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SUMMARY

THE CONTROLLING OF THE FERTILIZER TREATMENTS TO KEEP ON SOIL FERTILITY AND CROP QUALITY

Two field experiments were conducted to investigate the response of potato plants to Farmyard manure (FYM) as organic and (NPK) as inorganic fertilizers on the quality of tubers, mineral components, reduce NO_3^- and NO_2^- contents. As well as to investigate the residual effect of FYM and NPK on soil maintain and turnip yield. The experiments were located at a private farm near Talkha- El-Dakahlia, Governorate, Egypt, during the two successive winter of (2003/2004) & (2004/2005). This experiment was designed to identify on the best treatment. These treatments were as follows:-

1-untreated (control)

2-100%FYM

3-100%FYM+Foliar N1%.

4-75%FYM+FoliarN1%.

5-50%FYM+Folia N1%

6-75%FYM+25%NPK mineral fertilizer.

7-50%FYM+50%NPK mineral fertilizer.

8-100%NPK mineral fertilizer.

The experimental treatments were carried out in a randomized complete block design. The changes of crop parameters as a result as the suggested treatments illustrated that all of them gave a significant increase except for the treatment of (50% FYM + Foliar N 1%) which showed insignificant increase in both seasons, while the treatment of

(75% FYM + Foliar N 1%) showed a significant increase

The obtained results could be summarized as follow:-

1- Plant parameters at harvest time

The application of 100% NPK treatments as a recommended dose has effect significantly on plant height (cm), Dry weight of tubers % , No. of tuber per plant, tuber weight per plant (g.) and Total tuber yield (t.fed-1) in both seasons . As general the application of 50%FYM + 50%NPK treatment gave the higher values for specific gravity of tubers (g.cm^{-3})

2- N,P and K percentages in leaves of potato plants after 90 days from planting:-

Using of 100%NPK treatment gives the highest values for N,P and K% in both seasons. These raising values, while using FYM alone or combination with other treatments give lowest values compared by

100%NPK treatment and this decrease was highly significant in both seasons.

- 3- The concentrations of micro nutrients (ppm) in potato leaves after 90 days from planting :-

As general adding 100%NPK treatment at the recommended rate show highly significant increase in Fe, Zn and Mn ppm in both studied seasons, while adding FYM with other treatments causing lowering values for those micro nutrients in both seasons compared with 100%NPK treatment.

- 4- The uptake of N,P and K (kg.fed^{-1}) in tubers of potatoes in both seasons:-

The uptake of N,P and K were affected positively according to add treatments under study. And data raveled that 100%NPK treatment gives the highest values for N,P and K by tubers. While, adding FYM with other treatment causing decrease in those values in both seasons.

- 5- The uptake of Fe, Zn and Mn (g.fed^{-1}) in potatoes tubers :-

uptake of Fe, Zn and Mn (g.fed^{-1}) in potatoes tubers were increased as the result to use recommended dose of

NPK in both seasons and this increasing was highly significant.

6- NO_3^- and NO_2^- concentration of potato tuber yield.

Using 50% FYM +1%N foliar treatment causing to reduce of NO_3^- and NO_2^- concentrations in both seasons compared with adding 100%NPK treatment. This reduce was highly significant.

7- Total yields of roots and straw yield of turnip in studied seasons:-

Adding 100% of NPK has highly significant effect on yield of turnip parameters in both seasons. While adding FYM combination with other treatments causing reduce for turnip yield for roots and straw.

8- The percentages of N,P and K in turnip leaves:-

Adding FYM alone or with other treatments causing to reduce N,P and K% compared with 100% NPK treatment and this reduce was highly significant except K% in both seasons.

9- NO_3^- and NO_2^- concentration (ppm) in turnip leaves:-

The concentration of NO_3^- and NO_2^- (ppm) were reduced as the result to add 100%FYM in both seasons compared with 100%NPK treatment.

10- NO_3^- and NO_2^- concentration (ppm) in turnip roots:-

The 100% FYM treatment gives the lowest value for NO_3^- and NO_2^- in both seasons, while adding 100%NPK causing to increase of NO_3^- and NO_2^- percentage.

11- Macro and micro nutrients uptake in turnip roots in both studied seasons:-

The uptake of N,P, K (kg.fed^{-1}) Fe, Zn and Mn (g.fed^{-1}) Were highly increased as using 100%NPK treatment, while adding FYM alone or combined with other treatments causing decrease in uptake of them in both studied seasons.

12- Effect of studied treatments on soil chemical properties, after harvesting potatoes and turnip in both seasons:-

Using FYM had a favorite effect on soil (pH, EC, soluble cations and anions) which reduce their values causing improving their chemical properties, which using NPK separately causing bad favor effect on soil as using for long period.

13- Effect of the studied treatments on available macro and micro nutrients in both seasons after harvesting potatoes:-

Adding 50%FYM+50%NPK has the great value for available N, while using 100%FYM treatment gave the

greatest value for P, but the greatest value for available K was obtained from 100%NPK treatment.

Data show that adding 100% FYM increased available Mn and Zn in both seasons but adding 100%FYM +1%N increased available Fe in both seasons.

- 14- Effect of studied treatments on available macro and micro nutrients after harvesting turnip in both seasons:-

Adding 100%FYM improve the fertility of soil compared with other treatments, which increases available macro and micro nutrients in both seasons.

- 15- Effect of studied treatments on physical properties of soil :-

Adding 100%FYM improving Total porosity and saturation percentage in both seasons compared with 100%NPK treatment.

RECOMMENDATION

From the previous discussion it can be recommended that fertilized Potato plant by using rate 180-75-96 kg.fed⁻¹(N,P₂O₅and K₂O) respectively as a recommended dose by Ministry Of Agriculture Of Egypt by using FYM ton/fed⁻¹ after analyzed farmyard manure to know the macro elements in it and calculated the amount by ton/fed⁻¹ then use it in combination with foliar 1%N

(urea) or 50%FYM by ton /fed⁻¹ equivalent 90-37.5+48 N₂P₂O and K₂O respectively + 50%NPK mineral fertilizer. will improve soil chemical and physical properties as well as crop quantity and quality.

So, it reduce the pollution of soil and plant as a result use great amount of mineral fertilizers.