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RESPONSE OF THOMPSON SEEDLESS GRAPEVINES TO APPLICATION OF METHYLENE UREA AND SOME SLOW RELEASE N FERTILIZERS AS APARTIAL REPLACEMENT OF THE FAST RELEASE MINERAL UREA FERTILIZERS

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ABSTRACT

Thompson Seedless grapevines were fertilized with three slow release fertilizers namely P and S coated urea and methylene urea each at 25 & 50 % of N as a replacement of the soluble fertilizer urea.

Application of any one of the three slow release N fertilizers (P & S coated urea and methylene urea) was superior than using urea the fast release N fertilizer in enhancing all growth aspects , leaf pigments, nutrients (N, P, K, & Mg), berry setting %, yield and berry quality of the berries. Slow release fertilizer treatments effectively lowered both nitrate and nitrite in berry juice when compared with using urea. The best slow release fertilizer in this respect was methylene urea. Sulphur-coated urea occupied the last position in this respect. Using any slow release N fertilizer above 25% of the suitable N had no material effect on all the investigated characteristics.

Fertilizing Thompson Seedless grapevines with the suitable N (80 g. N/ yr.) as 25% N via methelen urea (89 g. N/ vine / yr.) is suggested to be beneficial for improving yield and quality of Thompson seedless grapevines.

Keywords: Slow release N fertilizers, Thompson seedless grapevines, yield and berries quality.

INTRODUCTION

During the last few years, newly controlled release fertilizers were developed to improve the efficiency of using nutrients, minimize the loss of nutrients via leaching and to reduce the pollution (Travis, 1971 and Nijjar, 1985). They are useful in supplying the trees with their requirements from various essential nutrients during all stages of plant development (Wang and Alva, 1996). In this respect, Travis (1971) stated that using slow release N fertilizers is responsible for controlling the uptake of N by the trees and at the same time supplying these trees with the available N at all stages of growth.

Previous studies was carried out, since Ahmed and El- Dawwey, (1992); Ahmed *et al.*, (1993) and Mikkelesen *et al.*, (1994). The results of Ragab *et al.*, (1996); Akl *et al.*, (1997); Ali- Mervet, (2000); Wassel *et al.*, (2000); Kandil *et al.*, (2010); Zhan *et al.*, (2011); Abd El- Aziz, (2012); Ahmed and Abada, (2012) and Wei *et al.*, (2012) emphasized the favourable effects of using slow release fertilizers as a replacement of fast ones on enhancing yield and fruit quality of fruit crops and another horticultural crops. Recently, (Alam, 2014) suggested that using slow release fertilizers was very effective in enhancing yield and berries quality of Superior seedless grapevines grown under Minia region conditions.

The goal of this study was examining the impact of replacing some slow release N fertilizers against those fast ones on fruiting of Thompson seedless grapevines.

MATERIALS AND METHODS

This study was carried out during 2014 and 2015 seasons on 48 10-years old Thompson seedless grapevine. The chosen vines were similar in growth as possible and they were planted in a sandy loam soil under surface irrigation system and spaced at 2x2 meters apart in a private vineyard located at West Samalout, Minia governorate. The vines were head pruned during the first week of Jan. during both seasons by leaving vine 72 eyes (10 long fruiting spurs x six eyes plus six renewal spurs x two eyes). Soil analysis was done (Wilde *et al.*, 1985) and the data are shown in table (1).

Table (1): Analysis of the tested soil

Characters	Values
Sand %	56.66
Silty %	21.67
Clay %	21.67
Texture	Sandy loam
Organic matter %	1.42
pH (1: 2.5 extract)	7.75
EC (1: 2.5 extract) (mmhos / 1 cm/ 25 ^{o}C)	1.11
$CaCO_3$ %	1.92
Total N %	0.09
Available P (ppm, Olsen)	2.20
Available (ppm , ammonium acetate)	21.0

The selected vines received the common horticultural practices that already applied in the vineyard except those dealing with the addition of slow and fast released fertilizers.

