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IMPACT OF INORGANIC N AND COMPOST ENRICHED WITH SOME BACTERIAL STRAINS ON FRUITING OF SUPERIOR AND FLAME SEEDLESS GRAPEVINES AS WELL AS ACTIVITY OF DEHYDROGENASE ENZYME IN THE SOIL

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ABSTRACT

Grapevine cvs Superior and Flame seedless were fertilized with the suitable N as ١٠٠ % inorganic N, ٧٥ % inorganic N plus solide compost during ٢٠٠٩ & ٢٠١٠ seasons. Compost tea also was used via soil or via foliage with or without biofertilization with three strains of bacteria namely *Azospirillum sp & Bacillus megaterium & Bacillus cerculanse*. The study focused on examining the impact of these treatments on total chlorophylls, vine nutritional status, and fruiting in such two grape cvs as well as dehydrogenase activity in the soil.

Results showed that supplying the vines with N via ٥٠ % inorganic N plus compost via solide state as well as compost tea via soil or via foliage with or without biofertilization contributed in faronable results. These results represented in enhancing total chlorophylls, leaf content of N, P and K, yield, berries quality and dehydrogenase activity in the soil comparing with using N completely via inorganic form. Application of N through the three sources (inorganic, organic and bioforms) was preferable than using one or two sources of N alone in this respect.

Supplying Superior and Flame seedless grapevines with the suitable N (٨٠ g/ vine/ year) through ٥٠ % inorganic + ٥٠ % solide compost + biofertilization with *Azospirillum sp & Bacillus megaterium & Bacillus cerculanse* supported fruiting and

stimulated the activity of dehydrogenase in the soil for fixation of N.

INTRODUCTION

Many trials were conducted for increasing the efficiency of N fertilization by using organic sources and some microorganisms as a partial replacement of mineral N in fruit orchards. Adjusting the uptake of N by organic and biofertilization was accompanied with enhancing yield as well as physical and chemical characteristics of the grapes. In addition, organic farming is responsible for reducing pollution in our environmental.

Previous studies showed that application of N via the three forms (inorganic, organic and bioforms) was very effective in stimulating soil fertility, growth and fruiting of different grapevine cvs comparing with using N via inorganic form only (Dahama, ١٩٩٩; Kannaiyan, ٢٠٠٢; Seleem- Basma and Telep, ٢٠٠٨; Eman *et al*., ٢٠٠٨; Masoud *et al*., ٢٠٠٨; Abada, ٢٠٠٩; Madian, ٢٠١٠, Abada *et al*., ٢٠١٠; Abd El-Hameed *et al*., ٢٠١٠; Abd El- Aziz, ٢٠١١; Refaai; ٢٠١١; Uwakiem, ٢٠١١ and Ahmed *et al*., ٢٠١٢).

The target of this study was adjusting the best inorganic, organic and biofertilization treatment that responsible for improving productivity of grapevine cvs Superior and Flame seedless.

MATERIALS AND METHODS

The study was carried out during ٢٠٠٩ and ٢٠١٠ seasons on ١٢٦ vines of flame seedless and superior grapevines. Each variety was represented by vines. The treated vines were uniform in vigour ٣-years old seedless and grown in Community Service and Environmental Studies and Res. Instit. farm, Sadat City, Minufiya Univ. Both cvs are table grafted onto freedom rootstock. The texture of the soil is sandy, well drained and water table is not less than two meters deep. Soil analysis was done according to method of Chapman and Pratt (١٩٦٥) and the obtained data are shown in Table (١).

Winter pruning was achieved in first week of January of each season by using cane pruning system. In case of grapevine cv. Superior , ٦٤ eyes (eight fruiting canes x seven eyes plus four renewal spurs × two eyes) were left, while spur pruning system was applied on grapevine cv. On the other hand, pruning of flame seedless was achieved through leaving ٦٤ eyes (fourteen fruiting spurs x four eyes plus four replacement spurs x two eyes). Supporting system shape for both Superior and Flame seedless grapevine cvs was followed. Vines of both grapevine cvs are planted at ٢.٠ (between vines) × ٣.٠ m (between rows) apart. Drip irrigation system using well water with ٤٥٠ ppm salinity was followed.

