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EFFECT OF NITROGEN AND PHOSPHORUS FERTILIZERS ON THE YIELD OF TORIA (*BRASSICA COMPESTRIS*) SEED AND THE *QUALITY OF TORIA SEED CAKE*

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In this experiment, 60 and 100 lbs of nitrogen in combination with 40, 60 and 80 lbs of phosphorus (P_2O_5) per acre were applied and the highest seed yield 13.95 mds per acre was obtained where 100 lbs N + 60 lbs P_2O_5 were applied, 4.56 mds per acre more than that of control. The highest percentage of oil 47.32 in the toria seed was recorded in the treatment of 100 lbs N + 80 lbs P_2O_5.

In toria seed cake highest protein contents (35.10%) were observed with 100 lbs N + 40 lbs P_2O_5 per acre, application of higher doses of phosphorus fertilizer with the same levels of nitrogen fertilizer slightly reduced the protein percentage, but phosphorus contents increased significantly, when phosphorus was applied with higher nitrogen levels. The crude fibre contents were, however, unaffected with the application of various treatments.

INTRODUCTION

Pakistan falls deficient in the production of oilseeds. A considerable amount of foreign exchange is being spent on the import every year to meet the ever increasing demands of vegetable oil. To meet the requirements of oils and fats in the country, production of good quality oilseeds needs to be increased. The proper use of fertilizers and improved varieties can help a great deal in solving the problem.

The yield of Raya-16 was increased with the application of 30 lbs of nitrogen as ammonium sulphate and ammonium phosphate (Faqar 1955). Sharif *et al.* (1970) confirmed the findings and further observed that ammonium nitrate phosphate was better source of nitrogen than ammonium sulphate. Chaudhry and Qureshi (1970) reported that nitrogen and phosphorus application gave higher yield of rape seed than nitrogen and potassium

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where as nitrogen, phosphorus and potassium yielded higher oil contents as compared to other two combinations. Ali (1970) observed increased protein contents of sunflower seed where nitrogen level with phosphorus or potassium was increased and the phosphorus increased significantly when it was applied only with nitrogen.

The present studies were undertaken to find out the optimum doses of nitrogen and phosphorus fertilizers for getting maximum seed yield with good quality of oil seed cake of newly evolved polycross variety of toria (*Brassica campestris*).

MATERIALS AND METHODS

These studies were conducted at the experimental area of the Soil Science Department, University of Agriculture. The experiment was laid out in randomized complete block design with three replications and following treatments :

1. Control (0 lb N + 0 lb P_2O_5)/acre
2. 60 lbs N + 40 lbs P_2O_5/acre
3. 60 lbs N + 60 lbs ,,
4. 60 lbs N + 80 lbs ,,
5. 100 lbs N + 40 lbs ,,
6. 100 lbs N + 60 lbs ,,
7. 100 lbs N + 80 lbs ,,

Urea and triple super phosphate were used as the sources of nitrogen and phosphorus respectively.

The crop was sown in rows 2 feet apart, with 6 inches distance from plant to plant. All the phosphorus and half of the nitrogen fertilizer as per treatment were mixed in the soil before sowing the crop. The remaining half of nitrogen carrier was applied at the preflowering stage. At maturity the crop was harvested and threshed separately for each plot. Observations were recorded for the yield and oil percentage of toria seed, and the protein, phosphorus and crude fibre contents of the cake. The data, thus obtained, were analysed statistically to note the differences due to various treatments.

Oil contents : Determined by Soxhlet fat extraction method (AOCS 1950).

Protein : Nitrogen by Ginning and Hibbard's Kjedahl method and was converted to protein by multiplying with 6.25. (Jackson, 1960.) Crude fibre was estimated by AOCS methods (1950).

RESULTS AND DISCUSSION

Effect of Nitrogen and Phosphorus Fertilizers on the Yield and Oil contents of Toria Seed.