This study included the following eight treatments:

1- Supplying the vines with N (80 g. / vine / yr.) through 100% N via urea (46.5%) (172 g. urea / vine/ yr.) .
2- Supplying the vines with N as 50% N via urea (86 g. urea / vine/ yr.).
3- Supplying the vines with N as 50% N via phosphour-coated urea (37.11 % N) (108 g. / vine / yr.).
4- Supplying the vines with N as 25% N via phosphour-coated urea (54 g. / vine / yr.).
5- Supplying the vines with N as 50% N via sulphur - coated urea (41 % N) (98 g. / vine / yr.).
6- Supplying the vines with N as 25 % N via sulphur - coated urea (49 g. / vine / yr.).
7- Supplying the vines with N as 50% N via methylene urea (22.5 % N) (178 g. / vine / yr.).
8- Supplying the vines with N as 25 % N via methylene urea (89 g. / vine / yr.).

Each treatment was replicated three times, two vines per each replicate. All the selected vines (48 vines) were received N at fixed rate namely 80 g. N/ vine/ yr. (Ahmed and Abada, 2012). The fast release N fertilizer namely urea was added at three unequal batches 40% at growth start (first week of March), 40% just after berry setting (3rd week of May) and 20% two week prior verasion stage (1st week of June). The three slow release fertilizers were added once at growth start (1st week of March). They were added on drenches around the vines (10 x 10x 10 cm. dimensions).

Experiment consists of eight treatments arranged as a Randomized complete block design (RCBD). Each treatment was replicated three times and each replicate included two vines.

The following parameters were measured to evaluate the tested treatments:

1- Vegetative growth aspects namely main shoot length (cm.) leaf area (cm.^{2}) (Ahmed and Morsy, 1999), number of leaves per shoot, cane thickness (cm.) , weight of removal one- year old wood (kg.) / vine and ripening coefficient (length of brownish wood / total length).
2- Leaf pigments namely chlorophylls a & b, total chlorophylls and total carotenoids as mg. / 100 g. F.W. (Von- Wettstein, 1957).
3- Leaf content of N, P, K and Mg in the petioles (from leaves opposite to the basal clusters) before verasion stage on dry weight basis (Summer, 1985 and Wilde *et al*., 1985).
4- Yield as well as percentage of berry setting expressed as number of clusters per vine and weight (kg.) as well as cluster weight (g.) and dimensions (width & length cm.).
5- Physical and chemical characteristics of the berries namely average berry weight (cm.), T.S.S. %, reducing sugars %, titratable acidity % (as tartaric acid / 100 ml. juice), T.S.S./ acid, total carotenoids (mg./ 100 g. F.W.) according to A.O.A.C. (2000) and both nitrate and nitrite (as ppm.) in the juice according to Ridnour – Lisa *et al*., (2000).

Statistical analysis was done using the procedure of Mead *et al*., (1993) and the treatment means were compared using new L.S.D. at 5%.

RESULTS AND DISCUSSION

1-Vegetative growth aspects:

It is clear from Table (2) that supplying Thompson seedless grapevines with N (80 g. N/ vine/ yr.) as 50% N through any one of the three slow release fertilizers (P or S coated urea and methylene urea) significantly stimulated main shoot length, leaf area, number of leaves/ shoot, cane thickness, wood pruning weight and wood ripening coefficient compared to using the fast release urea fertilizer. The best slow release fertilizers, in ascending order were P- coated urea, S-coated urea and methylene urea. Significant differences on these growth characters were observed among the four slow and fast release fertilizers. Increasing the levels of urea from 50 to 100 % N had significant promotion on these growth characteristics. However, increasing the percentages of N from 25 to 50% applied via slow release fertilizers failed to show significant promotion on these growth traits. Using the suitable N (80 g. / N/ vine/ yr.) via the slow release fertilizer methylene urea at 50% N gave the maximum values of main shoot length (116.6 & 118.3 cm.), leaf area (90.6 & 92.7%), number of leaves/ shoot (31 & 33) , cane thickness (1.20 & 1.28 cm.), pruning wood weight (3.3 & 3.0 kg.) and wood ripening coefficient (0.91 & 0.92) during both seasons, respectively. The minimum values were recorded on the vines that received N as 25% via urea. These results were true during both seasons.

Table (2): Effect of using the three slow release fertilizers as a replacement of the soluble fertilizer urea on some growth aspects of Thompson seedless grapevines during 2014 & 2015 seasons.

