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REDUCING INORGANIC N FERTILIZERS PARTIALLY IN SAKKOTI DATE PALM ORCHARDS BY APPLICATION OF ORGANIC AND BIOFERTILIZATION

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ABSTRACT

This study was carried out during ٢٠١٠ and ٢٠١١ seasons as an attempt to reduce chemical fertilizers partially in Sakkoti dry date palm orchards under Aswan region by application of organic (filter mud) and biofertilizer (Minia Azotene). Inorganic, organic and biofertilizers were applied at various proportions.

Obtained results indicated that supplying Sakkoti date palms with N in inorganic source at ٦٠ to ٨٠ % and organic and biofertilizers at ٢٠ to ٤٠ % was very effective in improving all growth characters and yield/ palm compared with using N completely in inorganic form. Reducing the percentages of inorganic N from ١٠٠ to ٠.٠ % and at the same time increasing the percentages of organic and biofertilizers from ٠.٠ to ١٠٠ % caused a gradual increase in the percentages of N, P and K and improved fruits quality i.e increasing in fruit weight, total soluble solids, total sugars and decreasing in total acidity, crude fibre, soluble tannins and nitrite.

However, to improve Sakkoti date palms yield quantitively and qualitatively, also reducing nitrite pollution of the fruits, it is advisable to supply the palms with the suitable N (١٠٠٠ g/ palm/ season) as inorganic, organic and bioforms at ٦٠, ٢٠ and ٢٠ %, respectively. Thus, it can be recommended to replace ٤٠ % of

mineral fertilizers by organic and biofertilizers for producing organic fruits.

INTRODUCTION

It is well known that date palm needs large amounts of fertilizers especially nitrogen. The major problems facing growers are the high costs of mineral fertilizers and also these chemical fertilizers play as air, soil and water polluting agents during their processing and utilization. This drow the attention of researchers and date palms growers to use organic fertilizers (which are safe for human, animal and environment) for partial substitution of mineral N.

It was found that using the suitable N in all sources at the optimum proportions had pronounced improving effect on growth and fruiting of different date palm cvs. (Melouk *et al*., ١٩٩٩; Osman, ٢٠٠٣; Shahein *et al*., ٢٠٠٣; Mohamed and Ragab, ٢٠٠٤; Abd El-Hameed and Ragab, ٢٠٠٤; Mansour *et al*, ٢٠٠٤; Gobara and Ahmed ٢٠٠٤; Abou- Sayed- Ahmed *et al*., ٢٠٠٥; El- Assar, ٢٠٠٥; Diab, ٢٠٠٦; Almadini and Al- Gosoibi, ٢٠٠٧; Al- Wasfy and El- Khawaga, ٢٠٠٨; Al- Kharusi- Latifa *et al*., ٢٠٠٩; Osman, ٢٠٠٩; Morsi, ٢٠٠٩; Souna- Faiza *et a*l., ٢٠١٠; Ibrahiem- Zenib, ٢٠١٠ and Ahmed- Samah, ٢٠١١).

The objective of this study was to select the best proportion of inorganic, organic and bioforms of N that result in improving yield quantitively and qualitatively and reducing nitrite pollution of Sakkoti date palm fruits.

MATERIALS AND METHODS

This study was conducted at the Public Experimental Orchard of Kom Ombo Research Station, Hort. Res. Instit., Agric. Res. Center during the two consecutive seasons of ٢٠١٠ and ٢٠١١. Thirty offshoots derived Sakkoti dry date palms were selected planted at ٧ × ٧ meters apart.

Soil is classified as silty clay in texture with water table depth not less than two meters. The results of orchard soil analysis according to Chapman and Pratt (١٩٧٥) are given in Table ١.

Table ١: Mechanical, physical and chemical analysis of the tested orchard soil.

