S U M M A R Y

Two experiments were carried out during the two seasons 1984, 1985 at the experimental station of the Faculty of Agriculture at Moshtohor Zagazig University.

The experimental design was in complete randomized block system with three replicates.

The first experiment aimed studying the effects of two growth regulators namely kinetin and B-nine (Alar) at different concentrations on the growth, flowering and chemical composition of Tagetes patula plants. The second experiment was to study the effects of different fertilization levels on the prementioned characters.

The most important results obtained were:

- Kinetin at all concentration increased plant height in two seasons while it had no remarkable effects on main number of branches.
- All concentrations of kinetin increased fresh and dry weights of root and stems over control. The highest level was more effective in this concern.
- The yield of flower per plant (number or weight) and weight of petals increased significantly with kinetin treatments except low level.
- Kinetin raised carbohydrate content in plant leaves while it did not affect it in plant stems.

- Phosphorous and potassium percentages in leaves increased with all levels of kinetin used, while N% increased only with kinetin at 75 and 100 ppm. Also N, P and K percentages in plant stems increased with all concentrations of kinetin except low one (25 ppm/ which decreased N% as well as 100 ppm which decreased K%.
- The oil yield per plant or per feddan increased with kinetin treatments, specially with 50 ppm concentration.
- The application of kinetin sprays at concentration of 25, 50 and 100 ppm increases phytofluence percentage while kinetin at 75 ppm decreases phytofluene percentage compared with untreated plant. B-carotene percentage increased by kinetin sprayed at 25, 75 and 100 ppm. The high level (100 ppm) was more effect in this concern. α-carotene and α-cryptoxanthin percentage increased by kinetin treatments. While the lutein percentage decreases. Kinetin at 25, 75 and 100 ppm concentrations increase antheraxanthin percentage but 50 ppm level decrease

- All concentrations of B-nine decreased plant height except low level (500 ppm) which gave slight increase over control.
- B-nine treatments increased number of branches/plant except low level (500 ppm) which gave slight decrease compared with control plants.
- Fresh and dry weights of plant roots and stems increased with B-nine treatments and the low level was more effective in this respect.

- B-nine treatments improved flower yield (number or weight) the low levels (500, 1000 ppm) attained significant increases.
- Fresh and dry weights of petals increased with all B-nine treatments, the increase reached the significant level in the first season.
- Total carbohydrate percentage nitrogen, phosphorous and potassium content in plant leaves increased by B-nine application except with high level of 3000 ppm which decreased total carbohydrate, nitrogen and potassium percentages.
- Total carbohydrate percent in plant stems decreased with B-nine treatments of 1000, 2000 and 3000 ppm while nitrogen, phosphorus and potassium percentages increased by the same treatments.
- The application of B-nine increased oil yield per plant and per feddan with all concentrations, specially 2000 ppm.
- B-nine at different concentrations increase phytofluene percentage compared with control plants. B-nine had no constant effect on ∝-carotene excretion in mean time B-carotene percentage decreased by B-nine treatments. The application of B-nine increacreased ∝-cryptoxanthin percentage except 2000 ppm level, while lutein percentage only increased by that level. In general B-nine concentration improved antheraxanthin percentage compared with untreated plant.

- Nitrogen fertilization treatments seemed to increase vegetative growth of tagetes plant measured as plant height, number of branches and fresh or dry weight of roots and stems.
- Nitrogen also advanced flower yield/plant counted as number or weight of flower and fresh or dry weight of petals.
- With chemical composition of leaves nitrogen fertilizer increased total carbohydrate and nitrogen percentages, while nitrogen application decreased phosphorous and potassium percentages in plant leaves except low level which increased P%.
- Total carbohydrate content as well as nitrogen, phosphorous and potassium percentages in plant stem increased by nitrogen addition.
- In general nitrogen accelerates the oil yield per plant.
- Phytofluene percentage increased by nitrogen application at 7.75, 15.50 g/m^2 while the highest level of nitrogen decreased phytofluene percent, $N_1P_0K_0$ and $N_3P_0K_0$ treatments increase α-carotene but $N_2P_0K_0$ treatment decrease it.
- Excretion of B-carotene gives positive response for nitrogen treatments. α-cryptoxanthin percentage increased with low and medium levels of nitrogen.
- Generally the application of nitrogen increases lutein percentage, but it decreased antheraxanthin excretion.

