plant buildups or plant extricates depends on the sum, quality of dynamic substances in the plant and extraction strategies.Watery extricates of Rhaza stricta ,Myrtus clears out, Eucalyptus clears out, date palm fiber and sunflower repressed urease when connected with urea and have been positive impact on the development and surrender of wheat, grass, radish and grain . Comes about of Singh & Singh (1989) and Kiran & Patra (2002) appeared that coating urea with neem oil ,mint oil, mint basic oil and mint terpenes come about in a critical increments of development, abdicate and N-uptake of wheat as compared with uncoated urea. The nearness of corn buildups in the field at the level of 6 tons ha^{-1} has progressed the development of wheat planted after maize, but expanding the level to 9 tons ha^{-1} decreased plant dry weight to almost 23%.In past think about, a research facility explore was carried out to consider the impact of urea treated with clears out or root of corn (Zea mays L.) or conocarpus (Conocarpus lancifolius Engl) at distinctive strategies on action of urease in calcareous soil . In display ponder the taking after medications of urea that caused the most noteworthy restraint of urease chemical in soil were chosen to ponder their impact on development of wheat:

1. Conocarpus leaves powder mixed with urea and add at level of 3% based on soil dry weight.
2. Conocarpus roots powder mixed with urea and add at level of 3% based on soil dry weight.
3. Urea dissolved in aqueous extract of corn roots and added at level of 1/4 of soil field capacity
4. urea coated with dried aqueous extract of corn roots at ratio of 9% of urea weight and mix with soil .

Materials & Methods :-

Corn roots were collected in September and conocarpus residue (leaves and roots) were collected in May, cleaned, air-dried ,pounded, sieved at that point treated urea at the taking after methods:

1-Concarpus takes off powder was blending with soil at rate of 3% based on soil dry weight, at that point urea included to the blend at rate of 450 mg N. kg^{-1} soil.

2-Concarpus roots powder was blending with soil at rate of 3% based on soil dry weight, at that point urea included to the blend at rate of 450 mg N. kg^{-1} soil.

3-Aqueous extraction of corn root buildups was arranged by blending the buildups with refined water at proportion of 1:8 (buildup :water), shaking for 5 hrs. at 140 rpm at that point sifted. Urea at rate of 450 mg N. kg^{-1} soil was broken down in the arranged extricate and included to soil identical to ¼ of field capacity.

4-The extricate arranged in strategy (3) was dried at 40 C . Urea at rate of 450 mg N kg^{-1} soil was treated with castor oil at rate of 1% overnight at that point coated physically by the dried extricate at proportion of 10% of urea .The soil utilized in this ponder was collected from district Sriganganagar , State Rajasthan at a depth of 0-30 cm.

Soil properties decided concurring to strategies portrayed by Black (1965) and Page et *al*. (1982) and presented in table (1). Three kilograms of air-dried soil was put in plastic pot and treated with four levels of urea (0, 60, 120 and 180 kg ha^{-1}) with said strategies or coated with phenyl mercuric acetic acid derivation (PMA) at proportion of 10% of Urea or untreated (control) .Pots were set in green house and wheat seeds were appeared in November 16, 2024. All the pots gotten 120 kg ha^{-1} of P_2O_5 and K_2O as triple super phosphate and potassium sulfate, individually. All fertilizers were connected by blending at the time of sowing.Soil moisture was maintained at field capacity by periodic weight and compensated by the addition of water all over the experiment period. The factual plan taken after a totally randomize plan (CRD) with three imitates. After 60 days of sowing the plant were gathered from soil surface and dry weight was measured. Nitrogen in plant shoot was decided by absorption with salicylic acid-H_2SO_4 blend that portrayed by Nelson & Sommers (1973), at that point the process was analyzed by the Kjeldahl refining strategy (Bremner, 1982). Take-up and recuperation of N were calculated as the following

Table (1): General characteristics of soil used

SOIL	
CHEMICAL PROPERTIES	
pH	**8.01**
EC (dS/m)	**2.12**
Na^+ (me/l)	**10.38**
K^+ (me/l)	**0.37**
Ca2+ (me/l)	**6.66**
Mg2+ (me/l)	**3.73**
HCO3 - (me/l)	**2.77**
Cl- (me/l)	**15.64**
SO4 = (me/l)	**2.73**
CaCO3 %	**22.77**
Physical properties	
Clay (%)	**5.20**
Silt (%)	**30.70**
Sand (%)	64.10
Soil texture	**Sandy loam**

N−uptake = dry weight x N concentration in shoot
N−recovery %= N uptake from treatment –N uptake from control/Amount of N applied x 100
The soil and plant data were statistically analyzed using appropriate statistical procedures. Mean separations were done by CV, SE and LSD by using Statistics version of "**MSTATC**" computer software package. The Revised least significant difference were calculated at 5% level for significant "F" test .