Treatment	Main shoot length (cm.)		Leaf area (cm.)^2		No. of leaves / shoot		Cane thickness (cm.)		Pruning weight (kg./ vine)		Wood ripening coefficient	
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
Urea via 100% N	105.0	106.6	80.3	82.0	22.0	24.0	0.96	1.01	2.2	1.9	0.72	0.66
Urea via 50% N	101.0	102.7	79.0	80.6	20.0	21.0	0.90	0.95	1.9	1.7	0.65	0.60
P- coated urea via 50 % N	108.7	110.3	83.0	84.7	25.0	27.0	1.01	1.06	2.7	2.3	0.79	0.71
P- coated urea via 25 % N	108.0	109.6	82.6	84.3	24.0	26.0	1.00	1.05	2.6	2.2	0.77	0.70
S- coated urea via 50 % N	113.3	115.0	87.1	88.9	28.0	31.0	1.10	1.15	3.0	2.7	0.87	0.80
S- coated urea via 25 % N	112.9	114.6	86.9	88.5	27.0	30.0	1.09	1.14	2.9	2.6	0.86	0.79
Methylene urea via 50 % N	116.6	118.3	90.6	92.7	31.0	33.0	1.20	1.28	3.3	3.0	0.91	0.92
Methylene urea via 25 % N	116.0	117.6	90.0	92.0	30.0	32.0	1.19	1.27	3.0	2.9	0.90	0.86
New L.S.D. at 5%	1.2	1.3	1.0	0.9	2.0	2.0	0.04	0.04	0.2	0.2	0.05	0.05

2- Leaf chemical composition:

Data from Tables (3 & 4) reveal that supplying the vines with N as 25 to 50 % via the three slow release fertilizer namely P or S coated urea and methylene urea had significant promotion on all pigments (chlorophylls a & b , total chlorophylls and total carotenoids) and nutrients (N, P , K& Mg) in the leaves relative to the application of urea. The promotion was slightly associated with increasing percentages of N from 50 to 100% for urea, and from 25 to 50% for the three slow release fertilizers. This stimulation on these pigments and nutrients significantly was depended on using methylene urea, S- coated urea and P- coated urea , in descending order. The maximum values of chlorophyll a (9.1 & 9.2 mg/ 100 g F.W.), chlorophyll b (3.5 & 3.4 mg/ 100 g F.W.), total chlorophylls (12.6 & 12.6 mg./ 100 g. F.W.), total carotenoids (3.6 & 3.5 mg./ 100 g. F.W.), N (2.10 & 2.12 %), P (0.33 & 0.17 %), K (1.41 & 1.46 %) and Mg (0.71 & 0.75 %) were recorded on the vines that received N as methylene urea at 50% N. Increasing the levels of urea from 50 to 100 % N caused a significant promotion on all pigments and N % and a reduction on nutrients namely P & K & Mg in the leaves . The minimum values of plant pigments and N were observed on the vines that supplied with urea at 50% N. Using urea at 100% N gave the lowest values of P, K and Mg in the leaves. Similar results were announced during 2014 & 2015 seasons.

Table (3): Effect of using the three slow release fertilizers as a replacement of the soluble fertilizer urea on some leaf pigments (mg./ 100 g. F.W.) of Thompson seedless grapevines during 2014 & 2015 seasons.

Treatment	Chlorophyll a (mg./ 100 g. F.W.)		Chlorophyll b (mg./ 100 g. F.W.)		Total chlorophylls (mg./ 100 g. F.W.)		Total carotenoids (mg./ 100 g. F.W.)	
	2014	2015	2014	2015	2014	2015	2014	2015
Urea via 100% N	6.6	7.0	2.1	2.0	8.7	9.0	2.0	1.9
Urea via 50% N	6.1	6.4	1.8	1.7	7.9	8.1	1.7	1.6
P- coated urea via 50 % N	7.4	7.7	2.5	2.4	9.9	10.1	2.5	2.4
P- coated urea via 25 % N	7.3	7.6	2.4	2.3	9.7	9.9	2.4	2.3
S- coated urea via 50 % N	8.2	8.3	3.0	2.9	11.2	11.2	3.0	2.9
S- coated urea via 25 % N	8.0	8.2	2.8	2.7	10.8	10.9	2.9	2.8
Methylene urea via 50 % N	9.1	9.2	3.5	3.4	12.6	12.6	3.6	3.5
Methylene urea via 25 % N	9.0	9.1	3.3	3.2	12.3	12.3	3.3	3.2
New L.S.D. at 5%	0.4	0.5	0.2	0.2	0.5	0.5	0.2	0.2

