CONTENTS

Page

ACKNOWLEDGEMENT .....

INTRODUCTION 1

REVIEW OF LITERATURE 3

I- Effect of phosphorus fertilizer 3

II- Effect of potassium fertilizer 9

III- Effect of application time of fertilizer 20

IV- Effect of interaction between phosphorus, potassium and application time of fertilizer 21

MATERIALS AND METHODS 23

RESULTS AND DISCUSSION 29

I- EFFECT OF PHOSPHORUS FERTILIZER 29

a- Growth characters 29

1- Number of leaves/ plant 29

2- Root length 31

3- Root diameter 31

4- Fresh and dry weight of leaves/ plant 32

5- Fresh and dry weight of root/ plant 32

6- Total fresh and dry weight of plant 33

b- Leaf characters 33

c- Yield and yield components 35

1- Root length 35

2- Root diameter 37

3- Fresh weight of root/ plant 37

4- Root yield/ fad 38
5- Top yield/ fad 39
6- Biological yield/ fad 40
7- Sugar yield/ fad 40
d- Technological quality 41
1- Total soluble solids percentage 41
2- Sucrose percentage 43
3- Sugar purity percentage 43
II- EFFECT OF POTASSIUM FERTILIZER 44
a- Growth characters 44
1- Number of leaves/ plant 46
2- Root length 46
3- Root diameter 47
4- Fresh and dry weight of leaves/ plant 47
5- Fresh and dry weight of root/ plant 48
6- Total fresh and dry weight/ plant 48
b- Leaf characters 49
c- Yield and yield components 51
1- Root length 51
2- Root diameter 53
3- Fresh weight of root/ plant 53
4- Root yield/ fad 54
5- Top yield/ fad 55
6- Biological yield/ fad 56
7- Sugar yield/ fad 57
c- Technological quality 58

1- Total soluble solids percentage 58
2- Sucrose percentage 58
3- Sugar purity percentage 60
III- EFFECT OF APPLICATION TIME OF FERTILIZER 60
a- Growth characters 60
1- Number of leaves/ plant 62
2- Root length 62
3- Root diameter 62
4- Fresh and dry weight of leaves/ plant 63
5- Fresh and dry weight of root/ plant 63
6- Total fresh and dry weight/ plant 64
b- Leaf characters 64
c- Yield and yield components 66
1- Root length 66
2- Root diameter 66
3- Fresh weight of root/ plant 68
4- Root yield/ fad 68
5- Top yield/ fad 69
6- Biological yield/ fad 69
7- Sugar yield/ fad 70
d- Technological quality 70
IV- EFFECT OF INTERACTION 70
1- Effect of the interaction between phosphorus and potassium fertilizer 76
a- Growth characters 76
b- Leaf characters 79

c- Yield and yield components and technological quality 81
2- Effect of the interaction between phosphorus and fertilizer applied time 84
3- Effect of the interaction between potassium and fertilizer applied time 86
4- Effect of the interaction between phosphorus, potassium and fertilizer applied time 88
SUMMARY 90
REFERENCES 98
ARABIC SUMMARY .....