

ABSTRACT

The study was conducted in the seasons 2014/15 and 2015/16 in the Sugar Research Center-Guneid farm. The objective was to investigate the effect of two nitrogen fertilizer carriers, namely ammonium sulphate (21%N) and urea (46%N); with four nitrogen rates, viz: control (no nitrogen was added), 43 kg N ha⁻¹, 86 kg N ha⁻¹ and 129 kg N ha⁻¹ on sugar beet yield and quality. Soil of the experiment site was cracking heavy clay soils (Vertisols) with low N and organic matter. Sugarbeet cultivar (Lenard) was sown. Treatments were laid in a factorial arrangement randomized complete block design (RCBD) with four replications. Parameters taken were beet root height, thickness, population and tuber yield. Quality of the sugar beet was determined by the parameters brix (total soluble solids), pol (sucrose content), ERS (estimated recoverable sugar) and pulp % of beet. The end product was the sugar yield which was a product of root yield x ERS % beet. Results revealed that there were no significant or consistent differences between the two source of N in beet root height, thickness, population, leaves and tuber yields for the two seasons. Similarly, there were no significant or consistent differences between the two sources of N for the recorded quality parameters. Sugar beet quality recorded significant readings; however, the second season 2015/16 recorded even better results.

On the other hand N rates affected sugar beet parameters differently. Tuber yield increased with the increase of N rates significantly up to 86 kg N/ha in the first season and up to 129 kg N /ha in the second season. Quality characters, namely brix% and pol % increased with the lower N rate (43 kg /ha) then decreased with the higher rates. N rates of 86 and 129 kg per hectare have given best tuber and sugar yields. In conclusion, this study shows that it is more useful to apply urea due to its higher N content (46% N). N rates 86 and 129 kg /ha showed similar tuber and sugar yield. It is recommend that 109.5 kg N/ha (100 kg urea/feddan), should be adopted.

المستخلص

تمت زراعة تجربة في موسمين 2015/2014 و 2016/2015 بمزرعة مركز بحوث السكر بالجنيـد. هدفت الدراسة لمعرفة تأثير مصدرين من الأسمدة النايـتروجينية وهما كبريتات الامونيوم (N%) واليوريا مع أربعة جرعات مختلفة من سماد النايـتروجين:- شاهد و 43 و 86 و 129 كجم نيتروجين للهكتار علي إنتاجية وجودة بنجر السكر. نوع التربة للمزرعة طينية، ثقيلة متشققة تحتوي علي كميات ضئيلة من النايـتروجين والمادة العضوية. تمت إضافة جرعات النايـتروجين علي جرعتين الاولي مع الزراعة والثانية بعد شهرين من الزراعة. زرع صنف بنجر السكر لينارد في سراب عرضه 80 سم والمسافة بين النباتات 15 سم بوضع إثنين إلى ثلاثة بذور في كل حفرة وبعد ذلك تتم عملية الخف لنبات واحد بعد شهر ونصف من الزراعة. تم تصميم التجربة علي تصميم القطاعات العشوائية الكاملة مع اربعة مكررات. تم أخذ قراءات لطول وسمك الدرنة والكثافة النباتية وإنتاجية الدرنات للككتار. وبالنسبة للجودة تم أخذ قراءات للمواد الصلبة الذائبة في العصير ونسبة السكريات ونسبة إستخلاص السكر المقدر ونسبة اللب (الألياف). المنتج النهائي هو إنتاج السكر والذي يساوي حاصل ضرب إنتاج الجذور في نسبة السكر المقدر.

أوضحت نتائج الدراسة في الموسمين أنه لا توجد فروقات معنوية واضحة بالنسبة لتأثير المصادر النايـتروجينية علي طول وسمك الجذور وكذلك علي الكثافة النباتية

وإنتاجية الأوراق والدرنات بالنسبة للهكتار. أيضاً لا توجد فروقات معنوية واضحة بالنسبة لتأثير المصادر النايتروجينية علي النوعية. كانت النوعية في الموسم الثاني أفضل من الموسم الأول ومن جانب آخر كان تأثير جرعات النايتروجين مختلفاً في الموسم الأول حيث أعطت المعاملة 86 كجم نايتروجين للهكتار أعلي إنتاجية درنات بينما أعطت المعاملة 129 كجم نايتروجين للهكتار أعلي إنتاجية للدرنات في الموسم الثاني.

بالنسبة للنوعية زادت نسبة المواد الصلبة الذائبة في العصير ونسبة السكريات بإنخفاض جرعات النايتروجين وتنخفض بزيادتها. جرعات النايتروجين 86 و 129 كجم نايتروجين للهكتار أعطت أفضل نتائج بالنسبة لإنتاجية الدرنات وإنتاجية السكر. في الختام، تبين هذه الدراسة أنه يفضل إضافة اليوريا ذات المحتوى العالي من النيتروجين (46%). وأظهرت معدلات 86 و 129 كجم نيتروجين / هكتار إنتاجية درنات السكر مماثلان. لذلك توصي الدراسة بإضافة جرعة وسيطة (109.5 كجم نيتروجين / هكتار (100 كجم من اليوريا للقدان لبنجر السكر).