Table (4): Effect of using the three slow release fertilizers as a replacement of the soluble fertilizer urea on the percentages of N, P, K and Mg in the leaves of Thompson seedless grapevines during 2014 & 2015 seasons.

Treatment	Leaf N %		Leaf P %		Leaf K %		Leaf Mg %	
	2014	2015	2014	2015	2014	2015	2014	2015
Urea via 100% N	1.74	1.78	0.13	0.11	1.09	1.14	0.54	0.57
Urea via 50% N	1.66	1.71	0.16	0.17	1.15	1.19	0.58	0.60
P- coated urea via 50 % N	1.82	1.85	0.37	0.36	1.22	1.27	0.61	0.65
P- coated urea via 25 % N	1.81	1.84	0.36	0.35	1.21	1.26	0.60	0.64
S- coated urea via 50 % N	1.92	2.01	0.31	0.30	1.32	1.37	0.67	0.70
S- coated urea via 25 % N	1.90	1.95	0.30	0.29	1.31	1.36	0.66	0.69
Methylene urea via 50 % N	2.10	2.12	0.23	0.17	1.41	1.46	0.71	0.75
Methylene urea via 25 % N	2.09	2.11	0.22	0.17	1.40	1.45	0.69	0.74
New L.S.D. at 5%	0.06	0.05	0.02	0.02	0.04	0.04	0.02	0.05

3- Yield and cluster aspects:

Data in Table (5) clearly show that supplying the vines with N via the three slow release N fertilizers significantly was accompanied with improving yield expressed in number of clusters/ vine and weight (kg.) and cluster weight and dimensions (length & width) comparing to supplying the vines with urea. Significant differences on these parameters were observed between the four slow and fast release fertilizers. Increasing urea levels from 50 to 100 % N caused significant promotion on these criteria. However, insignificant promotion on these parameters were noticed with increasing the levels of the three slow release fertilizers from 25 to 50%, N. Therefore, from economical point of view, it is suggested to use any slow release N fertilizer at 25% N (20 g. N / vine / yr.) .

The best results were obtained due to using methylene urea, S- coated urea and P- coated urea, in descending order. From economical point of view, it is preferable to supply the vines with N at 25% N via methylene urea. Under such promised treatment, yield per each vine reached 9.2 and 13.7 kg. during both seasons, respectively. The vines reviewed N at 100% via urea (control treatment) produced 8.8 and 9.5 kg. during both seasons, respectively. The percentage of increment on the yield due to using methylene urea at 25% N over the check treatment reached 4.5 and 44.2 % during both seasons, respectively. These results were true during both seasons.

Table (5): Effect of using the three slow release fertilizers as a replacement of the soluble fertilizer urea on the percentage of berry setting, yield and cluster characteristics of Thompson seedless grapevines during 2014 & 2015 seasons.

Treatment	No. Of clusters / vine		Yield / vien (kg.)		Av. Cluster weiht (g.)		Av. cluster length (cm.)		Av. cluster width (cm.)	
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015
1- Urea via 100% N	24.0	26.0	8.8	9.5	366.0	364.5	13.5	14.0	8.5	8.9
2-Urea via 50% N	23.0	24.0	8.3	8.6	360.0	358.5	13.0	13.6	8.0	8.4
3-P- coated urea via 50 % N	24.0	30.0	8.9	11.1	371.0	369.0	14.1	14.6	9.2	9.7
4- P- coated urea via 25 % N	24.0	28.0	8.9	10.3	369.0	368.0	14.0	14.5	9.0	9.6
5- S- coated urea via 50 % N	24.0	32.0	9.1	12.1	378.0	377.0	15.0	15.7	10.1	10.9
6- S- coated urea via 25 % N	24.0	31.0	9.0	11.7	377.0	376.0	14.9	15.5	9.9	10.8
7- Methylene urea via 50 % N	24.0	35.0	9.2	13.5	384.0	385.0	16.1	16.3	11.0	11.6
8- Methylene urea via 25 % N	24.0	34.0	9.2	13.7	383.0	384.0	16.0	16.2	10.9	11.5
New L.S.D. at 5%	N.S	2.0	0.2	0.4	4.1	3.9	0.4	0.4	0.3	0.3