Table ١: Analysis of the tested soil:

Constituents	Values
Particle size distribution:	
Sand %	: ٧٦.٥
Clay %	: ١٣.٠
Silt %	: ١٠.٥
CaCO٣ %	: ١.٢٩
pH (١:٢.٥ extract)	: ٧.٩٨
E.C (١: ٢.٥ extract) mmhos/ ١ cm ٢٥° C	: ١.٠٩
O.M. %	: ٠.٠٨
Total N %	: ١.٠٨
Available P (Olsen method) ppm	: ٤.٢
Available K (ammonium acetate) ppm	: ١٤٢.٣

Except those dealing with the present treatments, all the selected vines (١٢٦ vines for both cvs) received the usual horticultural practices which are common used in the vineyard.

This experiment included the following seven treatments:

١. Application of the suitable N (٨٠ g./ vine/ yr) completely via inorganic form namely ammonium nitrate (٣٣.٣ % N) by rate ٢٤٠ g./ vine/ yr.
٢. Application of the suitable N via inorganic form at ٥٠ % (١٢٠ g./ vine/ yr) + spraying tea compost at ١٠ %.
٣. Application of the suitable N via inorganic form at ٥٠ % (١٢٠ g./ vine/ yr) + ٥٠ % solide compost (١.٩ kg. compost/ vine/ yr).
٤. Application of the suitable N via inorganic form at ٥٠ % (١٢٠ g./ vine/ yr) + tea compost via soil at ١٠ %.
٥. Application of the suitable N via inorganic form at ٥٠ % (١٢٠ g./ vine/ yr) + spraying tea compost at ١٠ % + soil addition of the three strains of bacteria namely *Azospirillum sp* & *Bacillus megaterium* & *Bacillus cerculanse* on the basis of one liter from each bacteria culture (١٠٣ cells)/ vine/ yr.

٦. Application of the suitable N via inorganic form at ٥٠ % (١٢٠ g./ vine/ yr) + ٥٠ % solide compost (١.٩ kg. compost/ vine/ yr) + soil addition of the three strains of bacteria as mentioned above.

٧. Application of the suitable N via inorganic form at ٥٠ % (١٢٠ g./ vine/ yr) + tea compost via soil at ١٠ % + soil addition of the three strains of bacteria as previously mentioned.

Each treatment was replicated three times, three vine each.

Preparation of tea compost:-

Tea compost was prepared by weighing ١٠ kg compost + ٧٥٠ g molase + ١٠.٠ g. sodium chloride + ٥٥.٠ g magnesium sulphate per ١٠٠ liters water. The mixture was left stand for three days then continuously stirring and used in the fourth day (according to Ryan, ٢٠٠٣).

Solide compost (Table ٢) was applied once via soil at ١.٩ kg./ vine/ yr before sprouting of eyes (mid. of Feb.) Tea compost was applied either via foliage or via soil. In case of foliage application it was sprayed four times at growth start (١st week of Mar.), before first bloom (last week of Mar.), just after berry setting (١st week of may) and at one month later when average equatorial of berries reached ٤ mm (١st week of June). However, in case of soil application, tea compost was applied twice (five liters/ each) at growth (١st week of Mar.) and just after berry setting (١st week of May).

Table ٢: analysis of compost:

character	Values
Moisture %	: ٢٦.٦
pH (١:٢.٥ extract)	: ٨.٢
E.C (١: ٢.٥ extract)	: ٤.١
O.M. %	: ٦٥.٠
Total N %	: ٢.١٥
Total P %	: ١.٥
Total K %	: ١.٣
Available micronutrients (ppm)	
Fe	: ١٠٢.٥
Mn	: ١١٥.٠
Cu	: ١٨٠.٠
Zn	: ٢٨.٠

With concerning bio fertilization preparation, each culture of the three strains namely *Azospirillum sp* & *Bacillus megaterium* & *Bacillus cerculans* was obtained alone. Each ml of culture contains $١٠^{٩}$ cells bacteria.

Each culture was diluted through adding one ml in one liter water. Total counts of bacteria cells in one ml of the dilution culture reached $١٠^{٣}$ cells. Each vine received one liter of a mixture having the three cultures (one liter each) mixing the three liters. These bio fertilizers were added twice, the first was before growth start while, the second was just after berry setting. Inorganic N source namely ammonium nitrate (٣٣.٣ % N) was divided into three unequal and applied batches as ٥٠ %, ٣٠ % and ٢٠ % on the first week of March, April and May, respectively.