Characters	values
Particle size distribution:	
Sand %	: ١٠.٦٠
Clay %	: ٣١.٤٠
Silt %	: ٥٨.٠٠
Texture grade	: Silty clay
pH (١:٢.٥ extract)	: ٨.٠٠
E.C (١: ٢.٥ extract) mm hos/ ٢٠° C/١cm^{٣})	: ٠.٩١
O.M. %	: ٢.٠٩
$CaCO_{٣}$ %	: ١.٢٢
Macronutrients values:	
Total N %	: ٠.١١
P (ppm, Olsen method)	: ٢٠.٠٠
K (ppm, ammonium acetate)	: ٤١٩.٠٠
Mg (ppm)	: ٧٩.٠٠
S (ppm)	: ٦.٩٠
B (hot water extractable)	: ٠.٢٧
Available Zn, Fe, Mn and Cu (EDTA extractable, ppm)	
Zn	: ١.٣١
Fe	: ١١.٠٠
Mn	: ١٠.١٨
Cu	: ١.٦٠

The experiment included the following ten treatments from inorganic (ammonium nitrate, ٣٣.٥ % N), organic (Filter mud, ٢ % N) and biofertilization (Minia Azotene).

١- Application of the suitable N (١٠٠٠ g./ palm/ year) as ١٠٠ % inorganic source (٢٩٨٥.٠ g. ammonium nitrate/ palm/ year)

٢- Application of the suitable N as ٨٠ % inorganic source (٢٣٨٨.٠ g. ammonium nitrate/ palm/ year) and ٢٠ % organic source (١٠.٠ kg. Filter mud/ palm/ year).

٣- Application of the suitable N as ٨٠ % inorganic source (٢٣٨٨.٠ g. ammonium nitrate/ palm/ year) + ١٠ % organic source (٥.٠ kg.

Filter mud/ palm/ year) and ١٠ % bioform (١٠٠ g. Minia Azotene/ palm/ year).

٤- Application of the suitable N as ٦٠ % inorganic source (١٧٩١.٠ g. ammonium nitrate/ palm/ year) and ٤٠ % organic source (٢٠.٠ kg. Filter mud/ palm/ year).

٥- Application of the suitable N as ٦٠ % inorganic source (١٧٩١.٠ g. ammonium nitrate/ palm/ year) + ٢٠ % organic source (١٠.٠ kg. Filter mud/ palm/ year) and ٢٠ % bioform (٢٠٠ g. Minia Azotene/ palm/ year).

٦- Application of the suitable N through ٤٠ % inorganic source (١١٩٤.٠ g. ammonium nitrate/ palm/ year) and ٦٠ % organic source (٣٠.٠ kg. Filter mud/ palm/ year).

٧- Application of the suitable N through ٤٠ % inorganic source (١١٩٤.٠ g. ammonium nitrate/ palm/ year) + ٣٠ % organic source (١٥.٠ kg. Filter mud/ palm/ year) and ٣٠ % bioform (٣٠٠ g. Minia Azotene/ palm/ year).

٨- Application of the suitable N through ٢٠ % inorganic source (٥٩٧.٠ g. ammonium nitrate/ palm/ year) and ٨٠ % organic source (٤٠.٠ kg. Filter mud/ palm/ year).

٩- Application of the suitable N through ٢٠ % inorganic source (٥٩٧.٠ g. ammonium nitrate/ palm/ year) + ٤٠ % organic source (٢٠.٠ kg. Filter mud/ palm/ year) and ٤٠ % bio organic form (٤٠٠ g. Minia Azotene/ palm/ year).

١٠- Application of the suitable N through no inorganic source (٠.٠ g. ammonium nitrate/ palm/ year) + ٥٠ % organic source (٢٥.٠ kg. Filter mud/ palm/ year) and ٥٠ % bioform (٠.٥ kg. Minia Azotene/ palm/ year).

Each treatment was replicated three times, one palm per each. Inorganic, organic and bioforms of N were added in the forms of ammonium nitrate (٣٣.٥ % N), Filter mud (٢ % N) and Minia Azotene, respectively. Ammonium nitrate as inorganic N source was divided into three equal batches and applied at the first week of March, May and July for both seasons. Filter mud was added once at the Last week of Jan each season. Minia Azotene N biofertilizer was

applied once on the middle of Feb. in both seasons. The experiment was arranged in a complete randomized block design.