4- Quality of the berries:

From the data presented in Tables (6 & 7) it is clear that fertilizing Thompson seedless grapevines with any one of the three slow release fertilizers at 25% to 50% N caused a significant promotion on increasing berry weight , T.S.S. % , reducing sugars % , T.S.S./ acid and total carotenoids and decreasing titratable acidity , nitrite and nitrate in the juice relative to the use of urea the fast release N fertilizer at 50 to 100% N. Increasing levels of the three slow release fertilizer from 25 to 50% N failed to show significant promotion on quality of the berries. The best slow release fertilizer was methylene urea followed by sulphur- coated urea and the slow release fertilizer P- coated urea ranked the last position in this respect., The best results economically point of view on quality of the berries were recorded on the vines that received methylene urea at 25% N. These results were similar during the both seasons under the study.

Table (6): Effect of using the three slow release fertilizers as a replacement of the soluble fertilizer urea on some physical and chemical characteristics of the berries of Thompson seedless grapevines during 2014 & 2015 seasons.

Treatment	Av. Berry weight (g.)		T.S.S. %		Reducing sugars %		Titratable acidity %	
	2014	2015	2014	2015	2014	2015	2014	2015
1- Urea via 100% N	2.69	2.80	17.7	17.8	14.8	15.0	0.710	0.712
2-Urea via 50% N	2.59	2.71	18.0	18.1	15.2	15.5	0.690	0.681
3-P- coated urea via 50 % N	2.82	2.94	18.7	18.8	15.4	15.5	0.658	0.649
4- P- coated urea via 25 % N	2.80	2.93	18.4	18.7	15.3	15.4	0.660	0.651
5- S- coated urea via 50 % N	2.95	3.06	19.5	19.9	16.2	16.3	0.628	0.621
6- S- coated urea via 25 % N	2.94	3.04	19.4	19.6	16.0	16.2	0.630	0.622
7- Methylene urea via 50 % N	3.12	3.25	19.9	20.2	16.8	17.0	0.599	0.590
8- Methylene urea via 25 % N	3.11	3.23	19.8	20.0	16.7	16.9	0.601	0.592
New L.S.D. at 5%	0.10	0.9	0.2	0.3	0.3	0.3	0.018	0.017

Table (7): Effect of using the three slow release fertilizers as a replacement of the soluble fertilizer urea on some chemical characteristics of the berries of Thompson seedless grapevines during 2014 & 2015 seasons.

Treatment	T.S.S./ acid		Total carotenoids in the juice (mg./ 100 g. F.W.)		Nitrate in the juice (ppm.)		Nitrite in the juice (ppm.)	
	2014	2015	2014	2015	2014	2015	2014	2015
1- Urea via 100% N	24.9	25.0	3.92	4.42	2.50	2.39	1.12	1.07
2-Urea via 50% N	26.1	26.6	4.11	4.51	2.29	2.18	1.00	0.95
3-P- coated urea via 50 % N	28.4	29.0	4.43	4.94	2.11	2.00	1.03	0.98
4- P- coated urea via 25 % N	27.9	28.7	4.41	4.90	2.10	1.99	1.00	0.95
5- S- coated urea via 50 % N	31.3	32.0	4.58	5.12	1.72	1.61	0.79	0.74
6- S- coated urea via 25 % N	30.8	31.5	4.55	5.10	1.71	1.60	0.77	0.72
7- Methylene urea via 50 % N	33.2	34.5	5.04	5.22	1.12	1.00	0.61	0.55
8- Methylene urea via 25 % N	32.9	33.8	5.00	5.19	1.11	0.90	0.60	0.54
New L.S.D. at 5%	0.7	0.6	0.08	0.09	0.10	0.17	0.11	0.09

DISCUSSION

It is clear from our data that the previous beneficial effects of the three slow release fertilizers on fruiting of Thompson seedless grapevines might be attributed to their essential roles in minimizing the loss of nutrients via leaching as well as supplying of the vines with their requirements from nutrients at longer periods (Travis, 1971, Nijjar, 1985 and Wang and Alva, 1996). The effect of these slow release fertilizers on controlling and balancing the uptake of nutrients could give another interpretation (Wei *et al.*, 2012).

