

Dedication

I with my deepest gratitude and warmest affection that I would like dedicated this work To My father, mother, brothers, sisters and all my friends

With love

Acknowledgement

Praise is to Allah the almighty who gave me the health, strength and patience to complete this phase of my life. I would like to acknowledge my Supervisor Professor Mohammed Osman warag for his unlimited and scholarly guideness during the entire period of the study. I would like to extend my heartiest acknowledgement to Professor Tagelsir Ibrahim Mohamed Idries for encouraging and guiding me to accomplish my research. A special thanks to my family. No words can express how grateful I am for all the support. To my dearest father and mother, and my brothers and my sisters. I thank all members of the tissue culture laboratory especially Dr. Fakhrieldeen Awad, Fatima, Abeer. Last but not least. A special thanks to my brother and friend Bedreldeen Draj, those who supported me in respect and contributed to the completion of this work.

Hwoida

General Abstract

This study aimed to investigate the impact of the chemical fertilizers nitrogen, phosphorus, and forms of bio-stimulants mainly Argel (*Solenostemma argel* Del. Hayne) and Haza (*Haplophyllum tuberculatum* L.) at various rates on the growth attributes and quality of *Catharanthus roseus* plants under nursery conditions. Experiments were conducted in Sudan University of Science and Technology, College of Agricultural Studies, Shambat, Khartoum North, Sudan.

The study was composed of four independent trials as illustrated sequentially: Five levels of; urea 0.0, 2.5, 5, 7.5 and 10 g/plant, triple super phosphate 46% P₂O₅) 0.0, 2.0, 4.0, 6.0 and 8.0 g/plant. Argel foliar and soil treatments were also evaluated. The foliar treatments were cold, hot and boiled water extracts of 10 g dry leaves of Argel per litre while the soil-dressing test was for 0.0, 5.0, 10.0, 15.0 and 20.0 g/plant dry Argel leaves per plant. The Haza foliar and soil treatments; the foliar treatments were for cold, hot and boiled water extracts of 15 g dry shoots of Haza per litre and the soil application test were for 0.0, 5.0, 10.0, 15.0 and 20.0 g/ plant dry Haza shoot treatments. The treatments were arranged in a completely randomized design where each treatment was replicated seven times. Data were collected after 4 months from treatments, analyzed and the results obtained indicated that:

The high urea doses enhanced vegetative growth parameters, while flowering and fruiting of the plant were boosted by the lower urea doses. The encouraging results obtained from urea treatments in this study elucidated an economical potential for possible large-scale production of the plant under Sudan conditions.

A general increase was obtained in growth parameters in phosphorus treated plants compared to the control. The result also showed that, the 6 g per plant phosphorus treatment was the most enhancive for vegetative growth, flowering and fruiting parameters. The improvements in growth and yield are indicators of the benefit of Phosphorus applications.

Also, there was a general increase in growth parameters in the Argel treated plants compared to the control. Except for the root fresh and dry weights, the highest values of all growth parameters were obtained from the boiled Argel water extract and the 7.5 and 10 g/plant soil dressing treatments.

Relatively, there was a general increase in growth parameters in Haza treated plants compared to the control. The highest values of all growth parameters were obtained

from the boiled Haza water extract and the 7.5 and 10 g soil dressing treatments. The improvements in growth and yield are indicators of the agronomic benefit of Haza applications; a step towards organic farming.

المستخلص العام

هدفت الدراسة إلى تحديد أثر إضافة الاسمدة الكيميائية (اليوريا، الفسفور) وجرعات ومستخلصات مختلفة من المحفزات الحيوية تحديداً الحرجل والحزى على معايير النمو والإنتاجية في نبات الونكا تحت ظروف المشتل بجامعة السودان للعلوم والتكنولوجيا-كلية الدراسات الزراعية شمبات، بحري-السودان.

تتكون الدراسة من أربعة تجارب مستقلة كما هو موضح بالتتابع:

خمس جرعات من اليوريا (46%) (0.0، 2.5، 5.0، 7.5 و10جم/النبات).

خمس جرعات من سيوبر فوسفات الثلاثي (46%) (0.0، 2، 4، 6، 8 جم/النبات).

معاملات الحرجل رشاً وإضافة التربة. معاملات الرش كانت من مستخلصات (0.0، 5، 10، 15، 20جم/النبات) من أوراق وسيقان الحرجل في لتر من الماء المغلي، والشاهد. أما معاملات إضافة التربة فكانت (0.0، 5، 10، 15، 20جم/النبات).

معاملات الحزى رش وإضافة للتربة. معاملات الرش كانت من مستخلصات (0.0، 5، 10، 15، 20جم/النبات) من أوراق وسيقان الحزى في لتر من الماء المغلي، والشاهد. أما معاملات إضافة التربة فكانت (0.0، 5، 10، 15، 20جم/النبات).

صممت المعاملات بنظام التصميم العشوائي الكامل والتي فيها كررت المعاملات سبع مرات في كل التجارب.

رصدت النتائج بعد مرور 4 أشهر من بداية معاملات التجربة، حلت البيانات إحصائياً باستخدام جهاز الحاسوب ورصدت النتائج كما موضح أدناه:

أثبتت النتائج أن الجرعة العالية من النتروجين حفزت قياسات ومعايير النمو الخضري بينما الجرعات المنخفضة من اليوريا حفزت نمو الأزهار والثمار أعطت تحسناً في النمو النتائج المشجعة التي حصلت عليها في هذه التجربة نتيجة لاستخدام اليوريا أظهرت المقدرات الاقتصادية لإمكانية الإنتاج الموسع للونكا تحت ظروف السودان.

أظهرت النتائج زيادة عامة في معايير النمو في النباتات المعاملة بالفسفور مقارنة بالشاهد، القيم العالية لكل معايير النمو تمت الحصول عليها من المعاملة 6جم/النبات. التحسن الملحوظ في معايير النمو تدل على أهمية إضافة سماد الفسفور.

أدت معاملات الحرجل إلى زيادة عامه في كل معايير النمو المختبرة مقارنة بالشاهد.

أظهرت نتائج معاملات الحزى زيادة عامة في كل معايير النمو المختبرة مقارنة بالشاهد، التحسن الملحوظ في معايير النمو مؤشرات الفائدة الحقلية للحزى كخطوة إلى الأمام للزراعة العضوية.

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