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Amino acids contents of leaves and stems for two types of herbal plants (*Marjoram* and *Hybrid tea rose*) at AL-Gabal AL-Akhder region

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ABSTRACT

The amino acids contents were determined in Leaves and Stems of Two types of herbal Plants collected from AL-Gabal AL-Akhder region (Libya) during spring(2013). The plants including (Marjoram and Hybrid tea rose). The amino acids showed difference Level from Plants to another, but generally the high level was (Valine) (107730.31 µM) found in Marjoram Stems. While the Lower value was(Phenyl alanine) in Hybrid tea rose Stems (35.3183 µM).

Key words: Herbal Plants- Amino acids contents- Libya.

INTRODUCTION

Amino acids are building blocks of the proteins. Proteins are an essential part of all the living animals and participate in virtually every process within the cell. Enzymes that catalyze many biological reactions are proteins and these are vital to metabolism. Amino acids are linked with each other through peptide linkage to form a long chain which results in proteins responsible for the growth and well-functioning of cells. Identification of amino acid sequence in a protein is of utmost importance in synthesizing new drugs for treatment of diseases such as cancer, diabetes and many more related to genetic disorders. The study of amino acids is important as it reveals the nature of enzymes responsible for the biogenesis of various compounds in the plants. The study of amino acids present in the plant is important from the point of view that it will open up new research avenues.**(*Fowden, et al, 2001*).** Cysteine has been used in chemothereupatic treatment for leukemia, L-Proline is an osmoprotectant and therefore is used in many pharmaceutical and biotechnological applications.**(*Kashalkar, et al, 2011*)**. The main aim of this study is measure the amino acids contents in two types of plants which widely using in Libya as tea additions.

MATERIALS AND METHODS

Sampling:
Two different herbal plants samples were collected from AL-Gabel AL-Akhder region during winter- spring Seasons. The Samples including(***Marjoram* and *Hybrid tea rose*).**

Samples preparation:
Leaves and Stems of every plants were separated and washed with distilled water several times, then dried overnight at the room temperature, then crashed and powdered of Leaves and Stems separately using 40 mesh wiley mill to insure their complete homogeneity.

Amino acids analysis:
Dry defatted samples of Tree types of studied herbal plants(leaves and Stems) 0.1g was hydrolyzed with 10 ml of 6 N HCL in sealed tubes for 24 hrs at 110 °C .after hydrolysis ,the excess HCL was removed by evaporation under vacuum with occasional addition of water. The residue was dissolved in Sodium citrate buffer PH 2.2 and any insoluble matter is filtered off. The optically clear solution (30 µl) is chromatographic in an Amino Acid Analyzer, at Unit of Analysis and Scientific Services, Faculty of Agriculture, Alexandria University ***(Kassem, et al., 2009)***.

RESULTS AND DISSCUSSION

Amino acids of the Leaves and the Stems of Two Herbal Plants in Libya:

Marjoram: The amino acids concentration in two studied parts of *Marjoram* included (Alanine, Threonine, Glycine, Serine, Aspartic acid, Cystine, Valine, Proline, Methionine, Phenyl alanine and Lysine). The high total amino acids found in Stems (141157.9 µM), with high concentration for amino acid was recorded for Valine (107730.3196), and Low concentration was recorded for Phenyl alanine (120.9800), with absence of Threonine, Glycine and Lysine. While in Leaves the total amino acid was (15490.8 µM), with high concentration for Threonine (9702.3834), and Low concentration for Aspartic acid (488.9266), with absence of Alanine, Cystine, Valine, Proline, Methionine and Phenyl alanine. **(Table 1, Fig 1).**

Hybrid tea rose: The amino acids concentration in two studied parts of *Hybrid tea rose* included (Alanine, Glycine, Aspartic acid, Cystine, Valine, Proline, Phenyl alanine and Tyrosine).