Morphology of leaves was examined on the four full size leaves/ palm (one leaf at each side). Measurements included leaf length and width, number of leaflets/ leaf, average width and length of leaflet (cm) on ٨ leaflets per each leaf. Leaflet area (cm٢) was determined according to Ahmed and Morsy (١٩٩٩) equation: Leaflet area = (W × L) × ٠.٦٧ + ١٠.٢٩, in which W and L are the maximum width and length of leaflet. Then leaf area (m٢) was calculated by multiplying the number of leaflet/ leaf by the leaf area of leaflet. Also, total surface area of palm (m٢) was estimated by multiplying number of leaves per palm by total leaf area (m٢). Number of spines per leaf was also recorded. The percentages of N, P and K in the leaf was followed by taking one six-month old labeled leaf per palm was (at the first week of August annually) and the medium four pinnae. The concentrations of N, P and K in the dried pinnae were determined according to the procedures outlined by Chapman and Pratt (١٩٧٥).

Bunches (ten) of Sakkoti date palms were picked at the optimum commercial harvesting time under Aswan region conditions (٣rd of August) in the two experimental seasons. The yield of each palm was recorded in terms of weight (kg)/ palm by multiplying the average bunch weight by total number of bunches per palm (ten bunches). Samples of fifty dates from each replicate were taken for dermination of weights of fruit, total soluble solids % (T.S.S. %), total sugars (A.O.A.C, ١٩٩٥), total acidity (g malic acid/ ١٠٠ g pulp), tannins content (Balbaa, ١٩٨١) and crude fibers content (A.O.A.C, ١٩٩٥). The obtained data were tabulated and subjected to the proper statistical analysis of variance using New L.S.D. test for recognizing the significance differences among the various treatment means according to the method outlined by Mead *et al*., (١٩٩٣).

RESULTS AND DISCUSSION

Growth characters:

It is clear from the data in Tables ٢ and ٣ that varying N management had significant effect on all growth characters namely,

Table ٢: Effect of different proportions of inorganic, organic and bioforms of N on number of leaflet/ leaf, leaflet area (cm^2), leaf area and total surface area of palm (m^2) of Sakkoti date palms during ٢٠١٠ and ٢٠١١ seasons.

