

CONTENTS

	Page
LIST OF TABLES.....	vi
LIST OF FIGURES.....	viii
ACKNOWLEDGEMENT	xii
Chapter One : INTRODUCTION	1
Chapter Two : REVIEW OF LITERATURE	4
2.1. Effect of cultivars.....	5
2.1.1. Vegetative growth.....	5
2.1.2. Yield.....	5
2.1.3. Tuber's chemical analysis.....	6
2.2. Effect of organic manure.....	7
2.2.1. Vegetative growth.....	7
2.2.2. Yield.....	8
2.2.3. Tuber chemical analysis.....	9
2.3. Effect of nitrogen fertilizer.....	10
2.3.1. Vegetative growth.....	10
2.1.1.1. Leaf area.....	10
2.1.1.2. Plant height (cm.).....	10
2.1.1.3. Number of stems.....	11
2.1.1.4. Foliage fresh and dry weight (gm.).....	11
2.3.2. Yield.....	12
2.3.3. Tuber chemical analysis.....	13
2.3.4. Tuber NPK content.....	14
2.3.5. Leaf chlorophyll	14
2.4. Effect of storage conditions on preserving quality of tubers	15
2.5. Effect of extracted inulin from tubers on health and its applications in food industries.....	17
Chapter Three: MATERIALS AND METHODS	20
3.1. The filed experiments.....	21
3.1.1. Data recorded.....	22
3.1.1.1. Growth characteristics.....	22
3.1.1.2. Yield and yield characteristics.....	23
3.1.1.3. Tuber chemical analyses.....	24
3.2. Storage experiments.....	25
3.2.1. Data recorded.....	25
3.2.2. Chemical analysis.....	25
3.3. Statistical analysis.....	26

	Page
Chapter Four : RESULTS AND DISCUSSION	27
4.1. Vegetative growth.....	27
4.1.1. Plant length (cm/plant).....	27
4.1.2. Average number of main stems per plant (cm.).....	30
4.1.3. Average plant dry weight (gm/plant).....	30
4.1.4. Average leaf area per plant (cm ² / plant).....	34
4.1.5. Leaf dry matter percentage.....	36
4.1.6. Total leaf chlorophyll (mg/gm FW.).....	38
4.2. Yield and yield components.....	40
4.2.1. Total yield (ton/fed.).....	40
4.2.2 Average number of tubers per plant.....	45
4.3. Tuber's chemical analysis.....	46
4.3.1. Tuber's dry matter percentage.....	46
4.3.2. Tuber's specific gravity.....	49
4.3.3. Tuber's nitrogen content (%DM.)	49
4.3.4. Tuber's phosphorus content (%DM.)	52
4.3.5. Tuber's potassium content (%DM)	54
4.3.6. Tuber's reducing sugars content (%DM)	56
4.3.7. Tuber's non- reducing sugars content(%DM).....	56
4.3.8. Tuber's total sugars content (%DM).....	57
4.3.9. Tuber's starch content (%DM).....	58
4.3.10. Tuber's inulin content (%DM)	58
4.4. Effect of storage period, N fertilization levels, and poultry manure levels on keeping quality of the tested two cultivars of jerusalem artichoke tubers.....	59
4.4.1 Dry matter (%).....	59
4.4.2. Weight loss (%).....	64
4.4.3. Firmness (pounds/ force).....	69
4.4.4. Tuber's total sugars content.....	74
4.4.5. Inulin (%).....	79
Chapter Five : SUMMARY	84
Chapter Six : LITERATURE CITED.....	89
Chapter Seven : ARABIC SUMMARY	-

5. SUMMARY

The present study was carried out to investigate the effect of both N fertilization and poultry manure levels on plant growth, productivity chemical constituents and storability of the tubers of two Jerusalem artichoke cultivars the "Local and Fuseau". Field experiments were carried out in the summer seasons of 2000 and 2001 under sandy soil condition at the research farm of the Horticulture Research Station, at Ali Moubarak village, South El -Tahrir, El-Bostan region. The experimental design used was a split-split plot in a randomized complete block design with three replications. Also, four nitrogen fertilization levels of 50, 100, 150 and 200 kg N/ fed. were tested using ammonium sulphate. Each level of N fertilizer was divided into three parts and added at 30, 60 and 90 days after planting. Poultry manure rates of 0, 5, and 10 m³/ fed. were added during soil preparation.