The high total amino acids found in Leaves (89298.5 µM) and the high value was recorded for Valine (35183.0995), and Low concentration was recorded for Glycine (28.0989), with absence of Cystine, Proline and Phenyl alanine.

While in Stems the total amino acid was (20879.4 µM), with high concentration for Valine (7269.2467), and Low concentration for Phenyl alanine (35.3183), with absence of Glycine, and Tyrosine.**(Table 2, Fig 2).**

Essential Amino acid (EAA) of the Leaves and the Stems of five herbal plants in Libya:
***Marjoram*:** The percentage of essential amino acid are as following: Threonine (78.09, ND), Valine (ND, 96.2), Methionine(ND, 3.6), Phenyl alanine (ND, 0.1) and Lysine (21.9, ND) in Leaves and Stems, respectively. The high percentage of essential amino acid was recorded for Valine (96.2) in Stems, while the Low percentage was recorded for Phenyl alanine (0.1) in Stems.

In general the high values of the total amino acid of *Marjoram* in the present study were found in Stems (111943.9), while the percentage in Leaves was (12423.9). **(Table 3, Fig 3).**

***Hybrid tea rose*:** The percentage of essential amino acid are as following: Valine (100, 99.5) and Phenyl alanine (ND, 0.48) in Leaves and Stems, respectively. The high percentage of essential amino acid was recorded for Valine (100) in Leaves, while the Low percentage was recorded for Phenyl alanine (0.48) in Stems. On other side, the high values of total essential amino acid of *Hybrid tea rose* in this study was found in Leaves (35183.0995), while the percentage in Stems was (7304.565). **(Table 4, Fig 4).**

Non Essential Amino Acid of the Leaves and the Stems of Five herbal Plants:
***Marjoram*:** The percentage of non essential amino acids are as following: Alanine (ND, 13.6), Glycine (48.18, ND), Serine (35.87, 1.5), Aspartic acid (15.9, 62.1), Cystine (ND, 19.3) and Proline (ND, 3.36) in Leaves and Stems, respectively. The high percentage of non essential amino acids was recorded for Aspartic acid (62.1) in Stems, while the low percentage was Serine (1.5) in Stems. On other side, the high values of total non essential amino acids of *Marjoram* in this study were found in Stems (29214.05), while the Low values in Leaves (3066.8). **(Table 5, Fig 5).**

***Hybrid tea rose*:** The percentage of non essential amino acid are as following: Alanine (1.36, 19.8) Glycine (0.05, ND), Aspartic acid (59.5, 45.2), Cystine (ND, 29.6), Proline (ND, 5.2) and Tyrosine(39, ND) in Leaves and Stems, respectively. The high percentage of non essential amino acid was recorded for Aspartic acid (59.5) in Leaves, while the low percentage was recorded for Glycine (0.05) in Leaves.

In general the high values of the total non essential amino acids in the present study were found in Leaves (54115.4), while the values in Stems were (13573.9). **(Table 6, Fig 6).**

The amino acids have many function for human compounds, as examples they are the major constituents for protein, Hemoglobin, Ciriatinine and some hormones, Also they are combine with Genatic structure, and give ATP molecules.

The present study shows variations in presence of the amino acids in Leaves and Stems of every plants .Also some plants as *Marjoram*, *Hybrid tea rose* and *Rosemary* found the first data of amino acids in (Libya).

Very little previous studied gave the speciation of amino acids in herbal plants, but the our results are agreement with those recorded in **(Abdullah, 2013)** in *Salvia* and *Thyme* plants. Also **(said *et al*., 2010)** recorded some amino acids in sisavus plants in Libya. **(El-Taype, 2008)** stated that, the presence of some amino acids in *Salvia* without give the speciation of every type.

