SUMMARY

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This study was conducted at Hort. Dept. Faculty of Agriculture Moshtohor. The field experiments were carried out at A farm of Benha, Kaliubia Governorate during the period of march 2006 to Nov. 2008, aiming to investigate the effect of some organic manures, bio and chemical fertilizers application on the growth, chemical composition and volatile oil productivity of *Mentha pipperita L.*, peppermint runners were transplanted on 15 march, 2007 and 2008 for all plants.

This investigation consisted of one experiments:

In this experiment the effect of various combinations of fertilizers on vegetative growth, yield, volatile oil productivity and its components and chemical analysis of *Mentha pipperita L.* plants were investigated.

Fertilizers type:

1) Organic manure (Biogas) at the rate of 1250 g / m^2.
2) Chemical fertilization as ammonium nitrate (33% N), calcium super phosphate (15.5 P_2O_5) and potassium sulphat (48% K_2O) at the rate of 300, 200, 150 k.g / fed. Respectively for peppermint.
3) Biofertilizers as strains of bacteria i.e.
   1- *Azotobacter chroococcum* (Nitrobein).
   2- *Bacillus megatherium* (Phosphatein).
   3- *Bacillus spp* (Potassiumag).

   Provided from Agriculture Equalization fund (GOAEF).

- Organic manure during the preparation of the soil.

-Chemical and biofertilizers were added after one month of transplanting and another one after the first cut.

Treatments:

1- Nitrobein (Nitr.) 0.30 g / $2m^2$ as 100% dose.

2-Phosphatein (Phos.) 0.30 g / $2m^2$ as 100% dose.

3-Potassimag (Pota.) 0.30 g / $2m^2$ as 100% dose.

4- Ammonium nitrate (N) 150 g / $2m^2$ as 100% dose.

5-Super phosphate calcium (P) 100 g / $2m^2$ as 100% dose.

6- Potassium Sulphat (K) 75 g / $2m^2$ as 100% dose.

7- Biogas (Bio) 1250 g/ $2m^2$ as 100% dose.

8-Nitrobein (Nitr.) 0.15 g / $2m^2$ as 50% + Ammonium nitrate (N) 75g / $2m^2$ as 50%.

9-Phosphatein (Phos.) 0.15 g / $2m^2$ as 50% + Super phosphate calcium (P) 50 g / $2m^2$) as 50%.

10- Potassiumag (pota.) 0.15 g / $2m^2$ as 50% + Potassium sulphat (K) 37.5 g / $2m^2$as 50%.

11-Nitrobein (Nitr.) 0.15 g / $2m^2$ as 50% + Biogas (Bio) 625 g / $2m^2$ as 50%.

12-Phosphatein (Phos.) 0.15 g / $2m^2$ as 50% + Biogas (Bio) 625 g / $2m^2$ as 50%.

13-Potassiumag (Pota.) 0.15 g / $2m^2$ as 50% + Biogas (Bio) 625 g/ $2m^2$ as 50%.

14-Ammonium nitrate (N) 75 g / $2m^2$ as 50% + Biogas (Bio) 625 g / $2m^2$ as 50%.

15-Super phosphate calcium (p) 50 g / $2m^2$ as 50% + Biogas (Bio) 625 g / $2m^2$ as 50%.

16- Potassium sulphat (K) 37.5 g / $2m^2$ as 50% + Biogas (Bio) 625 g / $2m^2$ as 50%.

17-Biogas (Bio) 937.5 g / $2m^2$ as 75% + Ammonium nitrate (N) 37.5 g / $2m^2$ as 25%.

18-Biogas (Bio) 937.5 g / $2m^2$ as 75% + Super phosphate calcium (P) 25 g / $2m^2$ as 25%.

19- Biogas (Bio) 937.5 g / $2m^2$ as 75% + Potassium sulphat (K) 19 g / $2m^2$ as 25%.

20-100% of (N+P+K) .

21-50% of (Nitr. + Phos. + Pota.) + 50% of (N + P + K).

22-control (without any fertilizers).

Harvesting:

Four cuts were obtained during the two years of experiment, the first cut was on 10th July and the second cut was on 15th Nov. in two growing season.

Harvesting was done by cutting the vegetative aerial parts of plants about 10 cm above the soil surface.