These results are in harmony with those obtained by Ahmed and El- Dawwey, (1992); Ahmed *et al.*, (1993) and Mikkelesen *et al.*, (1994). The results of Ragab *et al.*, (1996); Akl *et al.*, (1997); Ali- Mervet (2000); Kandil *et al.*, (2010); Zhan *et al.*, (2011); Ahmed and Abada (2012) and Wei *et al.*, (2012) came in the same conclusion.

CONCLUSION

According to the overall results, it could be concluded that amending Thompson seedless grapevines grown under Minia region conditions with the new slow release N fertilizer methylene urea at 20 g. N/ vine/ year (89 g./ vine / year) was sufficient for giving high yield and producing higher berries quality parameters.

REFERENCES

Ahmed, F.F. and Abada, M.A.M. (2012): Response of Thompson seedless grapevines to some slow release N, P and K fertilizers. Egypt J. Agric. Res. Vol. 90, No. (3):pp. 1-16.

Ahmed, F.F. and El- Dawwary, G.M. (1992): Did urea formaldehyde is really more effective on Red Roomy grapevines than urea the traditionally fast release fertilizer. Minia J. of Agric. Res. & Develop. Vol. 12, No1: pp.20-39.

Ahmed, F.F. and Morsy, M.H. (1999): A new method for measuring leaf area in different fruit species. Minia, J. of Agric. Res., Develop. Vol. 19 pp. 97- 105.

Ahmed, F.F.; Nofal, M.A. and Assy K.G. (1993): Growth and nutrient uptake of Flame seedless grapevine seedlings in response to fertilization with some slow and fast release N fertilizers. Minia 1st Conf. for Hort. Crops. pp. 1383-1394.

Akl, A.M.; Ahmed, F.F.; El- Morsy, F.M. and Ragab, M.A. (1997): Behaviour of Red Roomy grapevines in response to application of urea-formaldehyde, sulphur and some iron compounds. Proc. of the 1st Sc. Conf. of Agric. Sci. Fac. of Agric. Assiut Univ. (1): pp106-118.

Alam, H.M.M. (2014): Productive capacity of Superior seedless grapevines in relation to application of some slow release fertilizers, Effective microorganisms and humic acid. Ph. D. Thesis Fac. of Agric. Minia Univ. Egypt.

Ali – Mervet, A. (2000): Response of Flame seedless grapevines to slow release nitrogen fertilizers. Minia J. of Agric. Res. & Develop. 20, No. (2):pp. 239-255.

Association of Official Agricultural Chemists (2000): Official Methods of Analysis (A.O.A.C), 12th Ed., Benjamin Franklin Station, Washington D.Q, U.S.A. pp. 490-510.

Kandil, E.A.; Fawzi, M.I.F. and Shahin, M.F.M. (2010): The effect of some slow release nitrogen fertilizers on growth, nutrient status and fruiting of Mit. Ghamr Peach trees. J. Amer. Sci. 6, No. (12): pp. 195-201.

Mead, R.; Currnow, R. N. and Harted, A. M. (1993): Statistical Methods in Agricultural Biology. 2nd Ed. Chapman & Hall, London. pp. 50 -70.

Mikkelesen, L.R..; Williams, H.M. and Behel, A.D. (1994): Nitrogen leaching and plant uptake from controlled release fertilizers . Fert. Res., 37: pp. 43-50.

Nijjar, S. (1985): Nutrition of Fruit Trees. Kalyane publisher, New Delhi pp. 10- 70.