Table (1): The Amount of Amino acid in *Marjoram* (Leaves and Stems)

Sample / Amino acid	Leaves (µM)	Stems (µM)
Alanine	-	3993.5514
Threonine	9702.3834	-
Glycine	1477.7142	-
Serine	1100.2094	445.1397
Aspartic acid	488.9266	18146.6060
Cystine	-	5644.8226
Valine	-	107730.3196
Proline	-	983.9322
Methionine	-	4092.6028
Phenyl alanine	-	120.9800
Lysine	2721.5797	-
Total Amino acid (TAA)	15490.8	141157.9

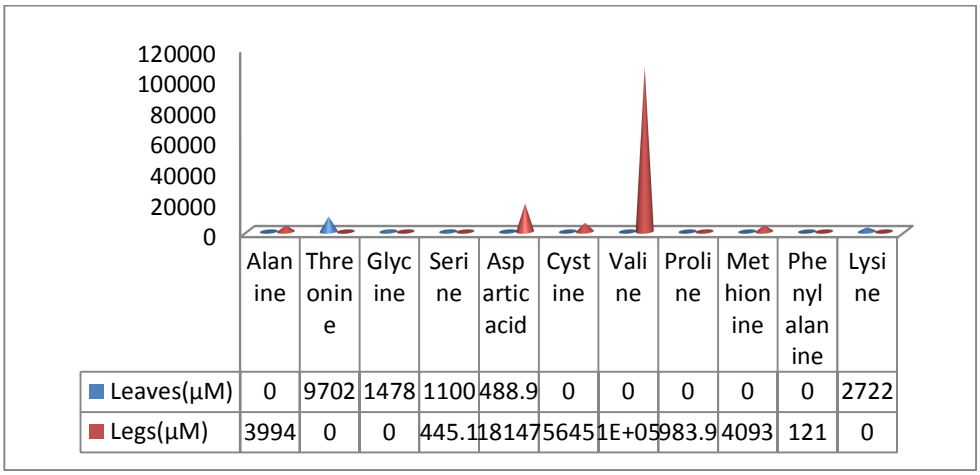

Figure (1):The Amount of Amino acid in *Marjoram* (Leaves and Stems (Legs))

Table (2): Percentage 0f Essential Amino acid (EAA%) of *Marjoram* (Leaves and Stems)

Sample / Amino acid	Leaves		Stems	
	EAA%	TAA%	EAA%	TAA%
Threonine	78.09	62.6	_	_
Valine	_	_	96.2	76.3
Methionine	_	_	3.6	2.8
Phenyl alanine	_	_	0.1	0.085
Lysine	21.9	17.5	_	_
Total Essential Amino acid (TEAA)	12423.9		111943.9	

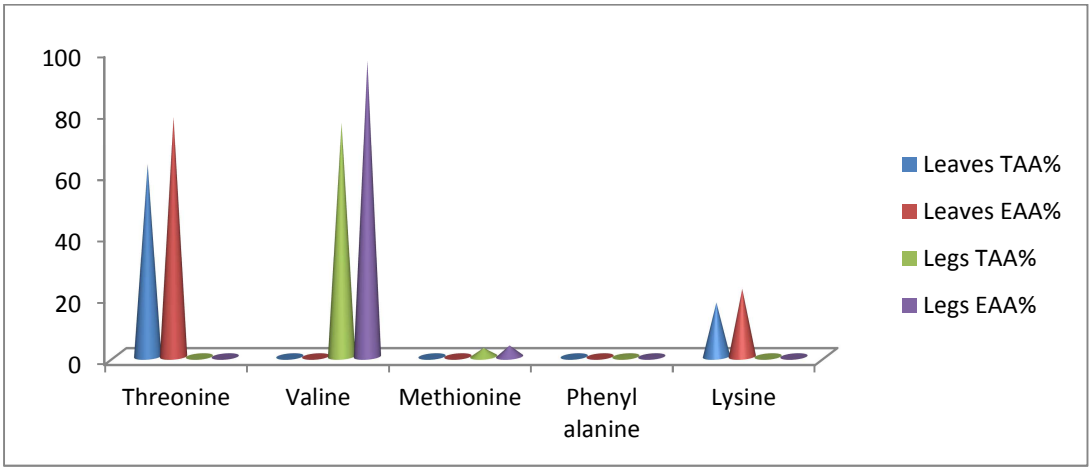

Figure (2): Percentage 0f Essential Amino acid (EAA%) of *Marjoram* (Leaves and Stems (Legs))