Complete randomized block design was followed. Each treatment was replicated three times, three vines each.

The following measurements were recorded during the two experimental seasons.

Chlorophylls a & b and total chlorophylls were determined as mg/ ١٠٠g. F. W.. Total according to method of Fadl and Seri El-Deen, (١٩٧٨). Twenty leaves picked from those opposite to the basal clusters (According to Balo *et al*., ١٩٨٨) for each vine for determining of N, P, and K percentages according to method of Chapman and Pratt (١٩٦٥).

Harvesting took place when T.S.S./ acid ratio in the berries of the check treatment reached at least ٢٥:١ (at the middle of July in both seasons) according to Weaver, (١٩٧٦). The yield of each vine was recorded in terms of weight (in kg.).

Five clusters from each vine were randomly taken for determination of cluster weight (g.), berry weight (g.), total soluble solids % and total acidity (as g. tartaric acid/ ١٠٠ ml juice) (A.O.A.C., ١٩٩٥).

Dehydrogenase activity was determined by TTC method Paul and Clark, (١٩٩٦).

All the obtained data were tabulated and statistically analyzed using new L.S.D. at ٥ % for made all comparisons among the investigated treatment means according to Mead *et al*. (١٩٩٣).

RESULTS AND DISCUSSION

١- Total chlorophylls and percentages of N, P and K:

It is clear from the data in Tables (٣ & ٤) that supplying Superior and Flame seedless grapevines with the suitable N (٨٠ g/ vine/ year) via ٥٠ % inorganic + compost (as solide or as compost tea via foliage or via soil) with or without biofertilization with the three bacterial strains namely *Azospirillum sp & Bacillus megaterium & Bacillus cerculanse* significantly was resulted in improving total chlorophylls and percentages of N, P and K in the leaves in relative to using N completely via inorganic form.

Table ٣: Effect of inorganic, organic and biofertilization on total chlorophylls (mg/ ١٠٠ g. F.W.) and percentage of N in the leaves of Superior and Flame seedless grapevines during ٢٠٠٩ and ٢٠١٠ seasons.

Inorganic, organic and biofertilization treatments	Superior cv.				Flame seedless cv.			
	Total chlorophylls (mg/ ١٠٠ g. F.W.)		Leaf N %		Total chlorophylls (mg/ ١٠٠ g. F.W.)		Leaf N %	
	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠
١- ١٠٠ % N completely via inorganic form	٨٥.٤	٨٩.٢	١.٩٧	٢.٠٢	٨٢.٥	٨٤.٥	١.٦٣	١.٦٧
٢- ٥٠ % inorganic + spraying tea compost	٩٤.٢	٩٧.٧	٢.١٠	٢.١٣	٩١.١	٩٢.٢	١.٧٣	١.٧٧
٣- ٥٠ % inorganic N + ٥٠ % N via solide compost	١٠١.٤	١٠٦.٦	٢.٢٠	٢.٢٤	٩٨.٢	١٠١.٣	١.٨٤	١.٨٨
٤- ٥٠ % inorganic N + soil addition of tea compost	١٠٩.٣	١١٤.٥	٢.٣٣	٢.٣٧	١٠٥.٨	١٠٩.٧	٢.٠٥	٢.١٠
٥- ٥٠ % inorganic N + ٥٠ % N via spraying tea compost + S	١١٥.٣	١٢٢.٨	٢.٤٢	٢.٤٥	١١٢.٢	١١٧.١	٢.١٧	٢.٢٢

٦- ٥٠ % inorganic N + ٥٠ % N via solide compost + S	١٣٢.٣	١٣٩.٤	٢.٦٤	٢.٦٦	١٢٩.٠	١٣٤.٥	٢.٤٤	٢.٥٠
٧- ٥٠ % inorganic N + soil addition of tea compost + S	١٢٣.٤	١٣٩.٣	٢.٥٢	٢.٥٥	١٢٠.٣	١٢٤.٠	٢.٢٩	٢.٣٤
New L.S.D at ٥ %	٢.٩	٢.٧	٠.٠٦	٠.٠٦	٢.٥	٢.٤	٠.٠٨	٠.٠٨

S = Strains of bacteria namely *Azospirillum sp*.& *Bacillus megaterium*& *Bacillus cerculans*e.