Different inorganic, organic and biofertilization treatments	No. of leaflet/ leaf		Leaflet area (cm^2)	
	٢٠١٠	٢٠١١	٢٠١٠	٢٠١١
١- ١٠٠ % inorganic (inorg.)	١٨٢.٠	١٨٣.٠	١٢٣.٢	١٢٦.٨
٢- ٨٠ % inorg. + ٢٠ % organic	١٨٧.٠	١٨٨.٠	١٢٧.٧	١٣١.٤
٣- ٨٠ % inorg. + ١٠ % organic + ١٠ % bio.	١٩١.٠	١٩٢.٠	١٣١.٦	١٣٥.١
٤- ٦٠ % inorg. + ٤٠ % organic	١٩٦.٠	١٩٨.٠	١٣٧.٠	١٤٠.٩
٥- ٦٠ % inorg. + ٢٠ % organic + ٢٠ % bio.	٢٠١.٠	٢٠٣.٠	١٤١.٥	١٤٥.٧
٦- ٤٠ % inorg. + ٦٠ % organic	١٧٣.٠	١٧٤.٠	١١٣.٦	١١٧.٦
٧- ٤٠ % inorg. + ٣٠ % organic + ٣٠ % bio.	١٧٧.٠	١٧٩.٠	١١٦.٨	١٢٠.٥
٨- ٢٠ % inorg. + ٨٠ % organic	١٦٤.٠	١٦٥.٠	١٠٦.٦	١٠٩.٧
٩- ٢٠ % inorg. + ٤٠ % organic + ٤٠ % bio.	١٦٨.٠	١٦٩.٠	١١٠.٢	١١٣.٩
١٠- ٠.٠ % inorg. + ٥٠ % organic + ٥٠ % bio.	١٦٠.٠	١٥٧.٠	١٠٣.١	١٠٦.٦
New L.S.D at ٥ %	٣.٦	٣.٥	١.٨	٢.٠
Characters	**Leaf area (cm^2)**		**Total surface area of palm (m^2)**	
١- ١٠٠ % inorganic (inorg.)	٢.٢٤	٢.٣٢	٢٢.٤	٢٣.٢
٢- ٨٠ % inorg. + ٢٠ % organic	٢.٣٩	٢.٤٧	٢٣.٩	٢٤.٧
٣- ٨٠ % inorg. + ١٠ % organic + ١٠ % bio.	٢.٥١	٢.٥٩	٢٥.١	٢٥.٩
٤- ٦٠ % inorg. + ٤٠ % organic	٢.٦٩	٢.٧٩	٢٦.٩	٢٧.٩
٥- ٦٠ % inorg. + ٢٠ % organic + ٢٠ % bio.	٢.٨٤	٢.٩٦	٢٨.٤	٢٩.٦
٦- ٤٠ % inorg. + ٦٠ % organic	١.٩٧	٢.٠٥	١٩.٧	٢٠.٥
٧- ٤٠ % inorg. + ٣٠ % organic + ٣٠ % bio.	٢.٠٧	٢.١٦	٢٠.٧	٢١.٦
٨- ٢٠ % inorg. + ٨٠ % organic	١.٧٥	١.٨١	١٧.٥	١٨.١
٩- ٢٠ % inorg. + ٤٠ % organic + ٤٠ % bio.	١.٨٥	١.٩٢	١٨.٥	١٩.٢
١٠- ٠.٠ % inorg. + ٥٠ % organic + ٥٠ % bio.	١.٦٥	١.٦٧	١٦.٥	١٦.٧
New L.S.D at ٥ %	٠.٠٨	٠.٠٧	٠.٨	٠.٩

Table ٣: Effect of different proportions of inorganic, organic and bioforms of N on number of spines/leaf and percentages of N, P and K in the leaves of Sakkoti date palms during ٢٠١٠ and ٢٠١١ season.

Different inorganic, organic and biofertilization treatments	No. of spines/ leaf		Leaf N %	
	٢٠١٠	٢٠١١	٢٠١٠	٢٠١١
١- ١٠٠ % inorganic (inorg.)	٢٠.٠	٢١.٥	١.٤٩	١.٥٥
٢- ٨٠ % inorg. + ٢٠ % organic	٢٠.٧	٢٢.٠	١.٥٧	١.٦٣
٣- ٨٠ % inorg. + ١٠ % organic + ١٠ % bio.	٢١.٤	٢٢.٦	١.٦٠	١.٦٦
٤- ٦٠ % inorg. + ٤٠ % organic	٢٢.٠	٢٣.٠	١.٧١	١.٧٨
٥- ٦٠ % inorg. + ٢٠ % organic + ٢٠ % bio.	٢٢.٥	٢٣.٤	١.٨٠	١.٨٧
٦- ٤٠ % inorg. + ٦٠ % organic	١٨.٦	٢٠.١	١.٨٩	١.٩٦
٧- ٤٠ % inorg. + ٣٠ % organic + ٣٠ % bio.	١٩.٢	٢٠.٧	١.٩٩	٢.٠٥
٨- ٢٠ % inorg. + ٨٠ % organic	١٧.٦	١٩.١	٢.١٥	٢.٢٣
٩- ٢٠ % inorg. + ٤٠ % organic + ٤٠ % bio.	١٨.١	١٩.٧	٢.٢٩	٢.٣٧
١٠- ٠.٠ % inorg. + ٥٠ % organic + ٥٠ % bio.	١٧.٠	١٨.٥	٢.٤١	٢.٤٨
New L.S.D at ٥ %	٠.٣	٠.٣	٠.٠٦	٠.٠٧
Characters	Leaf P %		Leaf K %	
١- ١٠٠ % inorganic (inorg.)	٠.١٤	٠.١٦	١.٣١	١.٣٦
٢- ٨٠ % inorg. + ٢٠ % organic	٠.١٧	٠.١٩	١.٣٩	١.٤٤
٣- ٨٠ % inorg. + ١٠ % organic + ١٠ % bio.	٠.٢٠	٠.٢٢	١.٤٧	١.٥٣
٤- ٦٠ % inorg. + ٤٠ % organic	٠.٢٢	٠.٢٥	١.٥٥	١.٦١
٥- ٦٠ % inorg. + ٢٠ % organic + ٢٠ % bio.	٠.٢٥	٠.٢٩	١.٦٢	١.٧١
٦- ٤٠ % inorg. + ٦٠ % organic	٠.٢٨	٠.٣٢	١.٧٠	١.٨٠
٧- ٤٠ % inorg. + ٣٠ % organic + ٣٠ % bio.	٠.٣١	٠.٣٦	١.٧٨	١.٨٨
٨- ٢٠ % inorg. + ٨٠ % organic	٠.٣٣	٠.٤٠	١.٨٤	١.٩٥
٩- ٢٠ % inorg. + ٤٠ % organic + ٤٠ % bio.	٠.٣٦	٠.٤٣	١.٩١	٢.٠٣
١٠- ٠.٠ % inorg. + ٥٠ % organic + ٥٠ % bio.	٠.٣٨	٠.٤٦	١.٩٨	٢.١١
New L.S.D at ٥ %	٠.٠٢	٠.٠٣	٠.٠٦	٠.٠٧

