CHAPTER VI

SUMMARY AND CONCLUSION
CHAPTER VI

SUMMARY AND CONCLUSION

1. The experimental work entitled "Effect of Nitrogen and Sulphur on Growth, Flowering, Fruiting and Metabolic Drift in Indian Mustard (Brassica juncea Linn.) cultivar Varuna" was conducted during rabi season 2003-2004 and 2004-2005 respectively.

2. The field experiment was conducted at Agricultural Research Farm, S.D.J. Post Graduate College, Chandeshwar, Azamgarh (U.P).


4. The present research work was conducted at in the year 2003-2004 and 2004-2005 respectively.

5. The initial fertility status and the texture of the soil of the experimental plot was determined prior to the layout and sowing in both the cropping season 2003-2004 and 2004-2005 respectively.
6. Before sowing, a light irrigation was given to the experimental field. After a week, the field was prepared by ploughing with soil turning plough followed by plankling under optimum soil moisture conditions.

The field was finally prepared by cross operations of country plough followed by plankling. The operations of field were similar in both the years 2003-2004 and 2004-2005 respectively.

7. The treatment combination of nitrogen (N), sulphur (S) and their interactions were: \( N_0, N_{80}, N_{100} ; S_0, S_{20}, S_{40} ; \) and \( N_0S_0, N_{80}S_{20}, N_{80}S_{40}, N_{100}S_{20} \) and \( N_{100}S_{40} \).

8. The Indian mustard (\textit{Brassica juncea} Linn.) cultivar Varuna was used in this experiment.

9. All plots received a uniform basal dressing of 60 kg/ha each of \( P_2O_5 \) (through super phosphate) and \( K_2O \) (through muriate of potash).

10. Nitrogen and sulphur were given as Urea and elemental sulphur.

11. The seeds of mustard cultivar Varuna was sown in furrow opened by Kudali maintaining a distance of 40 cm. The sowing was done on November 18, 2003 and November 20, 2004 having the seed rate 6 kg/ha of varuna treated prior with Bavistin @ 2 g/kg seed to protect the crop from seed borne and soil borne diseases.
12. During the crop season, four irrigations were done at 25, 40, 55 and 70 days after sowing respectively.

13. The extra plants of mustard cultivar Varuna was removed wherever needed at 15-20 days after sowing in order to keep almost uniform spacing between plants. One handweeding with Khurapi was done one week after first irrigation in both the years.

14. Before harvesting the crop, the height of plant, number of green leaves/plant at different stages of growth (30, 60, 90 DAS), length, width and area of leaf, weight of leaf at 45 DAS, days to flower-bud initiation, height of plant, green leaves/plant, fresh weight of green leaves/plant, fresh weight of stem/plant, fresh weight of shoot and root/plant at flower-bud initiation, were observed.

15. At the time of flower-bud initiation, the % total nitrogen, % total proteins, % reducing sugars and total free amino acids were estimated in leaf and shoot apex respectively.

16. To determine total-N, the material was digested by the Micro-method of Doneen (1932). For colour development, Nessier's reagent as modified by Jackson (1949) was used. The colour intensity was observed in Klett Summerson's Photoelectric Colorimeter using filter No. 42.
17. For protein estimation, the samples were treated with 10% TCA. The dried precipitates were used for determining the organic-N. The same procedure, as described for the estimation of total nitrogen was then followed for determining organic-N. The amount of organic-N was multiplied by the factor 6.25 for calculating protein content.

18. The reducing sugars were estimated by the Colorimetric Method of Fairbridge et al., (1951) by using filter No. 66.

19. The free amino acids were determined by the Colorimetric Method of Wiggins and Williams (1955). The absorbance of the solution was measured with Absorptiometer using filter No. 58.

20. Also, days to 50% flowering, days to 95% maturity, primary branches, secondary and other branches as well as total branches per plant were also observed.

21. At harvest, length of siliqua, number of siliquae/plant, number of seeds/siliqua, number of seeds/plant, seed yield/plant, biological yield/plant, harvest index, 1000-grain weight (Test Weight) and seed yield q/ha were also studied.

22. The oil content (%) in seed was determined by Soxhlet's Extraction Method using petroleum ether as solvent.

23. The data on growth, flowering, fruiting and yield were statistically analysed wherever needed. The mean value and C.D.
were also calculated according to need.

24. The height of plant, number of green leaves/plant at different stages of growth, length and width of leaf, area of leaf, fresh weight of leaf, stem, shoot and root, were found to increase over control with N, S, and N x S application.

25. In case of flower-bud initiation, it was slightly delayed with application of N, S and N x S respectively.

26. At the time of flower-bud initiation, the amount of % total nitrogen, % total proteins, % reducing sugars and total free amino acids in leaf and shoot apex were found to increase over control with the application of N, S, and N x S.

27. The flowering and maturity of mustard crop was slightly delayed with the application of N, S, and N x S.

28. At harvest, length of siliqua, siliquae/plant, seeds/siliqua, seeds/plant, seed yield/plant, biological yield, harvest index, 1000-grain weight and seed yield q/ha were also found to increase over control with the application of N, S, and N x S.

29. With the application of N, S and N x S, the oil content (%) was found to increase over control but was not significant. The total oil production was found to increase significantly due to an increase in the production of seeds/plant as well as per hectare respectively.
The application of different doses of nitrogen (N$_{80}$, N$_{100}$), sulphur (S$_{20}$, S$_{40}$) and nitrogen + sulphur (N$_{80}$S$_{20}$, N$_{80}$S$_{40}$, N$_{100}$S$_{20}$ and N$_{100}$S$_{40}$) is beneficial in respect of increasing growth, flowering, fruiting and yield of crop by increasing the metabolites i.e. total nitrogen, protein, reducing sugars and free amino acids in leaves and shoot apices. The oil production/hectare is also increased over control.

In all these treatments, N$_{80}$S$_{20}$, N$_{80}$S$_{40}$, N$_{100}$S$_{20}$ and N$_{100}$S$_{40}$ were found more effective in this respect. The treatments N$_{100}$S$_{40}$ (100 kg N/ha + 40 kg S/ha) was better than all other treatments. Therefore, it is suggested that for obtaining better growth, fruiting, seed yield and oil production per plant and per hectare use of N$_{100}$S$_{40}$ is better than all other treatments.

*  *  *

*  *  *