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**ABBREVIATION LIST**

<b>AN</b>	Ammonium nitrate
<b>AS</b>	Ammonium sulphate
<b>ATSDR</b>	Agency for Toxic Substances & Disease Registry
<b>C. s</b>	Coarse sand
<b>EC</b>	Electrical conductivity
<b>EPA</b>	Environmental Protection Agency
<b>F. s</b>	Fine sand
<b>FAO</b>	Food and Agricultural Organization
<b>IARC</b>	International Agency for Research in Cancer
<b>IOM</b>	Institute of Medicine
<b>MASR</b>	Ministry of Agriculture and Soil Reclamation
<b>MCL</b>	Maximum Contaminant Level
<b>MCLG</b>	Maximum Contaminant Level Goal
<b>ODS</b>	Office of Dietary Supplements Fact Sheet
<b>OM</b>	Organic matter
<b>RD</b>	Recommended doses
<b>S.C.L</b>	Sandy clay loamy
<b>Se1</b>	Na <sub>2</sub> SeO <sub>3</sub> (5 mg.L <sup>-1</sup> )
<b>Se2</b>	Na <sub>2</sub> SeO <sub>3</sub> (10 mg.L <sup>-1</sup> )
<b>Se3</b>	Na <sub>2</sub> SeO <sub>3</sub> (15 mg.L <sup>-1</sup> )
<b>Se4</b>	Na <sub>2</sub> SeO <sub>3</sub> (20 mg.L <sup>-1</sup> )
<b>U</b>	Urea
<b>WHO</b>	World Health Organization





College	Agriculture	Department	Soils	Call no.	
Author	Hanaa Mohamed El-Maghawry Sakara	Degree	Doctor	Date	
Title	Effect of nitrogen, calcium and selenium nutrition on chemical composition and nutrition value of spinach plant ( <i>spinacia oleracea</i> ).				

### Dissertation Abstract

Two pots experiment were carried out at the Experimental Farm of Faculty of Agric. El-Mansoura Univ. in the two seasons of 2012-2013 and 2013-2014 to study the effect of nitrogen, calcium and selenium nutrition on chemical composition and nutrition value of spinach plant (*Spinacia Oleracea*). The average values of all plant growth parameters (plant height, no. Using different forms of nitrogen fertilization as ammonium nitrate, ammonium sulfate and urea significantly affected the vegetative growth parameters, within the N-forms investigation the highest mean values of all mentioned parameters recorded with adding of ammonium sulfate following with urea and lately ammonium nitrate. Spraying spinach plant with  $\text{Na}_2\text{SeO}_3$  tell the rate of  $10 \text{ mg L}^{-1}$  significantly increased the mean values of all vegetative growth parameters of spinach than those obtained from the untreated plants. Increasing the rate of sodium selenite addition in foliar way up to the level of  $20 \text{ mg L}^{-1}$  sharply and significantly decreased the mean values of all the aforementioned traits than those obtained for the untreated one. Foliar application of Ca significantly increased the mean values of chlorophyll (a, b & total  $\text{mg g}^{-1}$ ) as well as carotene  $\text{mg } 100\text{g}^{-1}$  FW in spinach leaves as compared with the untreated plants. A stimulation effect was happened on the mean values of the previously mentioned traits due to an application of the studied forms of nitrogen fertilization as ammonium nitrate, ammonium sulfate and urea. Such effect was more pronounced for the plants fertilized with ammonium sulfate, which recorded the highest values of chlorophyll (a, b & total) as well as carotene in the two seasons of the experimentation as compared to the other N-fertilization forms investigated. Exposure of spinach plants to the lowest levels of  $\text{Na}_2\text{SO}_3$  ( $5$  and  $10 \text{ mg L}^{-1}$ ) sharply and significantly increased the mean values of chlorophyll (a, b and total) as well as carotene content of spinach plants in both seasons of the experiment. The highest mean values for the previously mentioned traits were found to be associated with the addition of ammonium sulfate, while the lowest values was recorded for the plants treated with ammonium nitrate. The same trend was realized during the two seasons of 2012-2013 and 2013-2014. The average values of  $\text{NO}_3\text{-N}$  and  $\text{NO}_2\text{-N}$   $\text{mg kg}^{-1}$  in spinach leaves were significantly affected decreased due to addition of Ca in foliar way as compared to the untreated plants, while the nitrate reductase activity was significantly increased for the plants treated with  $100 \text{ mg L}^{-1}$  Ca over the control treatment (tap water). The highest mean values of nitrate and nitrite accumulation were recorded for the plants treated with N-fertilization in the form of ammonium nitrate, while the lowest values of such traits were realized for the treatment of ammonium sulphate on spinach plant. Comparing with the control treatment;  $100 \text{ mg L}^{-1}$  Ca significantly decreased the average values of soluble and total oxalate  $\text{mg } 100\text{g}^{-1}$  and increased insoluble oxalate over the control. The highest values of soluble and total oxalate  $\text{mg } 100\text{g}^{-1}$  were recorded with the plants treated with ammonium sulfate and  $5 \text{ mg L}^{-1}$   $\text{Na}_2\text{SeO}_3$  with absence of Ca. Treating spinach plant with Ca at  $100 \text{ mg L}^{-1}$  significantly increased the average values of total phenol, VC and Se than those obtained for the untreated treatment. Under the same condition of this investigation it can be concluded that; foliar application of sodium selenite at the lowest levels of  $5$  and  $10 \text{ mg.L}^{-1}$  in combination with soil addition of ammonium sulphate as a source of N-fertilization in the presence of calcium at rate of  $100 \text{ mg.L}^{-1}$  applied in foliar way is considered to be the most suitable treatment for realizing the highest safe yield of spinach plant.