The results for seed yield and oil contents as affected by various treatments are presented in Table 1. A study of the table revealed that higher doses of nitrogen and phosphorus fertilizers proved effective means of increasing the yield and oil contents of toria seed. The maximum seed yield 13.95 mds per acre was recorded with 100 lbs N+60 lbs P_2O_5 per acre treatment. The increase in yield was 4.56 mds per acre more than control. From the study of the table, it is apparent that with the lower nitrogen level (60 lbs), different doses of phosphorus had a non-significant effect on seed yield. Similar results have been reported by Sharif *et. al.* (1970).

Table 1 : *Comparison of yield & Oil means.*

Sr. No.	Treatment	Treatment means	
		Yield	Oil
		Mds/acre	%
1.	Control (0 lb N + lb P_2O_5)	9.39d*	46.91c
2.	60 lbs N + 40 lbs P_2O_5	10.54c	47.09d
3.	60 ,, + 60 ,,	10.85c	47.16cd
4.	60 ,, + 80 ,,	10.93c	47.19bc
5.	100 ,, + 40 ,,	12.02b	47.21bc
6.	100 ,, + 60 ,,	13.95a	47.24ab
7.	100 ,, + 80 ,,	12.69b	47.32a

**Treatments followed by the same letters are statistically non-significant to each other at 5% probability level.*

This table further indicates that oil contents in toria seed increased gradually by increasing the levles of nitrogen and phosphorus fertilization. Application of 100 lbs N + 80 lbs P_2O_5 per acre gave the highest oil contents (47.32%). The results are, however, contrary to the findings of Faqar (1955)

who stated that application of nitrogen and phosphorus fertilizers did not affect the oil contents of seeds. The oil contents were increased when potassium was applied alongwith nitrogen and phosphorus (Chaudhry & Qureshi 1970). The higher percentage of oil in these studies might be due to the sufficient amounts of potassium already present in the soil.

Effect of Nitrogen and Phosphorus Fertilizers on the Protein, Phosphorus and Crude Fibre Contents of Toria Cake.

The results presented in Table 2 indicate that there were significant differences due to the fertilizer treatments in protein and phosphorus contents of toria cake. Application of 100 lbs nitrogen with different levels of phosphorus gave significantly higher protein contents than those of 60 lbs nitrogen with phosphorus levels and the control. Application of 100 lbs N + 40 lbs P_2O_5 per acre resulted in the highest protein contents (35.10 per cent) in the toria cake, however, the means did not differ significantly from each other at this nitrogen level even with further increases in the phosphorus levels.

Table : 2 *Comparison of means*

Sr. No.	Treatment	Treatment means (per cent)		
		Protein	phosphorus	Crude fibrs
1.	Control (0 lb N+O lb P_2O_5)	32.98c*	0.281d	16.46
2.	60 lbsN+ 40 lbs P_2O_5/acre	33.94b	0.304c	16.51
3.	60 ,, + 60 ,,	33.62b	0.318bc	16.50
4.	60 ,, + 80 ,,	33.43b	0.333ab	16.47
5.	100 ,, + 40 ,,	35.10a	0.319bc	16.52
6.	100 ,, + 60 ,,	34.84a	0.338ab	16.50
7.	100 ,, + 80 ,,	34.58a	0.347a	16.49

**Treatment means followed by the same letters are statistically non-significant to each other at 5% probability level.*

Nitrogen and phosphorus fertilizers affected favourably the concentration of phosphorus in toria cake. Application of 100 lbs N + 80 lbs P_2O_5 per acre resulted in the higher phosphorus contents than the other treatments. From the table it is evident that where phosphorus was applied with higher nitrogen levels, phosphorus contents in toria cake increased significantly

over control. Similar results have been reported by Ali (1970) in case of sunflower meal.

Crude Fibre contents in toria cake for each treatment is also shown in table 2. There were non-significant differences in the mean values of fertilizer treatments for this character.

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