- Phosphorus fertilizer advanced growth as fresh and dry weights of roots and stems.
- It also encouraged flowering since it increased flower yield yield as number or weight of flower/plant and also fresh and dry weights of petal per plant.
- Phosphorous application also increased total carbohydrate percent as well as nitrogen and phosphorous percent in plant leaves, except low level which decreased nitrogen % while all levels of phosphorous decreased potassium percentages in the leaves.
- In plant stem phosphorous addition increased total carbohydrate as well as phosphorous and potassium percent except low level which decreased total carbohydrate %, but low and high level of phosphorous decreased nitrogen percentage, while moderate level of phosphorous increased nitrogen %.
- The addition of phosphorous increases oil yield per plant and per feddan compared with control plant.
- Phosphorous at different levels increases phytofluene percentage specially medium level. The medium and high le level of phosphorous increase α-carotene percentage while the lowest level decreases it.
- B-carotene content decreased by different levels of phosphorous, α-cryptoxanthin increased with phosphorous at medium and high levels. The application of phosphorous at all levels enhance lutein accumulation, while antheraxanthin formation only increased with high level of P_2O_5.

- Potassium fertilizer affected Tagetes growth as it increased branching, fresh and dry weights of roots or stems either it decreased plant height.
- Potassium also encouraged Tagetes flowering since it increased number or weight of flowers and also fresh and dry weights of petals/plant. The moderate level of potassium was the most effective in this concern.
- Potassium fertilizer increased total carbohydrate percentage in plant leaves as well as nitrogen and phosphorous content while it decreased potassium percent when used at low or high rate.
- Total carbohydrate percent in plant stems increased with potassium addition at low and high rates. Also phosphorous and potassium content in stems increased with all levels used. But nitrogen was increased only with the moderate level of potassium.
- The application of potassium at different levels increase oil yield. The highest level was more effective on the oil yield.
- Phytofluene and α-carotene percentages increased by different levels of potassium. The high levels of potassium increased α-cryptoxanthin percentage while the lutein percentage increased with low and medium levels of potassium. Only the high level of potassium increased both B-carotene and antheraxanthin content.

- Complete fertilization treatments affected vegetative growth as it increased branching, fresh and dry weights of roots and stems either it had not affected plant height.
- Complete fertilization also increased greatly flower yield as number or weight of flowers and also fresh and dry weights of petals/plant.
- The moderate level of $N_2P_2K_2$ was the most effective in increasing both vegetative growth or flowering.
- All levels of complete fertilizer increased total carbohydrate percentage as well as nitrogen and phosphorous in plant leaves while it had no effect on potassium percentage when low and high levels were used. But potassium percent decreased with moderate level.
- With plant stem total carbohydrate, nitrogen, phosphorous and potasrium percentages increased with all levels of complete fertilization except with nitrogen percent which decreased when the low level was used.
- The complete fertilization increases apparantly the oil accumulation in plant flowers.
- In general complete fertilization accelerates most of the pigment constituents mainly phytofluene, α-carotene, α-cryptoxanthin and lutein formation in plant petals.

Summarly, the maximum value concern the total carotenoids percentage was attained due treating the plants with a mixture of macronutritive elements consisted 23.25 g N_2, 17.43 g P_2O_5 and 18.0 g K_2O while the highest pigment yield per productive unit was realized due to NPK treatment.

Further study on effects of the consolidation of growth substances and fertilization on Tagetes patula plants will be taken in consideration.