number of leaflet/ leaf, area of leaflet and leaf, total surface area of palm and number of spines per leaf. Application of the suitable N through ٦٠ to ٨٠ % inorganic N plus ٢٠ to ٤٠ % organic and biofertilization significantly enhanced growth characters compared with using N completely via inorganic form or using inorganic N at percentages lower than ٦٠ %. Application of the suitable N through the three forms of N was preferable than using one or two sources of N in stimulating growth characters. The maximum values were recorded on the palms that received N as ٦٠ % inorganic, ٢٠ % organic and ٢٠ % bioforms of N. Application of the suitable N as ٥٠ % organic and ٥٠ % bioform resulted in the minimum values. These results were true during ٢٠١٠ and ٢٠١١ seasons.

These results are in agreement with those obtained by Melouk *et al*., (١٩٩٩); Osman (٢٠٠٣); Shahein *et al*., (٢٠٠٣) and Ahmed- Samah (٢٠١١).

Percentages of N, P and K in the leaves:

As shown in Table ٣ percentages of N, P and K in the leaves varied significantly according to the sources and the proportions of N. They improved gradually with decreasing the proportions of inorganic N from ١٠٠ to ٠.٠ % and at the same time increasing the proportions of organic and biofertilizers from ٠.٠ to ١٠٠ %. Fertilization with N as ٥٠ % organic + ٥٠ % bioforms of N gave the maximum values. Inorganic fertilization of N alone gave the minimum values. In all cases, using the suitable N through all sources gave the highest values comparing with using N via one or two sources during both seasons.

These results are in harmony with those obtained by Mansour *et al*., (٢٠٠٤); Gobara and Ahmed (٢٠٠٤); Diab (٢٠٠٦); Morsi (٢٠٠٩) and Ibrahiem- Zenib (٢٠١٠).

Yield per palm:

It is clear from the data in Table ٤ that yield per palm was significantly affected by varying N management. Fertilization of the palms with N as ٦٠ – ٨٠ inorganic plus ٢٠ to ٤٠ % organic and biofertilization significantly improved yield compared with using N completely via inorganic form or using inorganic N at percentages lower than ٦٠ %. Yield was significantly declined with using

inorganic N at percentages lower than ٦٠ % of the suitable N. Reducing inorganic N from ٦٠ to ٠.٠ % and at the same time increasing percentages of organic and biofertilization from ٤٠ to ١٠٠ % caused a gradual reduction in the yield. The maximum yield was presented on the palms that were fertilized with N as ٦٠ % inorganic + ٢٠ % organic + ٢٠ % bioforms of N. The vice versa was obtained with using N completely via organic and biofertilization, during both two experimental seasons.