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DEDICATION

To my family: to the soul of my father, to my mother,

To my brothers and sisters,

To my husband,

To my kids:

Doaa, Alaa, Shima, Ahmed and Mohammed

And to my friends

LIST OF CONTENTS

ABSTRACT ENGLISH	I
ABSTRACT ARABIC	II
ACKNOWLEDGMENT	III
DEDICATION	IV
LIST OF CONTENTS	V
LIST OF TABLES	IX
LIST OF APPENDICES	X
CHAPTER ONE	
INTRODUCTION	1-3
CHAPTER TWO	
REVIEW OF LITRETURE	
2.1. Botany	4
2.2. Economic importance	4-5-6
2.3. Ecology, climate and soil	6-7
2.4. Cultural practices	7
2.4.1. Seedbed preparation	7
2.4.2. Sowing date	7
2.4.3. Method and rate of sowing	7
2.4.4. Row width and plant population	8

2.4.5. Irrigation	8
2.4.6. weed control	8-9
2.4.7. Thining	9
2.4. 8. Harvesting	9-10
2.5. Fertilization of sugar beet	10-11
2.5.1. Nitrogen (N)	11-12-13-14
2.5.2. Urea	14-15-16
2.5.3. Ammonium Sulphate (AS)	16-17-18
2.5.4. Response of sugar beet to Ammonium sulphate	18-19
2.5.5. Sulphur in soil	19
CHAPTER THREE	
MATERIALS AND METHODS	
3.1. Materials	20
3.1.1. Plant materials	20
3.1.2. Fertilizers	21
3.2. Methods	21
3.2.1. Experimental design	21
3.2.2. Land preparation, sowing and irrigation	21
3.2.3. Treatments	21-22
3.2.4. Fertilizer application	22
3.2.5. Harvesting	22
3.3. Data collection and analysis	22

3.3.1. Data collection	22
3.3.2. chemical analysis	22-23
3.3.3. Statistical analysis	23
CHAPTER FOUR	
RESULTS AND DISCUSSION	
4.1. The effect of N sources and rates on yield components of sugar beet:	24
4.1.1. The effect of N sources on sugar beet yield components	24-25
4.1.2. The effect of N rates on tuber yield and yield components:	25-26
4.2. The effect of nitrogen sources and nitrogen rates on the quality of sugar beet:	30
4.2.1. The effect of nitrogen sources on the quality of sugar beet:	30-31
4.2.2. The effect of N rates on sugar beet quality:	31-32
4.3. The effect of N sources and rates on the quality of sugar beet, one week after harvest:	36
4.3.1. The effect of N sources, urea and AS on the quality of sugar beet	36
4.3.2. The effect of N rates on sugar beet quality one week after harvest:	36-37
4.4.1. The effect of N sources and rates on the quality of sugar beet, two weeks after harvest	40-41
4.4.2. The effect of N rates on sugar beet quality two weeks after harvest:	41
CONCLUSION	46-47
RECOMMENDATIONS	47
REFERENCES	48-53
APPENDICES	54-55

LIST OF TABLES	
Table 1. (a): The effect of Urea, Ammonium Sulphate (AS) and nitrogen rates on the yield components of Sugar beet, season 2014/2015	27
Table 1. (b): The effect of Urea, Ammonium Sulphate (AS) and nitrogen rates on the yield components season (2015/2016)	28
Table 1 c. The combine effects of seasons, N source and N rates on yield components and beet yield, seasons 2014/15 and 2015/16	29
Table 2 (a): The effect of Urea, Ammonium Sulphate (AS) and nitrogen rates on the quality components and sugar yield of sugar beet season (2014/2015)	33
Table 2 (b): The effect of Urea, Ammonium Sulphate (AS) and nitrogen rates on the quality components and sugar yield of sugar beet season (2015/2016)	34
Table 2 c. The combine effects of seasons, N source and N rates on sugar yield and quality components of sugar beet	35
Table 3.a: The effect of Urea, Ammonium Sulphate and rates nitrogen on the quality components of sugar beet season (2014/2015) one week after harvest	38
Table 3. (b): The effect of Urea, Ammonium Sulphate and nitrogen rates on the quality components of sugar beet season (2015/2016) one week after harvest	39
Table 4. (a): The effect of Urea, Ammonium Sulphate (AS) and nitrogen rates on the quality components of sugar beet season (2014/2015) two weeks after harvest	41
Table 4. (b): The effect of Urea, Ammonium Sulphate (AS) and nitrogen rates on the quality components of sugar beet season (2015/2016) two weeks after harvest	42

LIST OF FIGURES	
Fig. 1.a: The effect of N sources, on sugar beet tuber yield tons/ha	42
Figure. 1. b. The effect of N sources, on sugar yield tons/ha, on seasons 2014/15 and 2015/16	43
Figure 2.a: The effect of N rates, on sugar beet tuber yield tons/ha, on seasons 2014/15 and 2015/16	43
Fig. 2.b. The effect of N sources, on sugar beet tuber yield tons/ha	44
Figure 3. Effect of N rates on brix, pol and pulp of sugar beet, at harvest, one week after harvest and two weeks after harvest, on seasons 2014/15(1) and 2015/16 (2)	45