Results & Discussion: -

Shoot dry weight :-

The comes about of table (2) appeared a noteworthy increments in dry matter of wheat plant when urea treated with corn buildups (Fluid extricate of corn root and coated urea) as compared with the untreated urea, with an increment per cents of 40 and 45% individually, with no noteworthy contrast between them. These increments in dry matter credited to decrease urea hydrolysis and diminish the smelling salts volatilization of fertilizer, which expanded the sum of accessible nitrogen in soil and influence the dry weight of the plant emphatically. Nitrogen plays an vital part in the arrangement of chlorophyll, proteins and proteins, and invigorates the generation of oxine, which advances cell division and multiplication, in this manner expanding plant biomass and switching the dry weight of the vegetative portion (Barker & Bryson, 2007).On the other hand , there are no noteworthy contrasts at urea treated with conocarpus takes off or root as compared with untreated urea (table 2). In spite of the fact that, these two medications caused

higher hindrance of urease and minimizing NH_3 volatilization, the negative impact on plant development may ascribed to coordinate impacts of allelopathic substances, particularly phenols inferred from the deterioration of the powder and /or to roundabout impacts coming about from a deformity in ripeness of soil. Rice (1984) credited the negative impact of plant extricates to the part of allelopathic compounds, particularly phenols, in restraining the development of porphyrin, compound mindful for the arrangement of chlorophyll, moreover famous that plant-derived chemicals increment water push and diminish water retention by plant , as well as the hindrance of the ATPase co-enzyme

Table(2):-Effect of the methods of urea treatment on shoot dry weight of wheat plant(g pot^{-1}).

Treatment	Urea Level Kg N Ha^{-1}				
	0	60	120	180	Mean
Conocarpus leaves Powder	0.55	1.66	2.04	2.12	1.59
Conocarpus root powder	0.55	1.80	2.80	2.51	1.91
Aqueous extract of corn root	0.76	2.40	3.49	4.62	2.81
Coated Urea	0.35	2.35	3.56	5.14	2.85
PMA	0.95	1.80	2.90	0.33	1.49
Control	0.60	1.96	2.32	3.10	1.99
Mean	0.62	1.99	2.85	2.97	

which capable for expanding the K^+ / Na^+ proportion in the plant tissue by controlling the porousness of these particles through plasmalema. All the urea medications expanded plant dry matter in comparison to PAM treatment (table 2), with more articulated at medications of fluid extricate and coated urea. Moreover , untreated urea had higher dry matter as compared with PMA treatment. An increment of dry matter weight of maize, sorghum and grain when urea treating with water extricates or coating with auxiliary metabolites of a few plants compared to chemical inhibitors such as HQ and ATS. This is due to the negative impact of PMA on plant development, which is most articulated at the tall nitrogen level (table 2).That implies the expanding of PMA as a result of expanding the level of urea will expanded its negative impact on plant. The chemical inhibitors (ATS and NBPT) repress protein action as it were when included at tall levels, coming about in a negative impact on plant development. When PMA included to the takes off of plant, it is considered to be an inhibitory specialist for transpiration since it modifies the porousness of the protect cells and their capacities. It is moreover utilized as an inhibitor for microbes and organism. In our think about, expanding the expansion of PMA at tall levels of urea related with expanding the sums of mercury and phenol and may lead to a coordinate inhibitory impact on wheat plant the comes about of table (2) shown that there was an increment in the dry matter of wheat plant with expanding the level of nitrogen the dry matter were 0.62, 1.99, 2.85 and 2.97 g pot^{-1}, for levels of 0, 60, 120 and 180 kg N ha^{-1}, separately. The contrasts were critical between the three levels of urea and the control, as well as between the levels of 60 and 120 kg N ha $^{-1}$. In spite of the fact that there is no critical impact of the interaction of treatment and N levels (table 2); it is taken note that treating urea with root or clears out of conocarpus gave the least dry matter at all levels of nitrogen, which affirms the negative part of the tall expansion of these powders. The comes about of the interaction moreover appeared an increment in dry matter by expanding the level of nitrogen up to 120 kg N ha^{-1} at the treatment of PMA, whereas the dry matter diminished essentially to 0.33 g pot^{-1} at level of 180 kg N ha $^{-1}$.

Nitrogen concentration in shoot of wheat plant :-

Table (3) appears that higher N concentrations were gotten in plant gotten urea treated with watery extricate or coated with dry fluid extricate as compared with plant gotten untreated urea, with noteworthy increment at coated urea. This is may be due to diminished alkali volatilization and adequate nitrogen take-up by the plant. The treated urea with a few plant extricates essentially decrease smelling salts volatilization .In any case, other medications gave lower N concentration as compared with untreated urea. But that of conocarpus root powder treatment, all urea medicines gave higher N concentration in plant as compared with PMA treatment (table 3). Coating urea with dried fluid extricate had a noteworthy increment with a percent of 15% as compared with PMA treatment having a same drift of dry matter (table 2). The conocarpus root powder treatment, all urea medications gave higher N concentration in plant as compared with PMA treatment (table 3). Coating urea with dried fluid extricate had a critical increment with a percent of 15% as compared with PMA treatment having a same drift of dry matter (table 2). The table (3) shown a noteworthy increment in concentration of nitrogen in clears out with an expanding rate of nitrogen. The contrasts were critical among all nitrogen rates, but for the difference between the levels of 120 and 180 kg N ha^{-1}. The nitrogen concentrations were 9.29, 17.18, 19.21 and 20.42 g. kg-1 dry matter for levels 0, 60, 120 and 180 kg N. ha^{-1}, respectively.