Ragab, M.A.; Ahmed, F.F. and El- Dawwey, G.M. (1996): Effect of rock phosphate and urea formaldehyde as slow release fertilizers on Red Roomy grapevines (*Vitis vinifera* L.) . Egypt Hort. Suez Canal. (2) pp. 224-2230.

Ridnour-Lisa, A.; Sim- Julia, E.; Michael, A.; David, A.; Sean, M.; Garry, R. and Douglas, R.(2000): A spectrophotometric Method for the Direct Detection and Quantitation of Nitric Oxide, Nitrite and Nitrate in Cell culture Media. Analytical Biochemistry,Vol.281:223-229.

Summer, M.E. (1985): Diagnosis and Recommendation Integrated system (DRIS) as a guide to orchard fertilization. Hort. Abst. 55, No.(8): p. 7502.

Travis, P.H. (1971): Controlled release fertilizers. Fertilizer New 5 , 6 : pp. 42-48.

Von- Wettstein, D. V. C. (1957): Clatale and der Sumbmikro Skopisne Formwechsel de Plastids. Experimental Cell Research, pp. 12 - 427.

Wang, F.L. and Alva. A.K. (1996): Leaching of nitrogen from slow release urea sources on sandy soil . Soil. Sci. Am. J. 6 : pp. 1455-1455.

Wei , J.L. ; Cui, R.Z.; Zhang, Y.F.; Yang, G.; Yu, S.F. and Li, C.M. (2012): Effect of different applications amount of controlled release fertilizer on grape. Northern Hort. pp. 20 - 55.

Wilde, S.' A.; Corey, R. B.; Layer, J. G. and Voigt, G. K. (1985): Soils and Plant Analysis for Tree Culture. Oxford and IBH publishing Co., New Delhi, India.

Zhan, S.; Chu, G. and Xiao, L. (2011): Effects of Bag controlled slow release fertilizer on the yield and quality of Crimson seedless. J. of North West Forestry Univ. pp. 6:19.

استجابة كرمات العنب الطومسون سيدلس لاستخدام الميثيلين يوريا وبعض الاسمدة النيتروجينية بطيئة التحلل كبديل جزئي لسماد اليوريا المعدنية سريع التحلل

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فى هذه التجربة تم تسميد كرمات العنب الطومسون سيدلس بثلاث اسمدة نيتروجينية بطيئة التحلل هى اليوريا المغطاة بالفوسفور واليوريا المغطاة بالكبريت والميثيلين يوريا بنسبة ٢٥ الى ٥٠% من النيتروجين كبديل للسماد النيتروجينى السريع الذوبان فى الماء (اليوريا).

ولقد أظهرت النتائج تفوق استخدام اى سماد من الاسمدة النيتروجينية البطيئة التحلل الثلاثه (اليوريا المغطاة بالفوسفور، اليوريا المغطاة بالكبريت والميثيلين يوريا) عن استخدام اليوريا سريعة الذوبان فى الماء فى تحسين جميع خصائص النمو الخضرى والصبغات فى الأوراق والعناصر الغذائية (نتروجين- فوسفور- بوتاسيوم- ماغنسيوم) وكمية محصول الكرمة وخصائص الجودة للحبات وكذلك انخفاض واضح فى محتوى عصير الحبات من عنصري النيتريت والنترات وكان افضل سماد نيتروجينى بطئ التحلل هو الميثيلين يوريا اما السماد البطئ التحلل اليوريا المغطاة بالكبريت فقد احتل المركز الاخير فى هذا الصدد ولم يؤدي استخدام اى سماد بطئ التحلل بنسبة اعلى من ٢٥% من كمية النتروجين الموصى بها الى تأثير على جميع الصفات تحت الدراسة.

لذا يقترح تسميد كرمات العنب الطومسون سيدلس بنسبة ٢٥% بالكمية الموصى بها من النتروجين (٨٠ جرام / كرمه / سنه) (٢٠ جرام / كرمه / سنه) فى هيئة السماد البطئ التحلل الميثيلين يوريا (٨٩ جرام / كرمة / سنه) وذلك لأجل تحسين كمية المحصول وخصائص الجودة للحبات.

الكلمات الدالة: الاسمدة النتروجينية بطيئة التحلل – العنب الطومسون سيدلس- كمية المحصول- خصائص الجودة للحبات.