Table ٤: Effect of inorganic, organic and biofertilization on the percentages of phosphorus and potassium in the leaves of Superior and Flame seedless grapevines during ٢٠٠٩ and ٢٠١٠ seasons.

Inorganic, organic and biofertilization treatments	**Superior cv.**				**Flame seedless cv.**			
	Leaf P %		**Leaf K %**		**Leaf P %**		**Leaf K %**	
	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠
١- ١٠٠ % N completely via inorganic form	٠.١٨	٠.١٩	١.٤٧	١.٤٩	٠.١٥	٠.١٦	١.٢٩	١.٣٣
٢- ٥٠ % inorganic + spraying tea compost	٠.٢١	٠.٢٢	١.٥٦	١.٥٧	٠.١٨	٠.١٨	١.٣٩	١.٤٤
٣- ٥٠ % inorganic N + ٥٠ % N via solide compost	٠.٢٣	٠.٢٥	١.٦٥	١.٦٧	٠.٢٢	٠.٢٢	١.٥١	١.٥٦
٤- ٥٠ % inorganic N + soil addition of tea compost	٠.٢٥	٠.٢٨	١.٧٥	١.٧٧	٠.٢٦	٠.٢٦	١.٦٠	١.٦٦
٥- ٥٠ % inorganic N + ٥٠ % N via spraying tea compost + S	٠.٢٨	٠.٣١	١.٨٥	١.٨٦	٠.٣٠	٠.٣١	١.٦٩	١.٧٥
٦- ٥٠ % inorganic N + ٥٠ % N via solide compost + S	٠.٣٤	٠.٣٨	١.٩٧	١.٩٩	٠.٣٨	٠.٣٩	١.٨٧	١.٩٢
٧- ٥٠ % inorganic N + soil addition of tea compost + S	٠.٣١	٠.٣٣	١.٩٢	١.٩٥	٠.٣٣	٠.٣٣	١.٧٩	١.٨٥
New L.S.D at ٥ %	٠.٠٢	٠.٠٢	٠.٠٥	٠.٠٦	٠.٠٣	٠.٠٢	٠.٠٦	٠.٠٦

S = Strains of bacteria namely *Azospirillum sp*.& *Bacillus megaterium*& *Bacillus cerculans*e.

Application of N through ٥٠ % inorganic + compost in any form with biofertilization was superior than using ٥٠ % inorganic + compost in any form alone. Under unbiofertilization treatments, application of compost tea via soil was preferable than using solide compost or compost tea applied via foliage. Solide compost applied via soil was favourable under biofertilization treatments. The maximum values were recorded on Superior or Flame seedless grapevines received N via ٥٠ % inorganic + ٥٠ % solide state of compost + biofertilization. Using N completely via inorganic form gave the lowest values. These results were similar during both seasons and in both grapevine cvs.

The essential roles of organic and biofertilization on enhancing soil fertility, microflora activity, natural hormones, antioxidants, vitamins B and antibiotics could results in enhancing the biosynthesis of plant pigments and uptake of different nutrients (Dahama, ١٩٩٩ and Kannaiyan, ٢٠٠٢).

These results are in harmony with those obtained by Refaai (٢٠١١); Uwakiem (٢٠١١) and Ahmed *et al*., (٢٠١٢).

٢- Yield and cluster weight:

Data in Table (٥) clearly showed that yield and cluster weight of Superior and Flame seedless grapevines were significantly improved by using N via ٥٠ % inorganic + compost in any form (solide or compost tea via soil or foliage) with or without biofertilization rather than application of N completely via inorganic form. The best results were obtained with using N through ٥٠ % inorganic + ٥٠ % solide compost + biofertilization. Unorganic and unbiofertilization (using inorganic N alone) gave the lowest values. Similar trend was observed in grape cvs Superior and Flame seedless during both seasons.

The beneficial of organic and biofertilization on growth and vine nutritional status positively reflected on enhancing the yield.

These results are in agreement with those obtained by Refaai (٢٠١١); Uwakiem (٢٠١١) and Ahmed *et al*., (٢٠١٢).