The obtained results could be summarized in the following:

1- Vegetative growth:

- The treatment of the combination 50% (nitrobein + phosphatein + potassiumag) + 50% (ammonium nitrate + calcium super phosphate + potassium sulphat) increased plant height, number of branches, number of leaves per plant, plant fresh

and dry weight in the first and second cut in the two growing seasons compare to the other treatments.

- The treatment of the combination 50% nitrobein + 50% ammonium nitrate increased plant height, number of branches, number of leaves per plant and plant fresh and dry weights in the first and second cut in the two growing seasons compare to other treatments.
- The treatment of the combination 50% nitrobein +50% biogas increase plant height, number of branches, number of leaves per plant and plant fresh and dry weight in the first and second cut in two growing seasons comparing to the other treatments.
- The treatment of the combination 50% biogas + 50% ammonium nitrate increase number of branches, number of leaves per plant and plant fresh and dry weight in the first and second cut in two growing seasons comparing to the other treatments.

2- Photosynthetic pigments :

- The treatment of the combination 50% biogas + 50% ammonium nitrate increased chlorophyll (a) and (b) content in the first and second cut in the two growing seasons compare to other treatments.
- The treatment of the combination 50% nitrobein +50% biogas increased chlorophyll (a) and (b) content in the first and second cut in the two growing seasons compared to the other treatments.

- The treatment of the combination 50% (nitrobein + phosphatein + potassiumag) + 50% (ammonium nitrate + calcium super phosphate + potassium sulphat) increased chlorophyll (a) and (b) content in the first and second cut in the two growing seasons compare to the other treatments.

3- Chemical composition of dry herb:

- The treatment of the combination 50% nitrobein +50% biogas increase N, P and K% in the first and second cut in two growing seasons comparing to other treatments.
- The treatment of the combination 50% biogas + 50% ammonium nitrate increased N and K% in the first and second cut in two growing seasons comparing to other treatment.
- The treatment of the combination 50% (nitrobein + phosphatein + potassiumag) + 50% (ammonium nitrate + calcium super phosphate + potassium sulphat) increased N and P% in the first and second cut in two growing seasons comparing to other treatments.

4- Volatile oil:

- The treatment of the combination 50% (nitrobein + phosphatein + potassiumag) + 50% (ammonium nitrate + calcium super phosphate + potassium sulphat) led to an increase in volatile oil percentage per plant and per feddan in the first and second cut in two growing seasons comparing to other treatments.
- The treatment of the combination 50% nitrobein +50% biogas led to an increase in volatile oil percentage per plant and

per feddan in the first and second cut in two growing seasons comparing to other treatments.

Oil components by GC:

It was obvious that 1.8 cineole, pulegone, limonene and isomenthol were found to increase in response to 50% (nitrobein + phosphotein + potassiumage) + 50% (ammonium nitrate + calcium superphosphate + potassium sulphate) in comparison to other treatments or control plants.

On the other hand, menthon increase with control plants comparing with other application. While 50% ammonium nitrate + 50% biogase, 50% calcium superphosphate + 50% biogase, gave the height contents, gave the next value of increasing the menthon.

Using (50% nitrobein + 50% biogas) gave the maximum contents of isomenthone and bisabelone.

The applications of 50% nitrobein + 50% ammonium nitrate) and gave the highest content of menthol, Table (18). While bisabelone content increased by using 50% of nitrobein + 50% of biogas.

It was obvious that pipertone content increasing in response to add (50% nitrobein + 50% ammonium nitrate) can be explained the enhancement of vegetative growth and yield of oil due to the increasing

Storage period:

- The treatments of the combination 50% (nitrobein + phosphatein + potassiumag) + 50% (ammonium nitrate + calcium super phosphate + potassium sulphat) led to an

increase in storage period, while 50% biogas + 50% potassiumag gave the next value comparing to the other treatments.

CONCLUSION

The previously mentioned results concerning N, P and K percentages in the dried herb of *Mentha piperita*, L showed that, inoculating the growing media with the different strain bacteria of Nitrobein, phosphatein and potassiumag improved N, P and K% in the dried herb. On the other hand the least values in this respect was obtained by the control plants in both growing seasons.