Table (3): Percentage of Non-Essential Amino acid (NEAA%) 0f *Marjoram* (Leaves and Stems)

Sample / Amino acid	Leaves		Stems	
	NEAA%	TAA%	NEAA%	TAA%
Alanine	_	_	13.6	2.8
Glycine	48.18	9.53	_	_
Serine	35.87	7.1	1.5	0.32
Aspartic acid	15.9	3.15	62.1	12.8
Cystine	_	_	19.3	0.39
Proline	_	_	3.36	0.69
Total Non-Essential Amino acid(NEAA)	3066.8		29214.05	

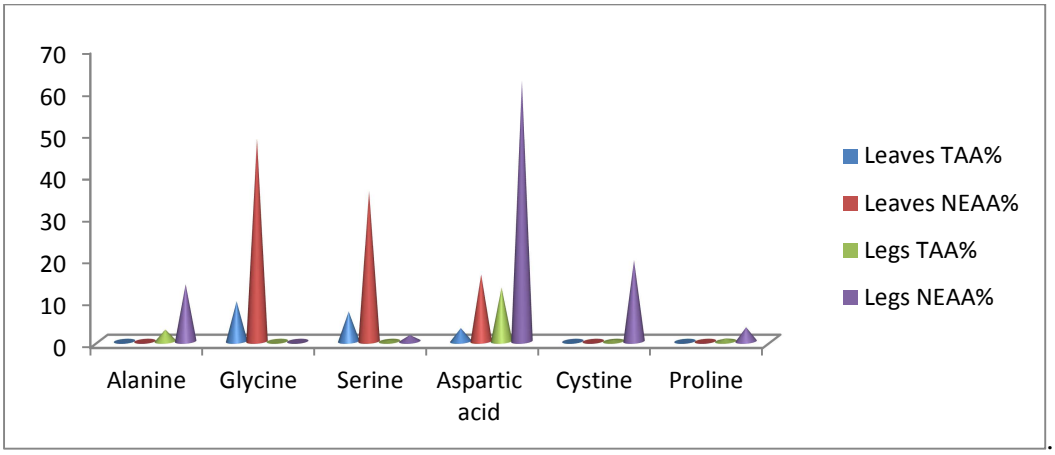

Figure (3): Percentage of Non-Essential Amino acid (NEAA%) 0f *Marjoram* (Leaves and Stems (Legs))

Table (4): The Amount of Amino acid in *Hybrid tea rose* (Leaves and Stems)

Sample / Amino acid	Leaves(µM)	Stems(µM)
Alanine	736.3659	2691.9872
Glysine	28.0989	_
Aspartic acid	32244.9213	6141.0813
Cystine	_	4024.8036
Valine	35183.0995	7269.2467
Proline	_	716.2323
Phenyl alanine	_	35.3183
Tyrosine	21106.0564	_
Total Amino acid (TAA)	89298.5	20879.4