Table (3): Effect of the methods of urea treatment on nitrogen concentration in shoot of wheat plant (g kg^{-1} dry matter).

Treatment	Urea Level Kg N Ha^{-1}				
	0	60	120	180	Mean
Conocarpus leaves Powder	8.47	16.88	18.47	20.03	15.96
Conocarpus root powder	5.86	16.12	19	18.43	14.85
Aqueous extract of corn root	9.87	16.21	20	21.93	17.00
Coated Urea	9.01	23.87	20.3	22.66	18.96
PMA	11.62	16.33	17.93	17.9	15.94
Control	10.92	13.7	19.60	21.6	16.45
Mean	9.29	17.18	19.21	20.42	

Nitrogen uptake by wheat plant :-

Table (4) uncovered that nitrogen substance of plants fertilized with urea treated with the dried watery extricate of corn roots or urea treated with watery extricate of corn roots were higher than plant with untreated urea, with an increment rates of 75 and 61 %, individually. In any case, treated urea with shoot or root powder of conocarpus did not grant a noteworthy contrasts as compared with untreated urea. Comes about of Singh & Shivay (2003) appeared a critical impact of neem cake coated urea on N-uptake by rice and wheat. All urea medications, as well as untreated urea expanded the N take-up by wheat over the PMA medicines, with critical contrasts at treatment of fluid extricate and coating urea (table 4). Information displayed in table (4) uncovered that the increment in nitrogen rate driven to an increment in the sum of nitrogen take-up with values of 6.85, 36.49, 60.25 and 68.36 mg.pot^{-1} for levels of 0, 60, 120 and 180 kg N. ha^{-1}, respectively.The comes about of table (4) appeared that the expansion of urea treated with fluid extricate or coating at a level of 120 kg N. ha^{-1} come about in a higher N-uptake than that of untreated urea and urea treated with PMA at the level of 180 kg N. ha^{-1} which clearly appears the plausibility of decrease of 60 kg N. ha^{-1}. These comes about affirm the conceivable utilize of corn buildups as an elective to

PMA.Comparative comes about were gotten by Vyas et al. (1991) when he pointed out that coating urea with the extricate of the neem decreased the sum of nitrogen utilized from 100 kg N. ha $^{-1}$ to 70 kg N. ha^{-1} to grant the same as the abdicate of the rice plant

Table (4): Effect of the methods of urea treatment on nitrogen uptake by wheat plant (mg pot^{-1}).

Treatment	Urea Level Kg N Ha^{-1}				
	0	60	120	180	Mean
Conocarpus leaves Powder	5.25	23.27	40.80	47.23	29.13
Conocarpus root powder	3.46	31.34	58.08	51.16	36.01
Aqueous extract of corn root	9.39	44.43	87.32	110.55	62.92
Coated Urea	3.77	60.69	78.24	120.09	65.69
PMA	11.87	30.88	62.77	8.34	28.46
Control	7.39	28.38	34.34	72.80	35.72
Mean	6.85	36.49	60.25	68.36	

Nitrogen recovery of wheat plant :-

Table (5) explained that N recovery by wheat with urea treated with aqueous extract and urea coated with dried aqueous extract markedly increased compared to untreated urea. However, lower increases were recorded in urea treated with shoot and root powder of conocarpus. Comparable comes about have been detailed by Blaise & Prasad (1996) who credited this increment to the hindrance of urease movement and the accessibility of adequate nitrogen in the soil reflected on the ingested amount as well as the change development of the plant. As compared with PMA treatment , all medicines expanded the N recuperation by 28, 63,136, 201 and 24% for medications of shoot powder, root powder, fluid extricate, coated urea and uncoated urea, separately (table 5).Results appeared that N recuperation by wheat diminished by expanding urea level (table 5). At all urea levels, most elevated N recuperation were gotten at treatment of coated urea with dried watery extricate taken after by treatment of urea treated with watery extricate.

Table (5): Effect of the methods of urea treatment on nitrogen recovery of wheat plant (%).

Treatment	Urea level (kg N ha^{-1})			
	60	120	180	Mean
Conocarpus leaves Powder	28.43	18.90	14.10	20.47
Conocarpus root powder	31.44	29.99	16.75	26.06
Aqueous extract of corn root	39.95	36.78	36.56	37.76
Coated Urea	62.32	40.50	41.81	48.21
PMA	20.33	27.36	0.32	16.00
Control	22.44	14.09	23.01	19.84
Mean	34.15	27.93	22.09	

Conclusion -

It can be inferred from this analysis that coating urea with corn root extract or combining liquid corn root extract with urea enhances the growth and nitrogen uptake of wheat plants when compared to untreated urea or urea treated with PMA. This clearly illustrates the success of using corn residues as a viable alternative to chemical inhibitors, while also achieving a reduction of 60 kg N ha^{-1}, which presents economic benefits and mitigates environmental risks.

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