٣- Some physical and chemical characteristics of the grapes:

Data in Tables (٦ & ٧) clearly revealed that using N through ٥٠ % inorganic + compost in any form (solide as well as compost tea via foliage or via soil) + biofertilization showed a significant effect in enhancing quality of the berries in terms of increasing percentages of total soluble solids, total sugars and reducing total acidity % comparing with using N completely via inorganic form or using inorganic plus compost alone. Application of N through ٥٠ % inorganic + ٥٠ % solide compost via soil + biofertilization gave the best results with regard to quality of the berries. Unfavourable effects on quality of the berries were recorded with using N completely via inorganic form. Similar trend was observed in grape cvs Superior and Flame seedless during ٢٠٠٩ and ٢٠١٠ seasons.

The beneficial effects of organic and biofertilization on enhancing the biosynthesis of plant pigments could result in promoting quality of the berries.

These results are in harmony with those obtained by Refaai (٢٠١١); Uwakiem (٢٠١١) and Ahmed *et al*., (٢٠١٢).

٤- Dehydrogenase activity :

It is clear from the data in Table (٧) that supplying Superior and Flame seedless grapevines with the suitable N (٨٠ g/ vine/ year) via ٥٠ % inorganic + compost (solide as well as compost tea via foliage or via soil) with or without biofertilization of the tested bacterial strains significantly improved dehydrogenase activity in relative to using N completely via inorganic form.

Application of N through ٥٠ % inorganic + compost in any form with biofertilization was superior than using ٥٠ % inorganic + compost in any form alone in this respect. Under unbiofertilization treatments, application of compost tea via soil was preferable than using solide compost or compost tea applied via foliage. Solide compost applied via soil was favourable under biofertilization treatments. The maximum values were recorded on the soil of Superior or Flame seedless grapevines received N via ٥٠ % inorganic + ٥٠ % solide state of compost + biofertilization. Using N completely via inorganic form gave the lowest values. These results were similar during both seasons and in both grapevine cvs.

The essential roles of organic and biofertilization on enhancing soil fertility, microflora activity, natural hormones, antioxidants, vitamins B and antibiotics could resulted in enhancing dehydrogenase activity Dahama (١٩٩٩) and Kannaiyan (٢٠٠٢).

These results are in approval with those obtained by Dahama, (١٩٩٩) and Kannaiyan,(٢٠٠٢)

As a conclusion, it is concluded to use N (٨٠ g/ vine/ year) via ٥٠ % inorganic + ٥٠ % solide compost + biofertilization with *Azospirillum sp & Bacillus megaterium & Bacillus cerculanse* for improving productivity of Superior and Flame grapevines.

Table ٥: Effect of inorganic, organic and biofertilization on the yield (kg.) per vine and cluster weight (g.) of Superior and Flame seedless grapevines during ٢٠٠٩ and ٢٠١٠ seasons.

Inorganic, organic and biofertilization treatments	Superior cv.				Flame seedless cv.			
	Yield/ vine (kg.)		Cluster weight (g.)		Yield/ vine (kg.)		Cluster weight (g.)	
	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠
١- ١٠٠ % N completely via inorganic form	٦.٢	٦.٥	٢٨١.٠	٢٨٨.٠	٧.٨	٨.٥	٣١٠.٠	٣١٦.٠
٢- ٥٠ % inorganic + spraying tea compost	٧.١	٨.٠	٣١٠.٠	٣٢٠.٠	٨.٤	٩.٩	٣٣٦.٠	٣٤٠.٠
٣- ٥٠ % inorganic N + ٥٠ % N via solide compost	٧.٨	٨.٧	٣٣٧.٠	٣٤٧.٠	٩.٢	١١.٥	٣٦٦.٠	٣٧١.٠
٤- ٥٠ % inorganic N + soil addition of tea compost	٧.٨	٩.٥	٣٤١.٠	٣٥٢.٠	٩.٣	١٢.٥	٣٧١.٠	٣٧٩.٠
٥- ٥٠ % inorganic N + ٥٠ % N via spraying tea compost + S	٨.١	٩.٨	٣٥٢.٠	٣٦٤.٠	٩.٥	١٢.٩	٣٨١.٠	٣٩٠.٠
٦- ٥٠ % inorganic N + ٥٠ % N via solide compost + S	٨.٨	١١.٨	٣٨١.٠	٣٨٢.٠	٩.٩	١٤.٨	٣٩٥.٠	٤١٠.٠
٧- ٥٠ % inorganic N + soil addition of tea compost + S	٨.٥	١٠.٨	٣٧١.٠	٣٧٤.٠	٩.٦	١٣.٥	٣٨٤.٠	٣٨٥.٠

New L.S.D at ٥ %	٠.٧	٠.٧	٢٥.٠	٢٣.٠	٠.٧	٠.٨	٢١.٠	٢١.٠

S = Strains of bacteria namely *Azospirillum sp*.& *Bacillus megaterium*& *Bacillus cerculans*e.

