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## SUMMARY

### Microbiological and chemical studies on rhizosphere of sugar beet plants.

#### Experiment I

This experiment was to study the total counts of bacteria, fungi and actinomycets in the rhizosphere and soil apart of sugar beet plants

#### Experiment II

Two experiments were carried out to study the effect of *Azospirillum brasilense*, *Azotobacter chroococcum* and *Bacillus megatherium* under different doses of nitrogen fertilizer on fresh and dry weight, photosynthetic pigments, nitrogen, phosphorus and potassium in roots, leaves and soils, sucrose %, purity % T.S.S., root yield and sugar yield. The major results of this investigation are summarized as follows:

1- The counts of bacteria in rhizosphere of sugar beet plant (R) and soil apart (S) the results after 75 days were higher in (R/S) with Negma, Pamella, Farida, Delmon and Gala varieteies then, after 150 and 210 days, Negma variety was the highest value of bacterial counts.

2- The counts of fungi in rhizosphere of sugar beet plant (R) and soil apart (S) the results was that count of fungi of sugar beet variety, pamella had the highest count of fungi in rhizosphere where Negma variety was lowest count of fungi after 75, 150 and 210 days from plantation.

3- The counts of actinomycets in rhizosphere of sugar beet varieties and soil apart were; Negma variety had the lowest count of actinomycets while the highest count was in

Gala variety after 75 days. Pamella variety had the highest count of actinomycets.

4-Inoculation sugar beet plant with biofertilizer increased the fresh weight of sugar beet leaves and roots in two seasons. The highest increase was recorded with biofertilizer and recommended dose of nitrogen fertilizer.

5- Data cleared that biofertilizer and mineral nitrogen had significant effect on dry weight of leaves and roots of sugar beet plants. the highest increase was recorded at 150 and 210 days after planting in two seasons.

6-The highest value of chlorophyll a was obtained when sugar beet was inoculated by biofertilizer in addition to  $\frac{1}{2}$  dose mineral nitrogen at 150 days from planting.

7- The highest value of chlorophyll b was obtained when sugar beet was inoculated by biofertilizer only at 75 days from planting.

8- The inoculation of sugar beet plants with biofertilizer without mineral nitrogen had significant effect on photosynthetic pigment (carotenoids) in sugar beet leaves at 75 and 150 days from planting.

9- The nitrogen content in leaves as well as in roots of sugar beet was decreased as the growing season. The increase in nitrogen content of leaves and roots obtained in the early stage of growth due to inoculation with biofertilizer.

10- The effect of inoculation with biofertilizer only or with different level of mineral nitrogen on nitrogen in soil had significant effect all treatments after 75 days from planting.

11- The effect of inoculation with nitrogen fixing bacteria and phosphate dissolving bacteria only or with different level of mineral nitrogen on potassium in soil were in significant in all treatments.

12- The percentage of total soluble solid were significantly increased when plants inoculated with biofertilizer only – other treatments had insignificant increase.

13- Sucrose percentage increased in sugar beet plants. Significant increase was obtained with inoculation plants with nitrogen fertilizers.

14- Purity percent did not affect in all treatments.

15- Inoculation sugar beet with nitrogen fixing bacteria and mineral nitrogen increased the root yield and sugar yield at harvest.

## Conclusion

Inoculation sugar beet plants with *Azospirillum brasilense* and *Azotobacter chroococcum* and *Bacillus megatherum* increased root yield 11.10%, sucrose 10.61% and sugar yield 11.26% as compared with control.