CONTENT

SUMMARY AND CONCLUSION

Two field experiments were carried out and replicated in two seasons to investigate the possibility of spraying compost extract and humic substances as foliar application for maximizing the soil compost addition, for reducing usage of mineral nitrogen fertilizers. A complete randomized blocks design with three replicates was adopted and data were statistically analyzed.

Compost preparation: Compost was prepared from rice straw, C/N ratio was adjusted to be 20:1 by addition farmyard manure, and moisture content was adjusted to 60% of water holding capacity (WHC). The material was allowed to decompose. The contents were turned weekly until maturity of heap (45days).

Compost extract preparation: One Kg of mature compost was taken and blended with tap water in dilution ratio 1: 10 (w/v): one kilogram of compost was put in plastic tanks and soaked into 9 liter of tap water. Then the mixture was turned daily and filtrated after 10 days. One liter of this compost extract was diluted by tap water in 1:10 ratio (v/v) and sprayed in rate of 100L/Fed.

Humic substances used: Humic is active ingredient of actosol product, the natural organic fertilizer oh contain 1: 5: 6 (%) N, P, K and 20% humic acid

Field experiments: Two field experiments were carried out using two plant variety kidney bean (*Phaseolus vulgaris*, L.) and lettuce (*Lactuca sativa,* L.) each experiment was replicated in two seasons in alluvial soil.

1- **Kidney baen experiments:** Kidney been (*Phaseolus vulgaris*, L.) planted during the two successive winter seasons of March 2007 and March 2008. Both of compost extract or humic substances was sprayed twice, the 1st after full grown plants, the 2nd after 2 weeks from the first spraying. But the treatment which included alternatively compost extract and humic substances, compost extract was applied after full grown plants, whereas humic substances was applied after 14 days from applying compost extract.

2- **Lettuce experiments:** Lettuce (*Lactuca sativa,* L.) transplanted during the two successive seasons of January 2007 and February 2008. Both of compost extract or humic substances were spraying twice, the 1st after 15 days of transplanting plants, the 2nd after 2 weeks from first spraying. The treatment which included alternatively compost extract and humic substances, compost extract was applied after 15 days of transplanting lettuce, whereas humic substances was applied after 14 days from applying compost extract.

Treatments in both experiments were as follow:

i) Control, 100% mineral nitrogen fertilizer (recommended dose), ii) 75% of mineral nitrogen fertilizer+10 ton compost (soil application) + humic substances (foliar addition), iii) 75% of mineral nitrogen fertilizer+10 ton compost (soil application)+ compost extract (foliar addition), iv) 75% of mineral nitrogen fertilizer+10 ton compost(soil application)+ humic substances alternatively with compost extract (foliar addition), v) 75% of mineral nitrogen fertilizer+5 ton compost(soil application)+humic substances (foliar addition), vi) 75% of mineral nitrogen fertilizer+5 ton compost(soil application)+ compost extract (foliar

addition), vii) 75% of mineral nitrogen fertilizer+5 ton compost(soil application)+ humic substances alternatively with compost extract (foliar addition), viii) 50% of mineral nitrogen fertilizer+10 ton compost (soil application)+humic substances (foliar addition), ix) 50% of mineral nitrogen fertilizer+10 ton compost (soil application)+ compost extract (foliar addition), x) 50% of mineral nitrogen fertilizer+10 ton compost(soil application)+ humic substances alternatively with compost extract (foliar addition), xi) 50% of mineral nitrogen fertilizer+5 ton compost(soil application)+humic substances (foliar addition), and xii) 50% of mineral nitrogen fertilizer+5 ton compost(soil application)+ compost extract (foliar addition), xiii) 50% of mineral nitrogen fertilizer+5 ton compost(soil application)+ humic substances alternatively with compost extract (foliar addition).

The results can be summarized as follow:

1. Kideny Bean (*Phaseolus vulgaris*, L.) experiment:

1.3. plant growth as affected by mineral nitrogen fertilizer, compost, humic substances and compost extract.

1.1.1. Fresh weight:

Application of 75% of the recommended dose of mineral nitrogen fertilizer in combination with compost additions led to a positive effect on the fresh weight. The superiority of fertilizer treatment for fresh weight of kidney bean was associated with 75% of recommended dose of mineral nitrogen fertilizer combined with 10 ton/fed compost and compost extract alternatively with humic substances spraying on plants produced fresh weight.

1.1.2. Shoot height:

Application of 75% of the recommended dose of mineral nitrogen fertilizer plus addition of compost at 10 ton/fed with spraying humic substances alternatively with compost extract gave the highest shoot height.

1.1.3. Fresh and dry weights of kidney bean shoot:

The highest fresh and dry weights were recorded by using humic substances plus compost extract by spraying on plants with 10 ton/fed of compost in case of the addition 75% of the recommended dose of mineral nitrogen fertilizer as compared with the control.

1.1.4. Fresh and dry weight, and number of pods:

Addition of 75% of the recommended dose of mineral nitrogen fertilizer jointly with 10 ton/fed of compost plus spraying of humic substances combined with compost extract led to the superior values of fresh, dry weights and number of pods.