Table ٦: Effect of inorganic, organic and biofertilization on the average berry weight (g.) and total soluble solids % in the grapes of Superior and Flame seedless grapevines during ٢٠٠٩ and ٢٠١٠ seasons.

Inorganic, organic and biofertilization treatments	Superior cv.				Flame seedless cv.			
	Av. berry weight (g.)		T.S.S %		Av. berry weight (g.)		T.S.S %	
	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠
١- ١٠٠ % N completely via inorganic form	٣.٢١	٣.٢٤	١٧.٩	١٨.١	٢.٢٩	٢.٣٣	١٨.٠	١٨.٢
٢- ٥٠ % inorganic + spraying tea compost	٣.٣١	٣.٣٤	١٨.٣	١٨.٦	٢.٤٠	٢.٤٥	١٨.٤	١٨.٦
٣- ٥٠ % inorganic N + ٥٠ % N via solide compost	٣.٤٢	٣.٤٥	١٨.٦	١٩.٠	٢.٥١	٢.٥٦	١٨.٨	١٩.٠
٤- ٥٠ % inorganic N + soil addition of tea compost	٣.٥٣	٣.٥٦	١٩.٠	١٩.٤	٢.٦٣	٢.٦٨	١٩.٢	١٩.٥
٥- ٥٠ % inorganic N + ٥٠ % N via spraying tea compost + S	٣.٦٤	٣.٦٧	١٩.٥	٢٠.٠	٢.٧٥	٢.٨٠	١٩.٧	٢٠.١
٦- ٥٠ % inorganic N + ٥٠ % N via solide compost + S	٣.٨٦	٣.٩٠	٢٠.٣	٢٠.٦	٢.٩٦	٢.٩٩	٢٠.٤	٢٠.٨
٧- ٥٠ % inorganic N + soil addition of tea compost + S	٣.٧٤	٣.٧٧	١٩.٩	٢٠.٣	٢.٨٥	٢.٨٨	٢٠.٠	٢٠.٣
New L.S.D at ٥ %	٠.٠٩	٠.٠٩	٠.٠٢	٠.٠٢	٠.٠٩	٠.٠٩	٠.٠٣	٠.٠٢

S = Strains of bacteria namely *Azospirillum sp.*& *Bacillus megaterium*& *Bacillus cerculanse*.

Table ٧: Effect of inorganic, organic and biofertilization on the percentage of total acidity in the grapes and dehydrogenase activity µ TPF/ ١ g. soil of Superior and Flame seedless grapevines during ٢٠٠٩ and ٢٠١٠ seasons.