**Key Words ( not more than 10 )**



## الإدارة العامة للمكاتبات

الكلية	الزراعة	القسم	الأراضى	الرقم العام
اسم الطالب	هناء محمد المغاورى صقاره	الدرجة العلمية	دكتوراه	التاريخ
عنوان الرسالة				
تأثير التغذية بالنيتروجين والكالسيوم و السيلينيوم على التركيب الكيماوي والقيمة الغذائية لنبات السبانخ				
المستخلص				
<p>تأثير التغذية بالنيتروجين والكالسيوم و السيلينيوم على التركيب الكيماوي والقيمة الغذائية لنبات السبانخ نفذت تجربتا اصص فى الصوبه الخشبية بكلية الزراعة - جامعه المنصوره خلال موسمى النمو ٢٠١٢-٢٠١٣، ٢٠١٣-٢٠١٤ وذلك لدراسه تأثير التفاعل بين صور السماد النيتروجيني كإضافه أرضيه وبين الإضافة الورقيه لكل من الكالسيوم السيلينيوم على التركيب الكيماوي وجودة نبات السبانخ. اشتملت التجربه على ٣٠ معامله فى تصميم قطاعات منشقه مرتين فى ٣ مكررات تمثل التفاعلات الممكنه بين معاملتين من الكالسيوم (صفر ، ١٠٠ مجم/ لتر نترات كالسيوم)، و ثلاثه معاملات من صور التسميد الازوتى ( نترات امونيوم، سلفات امونيوم، يوريا) كل منهما بمستوى ٦٠ كجم نيتروجين/فدان بالإضافة الى خمس مستويات من سليلينيت الصوديوم (صفر، ٥، ١٠، ١٥، ٢٠ مجم/لتر). تم إضافة صور النيتروجين أرضيا بينما أضيف كل من مستويات الكالسيوم وسيلينيت الصوديوم بالرش الورقى. متوسط قيم النمو الخضرى والتى تتمثل فى (طول النبات، عدد الاوراق، الوزن الطازج والجاف) لنبات السبانخ زادت زياده معنويه عند معاملتها ب ١٠٠ مجم/لتر كالسيوم مقارنة بالنباتات التى لم يتم معاملتها. أدى استخدام صور مختلفه من التسميد النيتروجينى مثل نترات الامونيوم، سلفات الامونيوم واليوريا لتأثير معنوي قيم النمو الخضري و الصوره الاكثر ملائمه اعطت اعلى القيم فى متوسطات النمو الخضرى و استخدام سلفات الامونيوم يليها اليوريا واخيرا نترات الامونيوم. أدى الرش الورقى بالكالسيوم لزياده معنويه لمتوسطات قيم الكلوروفيل (أ، ب، الكلي) بالإضافة الى الكاروتين فى اوراق نبات السبانخ مقارنة بالنباتات الغير معامله. حدث تأثير مشجع لمتوسطات القيم السابقه نتيجة لاضافه صور النيتروجين المختلفه تحت الدراسه وكان افضل تأثير نتيجة استخدام سلفات الامونيوم والذى اعطى اعلى القيم لمحتوى الكلوروفيل والكاروتين مقارنة بباقي الصور. أدى الرش الورقى للكالسيوم على نبات السبانخ لزياده معنويه لمتوسطات قيم النسبه المئويه لكل من النيتروجين والفوسفور والكالسيوم مقارنة بالنباتات الغير معامله. تحققت اعلى القيم لمتوسطات القيم السابقه عند معامله النباتات بسلفات الامونيوم بينما اقل القيم سجلت عند استخدام نترات الامونيوم. سجلت نفس القياسات خلال كلا الموسمين. أدى الرش الورقى من سليلينيت الصوديوم على نبات السبانخ عند المستويين (٥ و ١٠ مجم/لتر) لزياده معنويه فى متوسطات قيم النسبه المئويه لكل من النيتروجين والفوسفور والكالسيوم لاوراق السبانخ. حدث نقص معنوي فى متوسطات قيم النترات والنيتريت لاوراق السبانخ عند الرش الورقى بالكالسيوم مقارنة بالنباتات التى لم يتم معاملتها بينما نشاط انزيم النترات حدث به زياده معنويه فى نشاط انزيم النترات عند مستوي ١٠٠ جزء فى المليون من الكالسيوم مقارنة بالنباتات الغير معامله. سجلت اعلى متوسطات لقيم تراكم النترات والنيتريت مع النباتات التى تم معاملتها بسلفات الامونيوم بالإضافة لحدوث اتجاه مخالف حيث سجلت اقل القيم مع النباتات التى تم معاملتها بنترات الامونيوم اما بالنسبه لنشاط انزيم النترات فزاد عند استخدام سلفات الامونيوم. سجلت اعلى القراءات عند استخدام الكالسيوم+سلفات الامونيوم+ ٥ مجم/لتر صوديوم سيلينيت. تحت نفس اظروف التجربه يمكن القول ان الرش باستخدام سليلينيت الصوديوم عند مستويات منخفضه ٥ مجم/لتر فى وجود الاضافه الارضيه من سلفات الامونيوم كمصدر نيتروجينى مع الرش الورقى بـ ١٠٠ جزء فى المليون من الكالسيوم تعتبر افضل المعاملات للحصول على محصول امن من السبانخ.</p>				
رؤوس الموضوعات ذات الصلة ( لا تزيد عن ١٠ )				