The promoting effect on yield by using N through all sources was also reported by Almadini and Al- Gosoibi (٢٠٠٧); Al- Kharusi- Latifa *et al.,* (٢٠٠٩) and Ahmed- Samah (٢٠١١).

Physical and chemical characters of the fruits:

Data in Tables ٤ and ٥ show that fruit quality significantly varied according to sources and proportions of N. Decreasing the proportions of inorganic N from ١٠٠ to ٠.٠ % and at the same time increasing the proportions of organic and biofertilization from ٠.٠ to ١٠٠ % significantly caused a gradual promotion in fruits quality i.e increasing fruit weight, total soluble solids and total sugars and reducing total acidity, crude fibre, soluble tannins and nitrite. Combined application of all N sources was preferable in improving quality compared with using N through one or two sources. Complete application of N as inorganic N gave unfavourable effects on physical and chemical characters of the fruits. The best results were obtained when N was added as ٥٠ % organic form plus bioform at ٥٠ %. These results were true during both seasons.

These results are in agreement with those obtained by Osman (٢٠٠٩); Souna- Faiza *et al.,* (٢٠١٠) and Ahmed- Samah (٢٠١١).

The positive effect of organic and biofertilization on fruiting of Sakkoti data palms could be due to great improving in soil fertility, availability of nutrients, natural hormones, antibiotics and the biosynthesis of organic foods (Kannaiyan, ٢٠٠٢).

As a conclusion, the best results with regard to yield and quality of Sakkoti date palms grown under Aswan regions were obtained with supplying the palms during each season with the suitable N (١٠٠٠ g/ palm) as ٦٠ % in organic + ٢٠ % organic + ٢٠ % biform.

Table ٤: Effect of different proportions of inorganic, organic and bioforms of N on the yield/ palm (kg.), fruit weight (g.), percentages of total soluble solids and total sugars of fruits of Sakkoti date palms during ٢٠١٠ and ٢٠١١ season.

Different inorganic, organic and biofertilization treatments	Yield/ palm (kg.)		Fruit weight (g.)	
	٢٠١٠	٢٠١١	٢٠١٠	٢٠١١
١- ١٠٠ % inorganic (inorg.)	٩٣.٠	١١٠.٠	٩.٠٠	٩.٠٥
٢- ٨٠ % inorg. + ٢٠ % organic	٩٩.٠	١١٥.٠	٩.٣٧	٩.٤٠
٣- ٨٠ % inorg. + ١٠ % organic + ١٠ % bio.	١٠٥.٠	١٢٠.٠	٩.٥٨	٩.٦٠
٤- ٦٠ % inorg. + ٤٠ % organic	١١٠.٠	١٢٦.٠	٩.٧٩	٩.٨٠
٥- ٦٠ % inorg. + ٢٠ % organic + ٢٠ % bio.	١١٥.٠	١٣٢.٠	١٠.٠٠	١٠.٠٢
٦- ٤٠ % inorg. + ٦٠ % organic	٨٧.٠	١٠٠.٠	١٠.٣١	١٠.٣٣
٧- ٤٠ % inorg. + ٣٠ % organic + ٣٠ % bio.	٩٠.٠	١٠٥.٠	١٠.٥٣	١٠.٥٥
٨- ٢٠ % inorg. + ٨٠ % organic	٨٤.٠	٨٨.٠	١٠.٦٧	١٠.٦٨
٩- ٢٠ % inorg. + ٤٠ % organic + ٤٠ % bio.	٨٨.٠	٩٣.٠	١٠.٨١	١٠.٨٢
١٠- ٠.٠ % inorg. + ٥٠ % organic + ٥٠ % bio.	٨٠.٠	٨٤.٠	١٠.٩٦	١٠.٩٦
New L.S.D at ٥ %	٢.٢	٣.٠	٠.١٤	٠.١٦
Characters	**T.S.S %**		**Total sugars %**	
١- ١٠٠ % inorganic (inorg.)	٦٨.٠	٦٩.٠	٦٣.٢	٦٤.٠
٢- ٨٠ % inorg. + ٢٠ % organic	٦٨.٦	٦٩.٠	٦٣.٦	٦٤.٣
٣- ٨٠ % inorg. + ١٠ % organic + ١٠ % bio.	٦٩.٥	٧٠.٢	٦٤.٠	٦٤.٧
٤- ٦٠ % inorg. + ٤٠ % organic	٧٠.٠	٧٠.٨	٦٤.٤	٦٥.٠
٥- ٦٠ % inorg. + ٢٠ % organic + ٢٠ % bio.	٧٠.٦	٧١.٨	٦٤.٩	٦٥.٤
٦- ٤٠ % inorg. + ٦٠ % organic	٧١.٢	٧٢.٠	٦٥.٣	٦٥.٨
٧- ٤٠ % inorg. + ٣٠ % organic + ٣٠ % bio.	٧٢.٠	٧٢.٦	٦٥.٦	٦٦.١
٨- ٢٠ % inorg. + ٨٠ % organic	٧٢.٦	٧٣.٨	٦٦.٠	٦٦.٥
٩- ٢٠ % inorg. + ٤٠ % organic + ٤٠ % bio.	٧٣.٠	٧٤.٣	٦٦.٤	٦٦.٨