Inorganic, organic and biofertilization treatments	Superior cv.				Flame seedless cv.			
	Total acidity %		Dehydrogenase activity µ TPF/ ١ g. soil/ ١ hr		Total acidity %		Dehydrogenase activity µ TPF/ ١ g. soil	
	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠	٢٠٠٩	٢٠١٠
١- ١٠٠ % N completely via inorganic form	٠.٧١٤	٠.٧٢٣	٠.٠٠٧	٠.٠١٠	٠.٧٢٠	٠.٧٢٧	٠.٠٢٩	٠.٠٣١
٢- ٥٠ % inorganic + spraying tea compost	٠.٦٨٠	٠.٦٨٩	٠.٠٦٩	٠.١٦٠	٠.٦٨٨	٠.٦٩٢	٠.٠٩٢	٠.٩٥
٣- ٥٠ % inorganic N + ٥٠ % N via solide compost	٠.٦٤٥	٠.٦٦٠	٠.١٠٥	٠.١٥٩	٠.٦٥٠	٠.٦٦١	٠.١٥٠	٠.١٧٢
٤- ٥٠ % inorganic N + soil addition of tea compost	٠.٦٢٠	٠.٦٢٢	٠.١٩٩	٠.٢٩٩	٠.٦١٨	٠.٦٢٧	٠.٢٩٧	٠.٣١٩
٥- ٥٠ % inorganic N + ٥٠ % N via spraying tea compost + S	٠.٦٠٠	٠.٥٨٩	٠.٤١٥	٠.٤٦٥	٠.٥٨٠	٠.٥٩٢	٠.٥١٥	٠.٥٦٥
٦- ٥٠ % inorganic N + ٥٠ % N via solide compost + S	٠.٥٤١	٠.٥٢٢	٠.٨٢٢	٠.٨٧٢	٠.٥١١	٠.٦١١	٠.٩٢٢	٠.٩٨٢
٧- ٥٠ % inorganic N + soil addition of tea compost + S	٠.٥٧٤	٠.٥٥٥	٠.٥١٥	٠.٥٦٥	٠.٥٤٧	٠.٥٤٤	٠.٦١٢	٠.٦٧١
New L.S.D at ٥ %	٠.٠٢٥	٠.٠٢٨	٠.٠٣٥	٠.٠٤٢	٠.٠٣٠	٠.٠٣٣	٠.٠٤٥	٠.٠٤٩

S = Strains of bacteria namely *Azospirillum sp*.& *Bacillus megaterium*& *Bacillus ceraulanse*.

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Impact of inorganic n and compost enriched with bacterial strains on seedless grapevines

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تأثير النيتروجين الغير عضوي مع الكمبوست الملقح ببعض سلالات البكتريا علي الإثمار في كرمات العنب السوبيريور والفليم سيدلس وعلي نشاط إنزيم الديهيدروجينيز في التربة

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تم تسميد كرمات العنب السوبيريور والفليم سيدلس خلال موسمي ٢٠٠٩، ٢٠١٠ بالكمية المثلي من النيتروجين في صورة ١٠٠ % تسميد نيتروجيني غير عضوي ، ٧٥ % تسميد نيتروجيني غير عضوي بالاضافة الي الكمبوست في الصورة الصلبة أو مستخلص الكمبوست الذي يتم اضافته اما أرضيا أو من خلال الأوراق مع أو بدون التسميد الحيوي باستخدام ثلاثة سلالات من البكتريا هي *Azospirillum sp & Bacillus megaterium & Bacillus cerculanse*. ولقد تركزت الدراسة علي اختبار تأثير هذه المعاملات علي الكلوروفيل الكلي والحالة الغذائية للكرمات والإثمار في هذين الصنفين من أصناف العنب ونشاط إنزيم الديهيدروجينيز في التربة.

Impact of inorganic n and compost enriched with bacterial strains on seedless grapevines

أشارت نتائج الدراسة أن تسميد الكرمات بالنيتروجين في صورة تسميد نيتروجيني غير عضوي بنسبة ٥٠ % بالاضافة الي استخدام الكمبوست الصلب أو مستخلص الكمبوست إما من خلال التربة أو رشا علي الأوراق مع أو بدون التسميد الحيوي باستخدام السلالات الثلاثة من البكتريا كان مصحوبا بزيادة الكلوروفيل الكلي ومحتوي الورقة من عناصر النيتروجين والفوسفور والبوتاسيوم وكمية المحصول وخصائص الجودة للحبات وكذلك نشاط إنزيم الديهيدروجينيز في التربة وذلك بالمقارنة باستخدام النيتروجين في الصورة النيتروجينية الغير عضوية بنسبة ١٠٠ % وكان استخدام جميع مصادر النيتروجين أفضل من استخدام مصدر أو مصدرين في هذا الصدد.

كما أشارت النتائج أن تسميد كرمات العنب السوبيريور والفليم سيدلس بالكمية المثلي من النيتروجين (٨٠ جرام/ الكرمة/ السنة) من خلال ٥٠ % تسميد نيتروجيني غير عضوي + ٥٠ % كمبوست صلب من خلال التربة والتسميد الحيوي بسلالات البكتريا الثلاثة *Azospirillum sp & Bacillus megaterium & Bacillus cerculanse* يعطي أفضل النتائج بخصوص الإثمار وكذلك تحسين نشاط إنزيم الديهيدروجينيز في التربة يعطي اللازم لتثبيت النيتروجين.