Storage experiments were started, directly, after harvesting in winter seasons of 2001 and 2002.

The morphological characteristics, such as plant length, number of main stems, plant dry weight, leaf area per plant, leaf dry matter (%) and total leaf chlorophyll as well as tuber yield were recorded. In addition, chemical analyses of tubers were conducted including inulin, total sugars, reducing and non reducing sugars, starch, nitrogen, phosphorus and potassium content were, also, determined.

A storage study was carried out on tubers to investigate the effect of the above mentioned treatments on the storability of the tubers at 0, 15, 30 and 45 days duration at 0°C and 90% R.H. in this regard, dry matter (%), weight loss (%), firmness (pounds/ force), total sugars and inulin contents of tubers were determined.

However, the obtained results could be summarized as follows:

- 1- The plant growth parameters i.e., plant length, number of main stems, average plant dry weight, leaf area, dry matter (%) of leaves and total leaf chlorophyll tended to increase, significantly, due to increasing N fertilization level during both seasons.
- 2- The highest mean values of plant growth parameters were recorded due to increasing poultry manure rates during both growing seasons.
- 3- The "Local" cv. possessed higher plant length, average plant dry weight, leaf area per plant and leaf chlorophyll content compared with "Fuseau" cv. which produced higher leaf dry matter (%) compared with "Local" cultivar.
- 4- Increasing nitrogen fertilization levels resulted in significant increase in the number and weight tuber yield during the two growing seasons.
- 5- The total tuber's yield was increased, significantly, due to increasing poultry manure rates during both seasons of the study.
- 6- The "Fuseau" cv. produced the highest tuber yield (number and weight) compared with the "Local" cultivar.
- 7- Tuber dry matter (%) was increased, significantly, with increasing both N fertilization levels and poultry manure rates.
- 8- "Fuseau" cultivar produced tubers which contained higher dry matter compared with that of the "Local" cultivar.

- 9- No significant differences were detected regarding the specific gravity of tubers due to neither N fertilizer levels nor poultry manure rates or cultivar, as well.
- 10- Increasing either of N fertilizer or poultry manure levels resulted in significant increase with respect to tuber minerals content (i.e., nitrogen, phosphorus and potassium).
- 11- Tubers of the "Local" cultivar contained higher percent of nitrogen, phosphorus and potassium than those of "Fuseau" cultivar.
- 12- Increasing either of N fertilization levels or poultry manure rates brought about increasing reducing, non-reducing, total sugars, starch and tuber inulin(%), significantly.
- 13- Tubers of the "Local" cv. contained higher levels of total sugars than those of "Fuseau" cv. which were higher in reducing sugars and inulin(%).
- 14- Tubers dry matter (%), weight loss (%), total sugars (%) were increased, significantly, with prolonging storage period.
- 15- The highest levels of either N fertilization or poultry manure rates after 30 days of storage; increased tuber dry matter (%).
- 16- Tubers of the "Fuseau" cv. showed higher percentage of dry matter at the highest level of N fertilization after 30 days of cold storage.
- 17- Different N fertilization levels and poultry manure rates affected tuber's weight loss (%), significantly, during storage period in both seasons.
- 18- Tuber's firmness was decreased, significantly, with prolonging storage period.

- 19- Tuber's firmness of the jerusalem artichoke cultivars were not affected by either N fertilization or poultry manure rates during storage period.
- 20- Total sugars content of the "Local" cv. tubers was increased by application the highest level of N fertilization under different poultry manure rates during storage period.
- 21- Tuber's inulin(%) was decreased, significantly, with prolonging storage period.
- 22- Tuber's inulin (%) was decreased by the either the highest level of N or the highest rate of poultry manure during storage period.