١٠- ٠.٠ % inorg. + ٥٠ % organic + ٥٠ % bio.	٧٣.٥	٧٤.٩	٦٦.٧	٦٧.٢
New L.S.D at ٥ %	٠.٤	٠.٥	٠.٣	٠.٣

Table ٥: Effect of different proportions of inorganic, organic and bioforms of N on some chemical characters of the fruits of Sakkoti date palms during ٢٠١٠ and ٢٠١١ season.

Different inorganic, organic and biofertilization treatments	Total acidity %		Crude fibre %	
	٢٠١٠	٢٠١١	٢٠١٠	٢٠١١
١- ١٠٠ % inorganic (inorg.)	٠.٣٧٦	٠.٣٧٠	٢.١١	٢.١٢
٢- ٨٠ % inorg. + ٢٠ % organic	٠.٣٥٨	٠.٣٥٢	٢.٠٧	٢.٠٨
٣- ٨٠ % inorg. + ١٠ % organic + ١٠ % bio.	٠.٣٤٠	٠.٣٣٥	٢.٠٢	٢.٠٤
٤- ٦٠ % inorg. + ٤٠ % organic	٠.٣٢١	٠.٣١٧	١.٩٨	١.٩٧
٥- ٦٠ % inorg. + ٢٠ % organic + ٢٠ % bio.	٠.٣٠٠	٠.٢٩٩	١.٩٤	١.٩٢
٦- ٤٠ % inorg. + ٦٠ % organic	٠.٢٨٠	٠.٢٧٩	١.٩٠	١.٨٨
٧- ٤٠ % inorg. + ٣٠ % organic + ٣٠ % bio.	٠.٢٦٠	٠.٢٦٢	١.٨٧	١.٨٠
٨- ٢٠ % inorg. + ٨٠ % organic	٠.٢٤٠	٠.٢٤٤	١.٨٣	١.٧٠
٩- ٢٠ % inorg. + ٤٠ % organic + ٤٠ % bio.	٠.٢٢٢	٠.٢٢٧	١.٨٠	١.٦٢
١٠- ٠.٠ % inorg. + ٥٠ % organic + ٥٠ % bio.	٠.٢٠٥	٠.٢٠٨	١.٦٩	١.٥٧
New L.S.D at ٥ %	٠.٠١٨	٠.٠١٧	٠.٠٣	٠.٠٣
Characters	**Soluble tannins %**		**Nitrite in the fruits (mg/ ١٠٠ g.)**	
١- ١٠٠ % inorganic (inorg.)	٠.٦٤	٠.٦٤	٥.٩٩	٦.٢٢
٢- ٨٠ % inorg. + ٢٠ % organic	٠.٦٠	٠.٥٨	٥.٢٢	٥.٠٠
٣- ٨٠ % inorg. + ١٠ % organic + ١٠ % bio.	٠.٥٧	٠.٥٥	٤.٩٠	٤.٧٠
٤- ٦٠ % inorg. + ٤٠ % organic	٠.٥٣	٠.٥٠	٣.١١	٢.٩٧
٥- ٦٠ % inorg. + ٢٠ % organic + ٢٠ % bio.	٠.٥٠	٠.٤٧	٢.٨٠	٢.٦٠
٦- ٤٠ % inorg. + ٦٠ % organic	٠.٤١	٠.٣٧	٢.٥٥	٢.٣٠
٧- ٤٠ % inorg. + ٣٠ % organic + ٣٠ % bio.	٠.٣٠	٠.٢٩	٢.٣٠	٢.٠٠
٨- ٢٠ % inorg. + ٨٠ % organic	٠.٢٧	٠.٢٦	٢.٠٥	١.٧٢
٩- ٢٠ % inorg. + ٤٠ % organic + ٤٠ % bio.	٠.٢٤	٠.٢٠	١.٩٠	١.٤٠
١٠- ٠.٠ % inorg. + ٥٠ % organic + ٥٠ % bio.	٠.٢٠	٠.١٧	١.٦٢	١.١٠
New L.S.D at ٥ %	٠.٠٢	٠.٠٢	٠.٢٢	٠.٢٦

