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Effect of N, P and Biofertilizers on Yield Quality and Nutrients Uptake in Wheat

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A field experiment was carried out at Agronomy Farm, Gujarat Agricultural University, Junagadh during the *rabi* season of 1991-92. The soil was clayey in texture, low in available N (229 kg/ha), low in available P (20 kg/ha) and medium in available K (208 kg/ha) and slightly alkaline in reaction (7.8 pH) with normal E.C. (0.39 dS/m). The treatments comprising three levels each of nitrogen (60, 90 and 120 kg/ha), phosphorus (30, 45 and 60 kg P_2O_5/ha) and biofertilizer (uninoculated, *Azotobacter chroococcum* and *Pseudomonas striata* inoculation). The experiment was laid out in randomised block design with four replications. Half dose of N and full dose of P as per treatments were applied in form of urea and single super phosphate, respectively at the time of sowing and remaining half dose of N was top-dressed in form of urea at 25 days after sowing. The crop was sown on November 26, 1991 with inter-row spacing of 22.5 cm apart using wheat cv. GW-496 and harvested on March 11, 1992.

The uptake of N and P by wheat crop was significantly increased with successive increase in the levels of nitrogen from 60 to 120 kg/ha, whereas the uptake of K increased significantly only upto 90 kg N/ha. The results are in accordance with that of Maurya and Verma (1991). Appreciable increase in protein content in grain was noticed with increase in subsequent levels of nitrogen. Nitrogen is an important constituent of protein, which markedly influence protein synthesis. The results are in confirmity with the study conducted by Singh *et al.*, (1992). Crop fertilized with 90 and 120 kg N/ha did not differ materially in respect of grain and straw yields of wheat but found significantly superior to 60 kg N/ha. The findings are in agreement with those of Singh *et al.*, (1992). Maximum net realization of Rs 10540/ha was recorded under 120 kg N/ha closely followed by 90 kg N/ha.

Crop fertilized with higher doses of P_2O_5 (45 and 60 kg/ha) significantly increased N, P and K uptake by wheat crop. This might be due to higher amount of phosphorus application resulted in mobilization of native phosphorus to the extent that plant utilized more phosphorus from the native source. Application of phosphorus @ 60 kg/ha increased protein content of grain as compared to that of 30 and 45 kg P_2O_5/ha. More protein synthesis in presence of P and

TABLE 1

Effect of different treatments on yield, quality, nutrient uptake and net realization of wheat.

Treatments	Yield (q/ha)		Nutrient uptake (kg/ha)			Protein content (%)	Net realization (Rs/ha)
	Grain	Straw	N	P_2O_5	K_2O		
Nitrogen (kg/ha)							
60	33.43	40.41	89.73	9.44	71.63	13.44	8847
90	37.12	44.59	103.02	10.61	80.96	13.87	10207
120	38.38	46.59	116.49	11.41	85.39	14.63	10540
C. D. at 5%	2.47	3.23	7.16	0.78	6.05	0.20	—
Phosphorus (kg/ha)							
30	33.99	39.96	91.27	9.34	72.30	13.55	9203
45	36.90	44.81	104.61	10.95	80.57	14.00	10338
60	38.03	46.75	113.35	11.17	85.12	14.39	10690
C. D. at 5%	2.47	3.23	7.16	0.78	6.05	0.20	—
Biofertilizers							
Uninoculated	34.34	41.16	92.75	9.24	73.54	13.69	9671
A. chroococcum	37.59	45.59	111.69	10.78	82.14	14.33	10950
P. striata	36.99	44.78	104.78	11.44	82.32	13.92	10690
C. D. at 5%	2.47	3.23	7.16	0.78	6.05	0.20	—

formation of some stable phospho-protein compounds is responsible for higher protein content with P application. Grain and straw yields recorded with application of 45 and 60 kg P_2O_5/ha were found statistically at par but significantly superior over 30 kg P_2O_5/ha. The findings corroborate the reports of Shrinivas and Singh (1991). Application of 60 kg P_2O_5/ha recorded maximum net realization of Rs. 10690/ha closely followed by 45 kg P_2O_5/ha (Rs 10338/ha).

Seeds inoculated with *A. chroococcum* exhibited their superiority in the uptake of N and protein content in seeds over *P. striata* and uninoculated treatment but in case of P and K uptake, inoculation with *P. striata* was proved superior over *A. chroococcum* and uninoculation. Inoculation of whaet seed with bio-fertilizers substantially increased grain and straw yields of wheat. This lends support to the findings of Gaur (1990). Seed inoculated with *A. chroococcum* recorded the maximum net realization of Rs 10950/ha closely followed by *P. striata* (Rs 10690/ha).

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