1.4. Chemical composition of shoot and pods:

1.2.1. N concentration and uptake in kidney bean shoot:

Soil application of compost plus compost extract alternatively with humic substances produced the high N content and uptake while the lowest values were realized from the control treatment.

1.2.2. P concentration and uptake in kidney bean shoot:

The maximum values of P concentration and uptake were obtained as a result of addition of 75% mineral nitrogen fertilizer coupled with the compost as soil application at 10 ton/fed combined with compost extract plus humic substances by foliar spray. Data showed that the second best treatment was observed with spraying compost extract alone followed by using humic substances as foliar.

Generally, the combination of compost as soil addition and compost extract with humic substances or using both of them alternatively led to reducing the mineral nitrogen fertilizer, increasing P concentration and uptake comparing with control.

1.2.3. K concentration and uptake in kidney bean shoot:

Addition of compost as soil application at rate of 10 ton/fed plus compost extract alternatively with humic substances caused significant increases in K concentration and its uptake. On contrary, the lowest results was observed with entirely absence of organic fertilizer (control).

1.2.4. N concentration and uptake in kidney bean seeds:

It is clear that application of 75% of mineral nitrogen fertilizer plus compost at 10 ton/fed plus compost extract jointly with humic substances gave the highest mean values of N concentration and uptake.

1.2.5. P concentration and uptake in kidney bean seeds:

The highest values of P concentration and uptake were realized for the plants received 75% of mineral nitrogen fertilizer coupled with the addition of 10 ton/fed of compost jointly with compost extract alternatively with humic substances as foliar application. followed by application of compost extract separately plus 10 ton/fed of compost plus 75% of mineral nitrogen fertilizer. The control plant showed the lowest values.

1.2.6. K concentration and uptake in kidney bean seeds:

Soil application of compost at 10 ton/fed combining with 75% of mineral nitrogen fertilizer plus compost extract with humic substances gave the high concentration of K and uptake. The followed treatment was application compost extract combined with 10 ton/fed of compost with 75% of mineral nitrogen fertilizer. On the other hand, 100% mineral nitrogen fertilizer (control) recorded the lowest values.

2. Lettuce (*lactuca stiva* L.) experiment:

2.2. Effect of mineral nitrogen fertilizer, compost, humic substances and compost extract on plant growth:

2.1.1. Fresh and dry weight:

The 75% of the recommended dose of mineral nitrogen fertilizer jointly with 10 ton/fed of compost as soil addition plus spraying compost extract alternatively with humic substances treatment recorded the highest values of

fresh and dry weight. Followed by spraying compost extract in single form in case of 10 ton/fed plus 75% of mineral nitrogen fertilizer.

Also, application of 5 ton/fed of compost plus 75% of recommended dose resulted in close values to which resulted from 10 ton/fed plus 75% of mineral nitrogen fertilizer. On the other hand, the minimum fresh and dry weight values of lettuce observed in the plants treated with 100% of mineral nitrogen fertilizer (control).

2.1.2. Plant height:

The plant height of lettuce differed according to the different treatments. The maximum plant heights were observed consistently with the plants treated with 10 ton/fed of compost with compost extract alternatively with humic substances in spray form with addition of 75% of mineral nitrogen fertilizer. All treatments either rate of 10 or 5 ton/fed of compost with 75% or 50% of mineral nitrogen fertilizer with spraying of compost extract or humic substances gave results higher than control treatment.

2.2. Effect of mineral nitrogen fertilizer, compost, humic substances and compost extract on chemical composition of lettuce.

2.2.1. N concentration and uptake:

The concentration and uptake of nitrogen increased by addition of organic fertilizers compared with control. The maximum N concentration and uptake

were observed consistently in the plants treated with 10 ton/fed of compost plus compost extract alternatively with humic substances as foliar addition coupled with the 75% of mineral nitrogen fertilizer. The lowest values of all treatments were observed with control treatment (100% mineral fertilizer without any organic fertilizers).

2.2.2. P concentration and uptake:

The most pronounced treatment which gave the highest significant increases in P concentration and uptake was with 75% of mineral nitrogen fertilizer in combination with 10 ton/fed of compost as soil application coupled with compost extract alternatively with humic substances, followed by 75% of mineral nitrogen fertilizer plus 10 ton/fed of compost with compost extract. Meanwhile the lowest values were observed with the control treatment.

2.2.3. K concentration and uptake:

The highest values of K concentration and uptake were realized for the plants received 75% of mineral nitrogen fertilizer coupled with the addition of 10 ton/fed of compost jointly with spraying of compost extract alternatively with humic substances.

The second treatment was in case of spraying compost extract separate.. Whereas the control treatment showed the lowest K concentration and uptake

CONCLUSION:

From the obtained results, it can be concluded that, usage of compost as soil application led to reducing the mineral nitrogen fertilizer use. Also, spraying compost extract and humic substances separately or alternatively increased all growth parameters of kidney bean and lettuce in both seasons compared with recommended dose of mineral nitrogen fertilizer (control). That means, when compost extract or humic substances applied the utilization of soil compost addition was maximized.