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"تقليل الاسمدة النيتروجينية غيرالعضوية جزئيا في بساتين نخيل البلح السكوتي باستخدام التسميد العضوي والحيوي"

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** المعمل المركزي للزراعة العضوية – مركز البحوث الزراعية – الجيزة – مصر.

أجريت هذه الدراسة خلال موسمي ٢٠١٠، ٢٠١١ لمحاولة لتقليل الاسمدة الكيماوية جزئيا في بساتين نخيل البلح السكوتي تحت ظروف منطقة أسوان باستخدام التسميد العضوي (طينة المرشحات) والحيوي (المنيا أزوتين) ولقد تم استخدام الاسمدة غيرالعضوية والعضوية والحيوية بنسب مختلفة

كان تسميد نخيل البلح السكوتي بالكمية المثلي من النيتروجين في صورة ٦٠ الي ٨٠ % مصدر غير عضوي ، ٢٠ الي ٤٠ % اسمدة عضوية وحيوية فعالا جدا في تحسين جميع الصفات الخضرية وكمية محصول النخلة وذلك بالمقارنة باستخدام النيتروجين كليا في الصورة غير العضوية وكان هناك تحسن تدريجي في قيم عناصر النيتروجين والفوسفور والبوتاسيوم وكذلك خصائص الجودة للثمار بنقص النسبة المئوية للسماد النيتروجيني غير العضوي من ١٠٠ الي صفر % وفي نفس الوقت زيادة النسبة المئوية للأسمدة العضوية والحيوية من صفر الي ١٠٠ % وكان التحسن في صفات الجودة متمثلا في زيادة وزن الثمرة والنسبة المئوية للمواد الصلبة الذائبة الكلية والسكريات الكلية وفي تقليل الحموضة الكلية والألياف والتانينات والنيتريت

لأجل تحسين انتاجية نخيل البلح السكوتي كما ونوعا كذلك تقليل تلوث الثمار بالنيتريت فإنه ينصح بتسميد النخيل بالنيتروجين المناسب (١٠٠٠ جرام للنخلة/ سنويا) في صورة الأسمدة غير العضوية والعضوية والحيوية بنسبة ٦٠ %، ٢٠ %، ٢٠ % علي التوالي ولهذا يوصي باستبدال ٤٠ % من الأسمدة غير العضوية بالأسمدة العضوية والحيوية لانتاج ثمار عضوية قليلة التلوث بالاسمدة المعدنية.