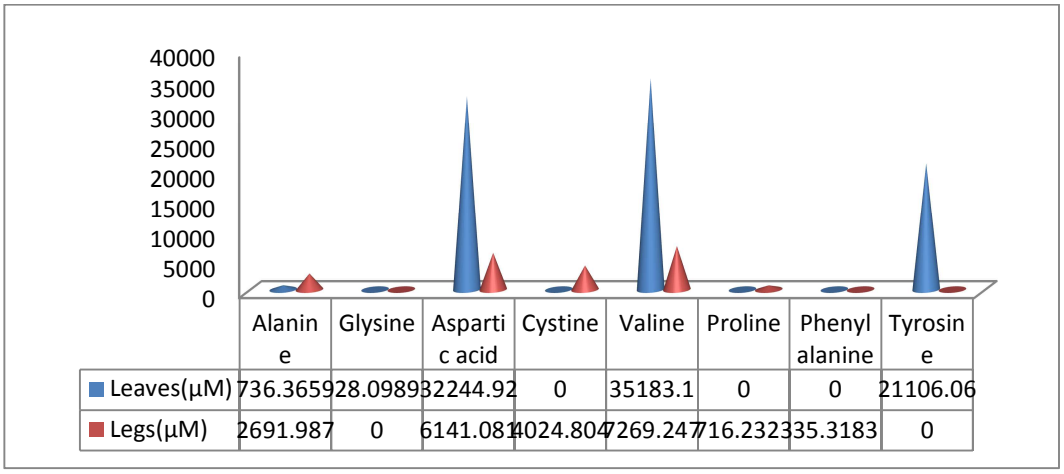

Figure (4): The Amount of Amino acid in *Hybrid tea rose* (Leaves and Stems (Legs))

Table (5): Percentage of Essential Amino acid (EAA%) of *Hybrid tea rose* (Leaves and Stems)

Sample / Amino acid	Leaves		Stems	
	EAA%	TAA%	EAA%	TAA%
Valine	100	39.3	99.5	34.8
Phenyl alanine	_	_	0.48	0.169
Total Essential Amino acid (TEAA)	35183.0995		7304.565	

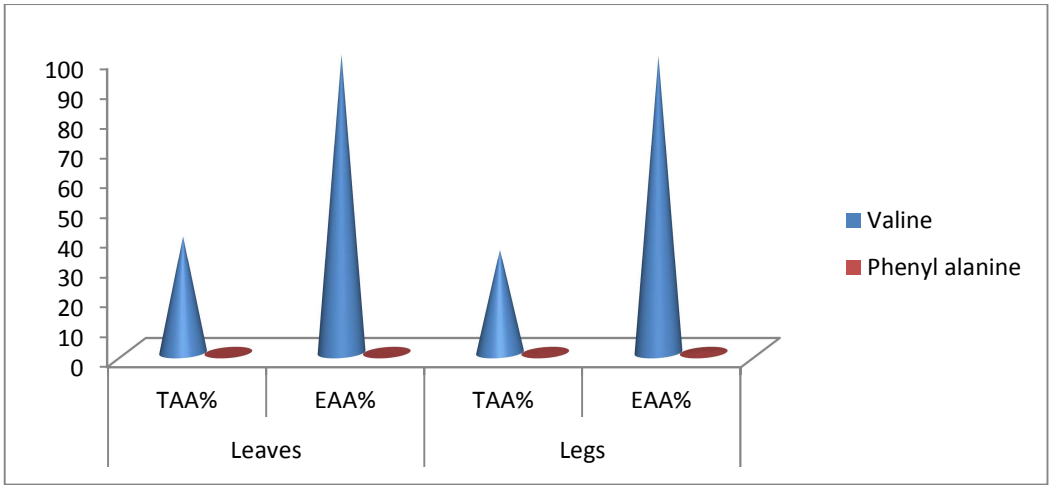

Figure (5): Percentage of Essential Amino acid (EAA%) of *Hybrid tea rose* (Leaves and Stems (Legs))

Table (6): Percentage of Non-Essential Amino acid (NEAA%) of *Hybrid tea rose* (Leaves and Stems)

Sample / Amino acid	Leaves		Stems	
	NEAA%	TAA%	NEAA%	TAA%
Alanine	1.36	0.82	19.8	12.89
Glycine	0.05	0.031	_	_
Aspartic acid	59.5	36.1	45.2	29.4
Cystine	_	_	29.6	19.27
Proline	_	_	5.2	3.4
Tyrosine	39	23.6	_	_
Total Non-Essential Amino acid (TNEAA)	54115.4		13573.9	

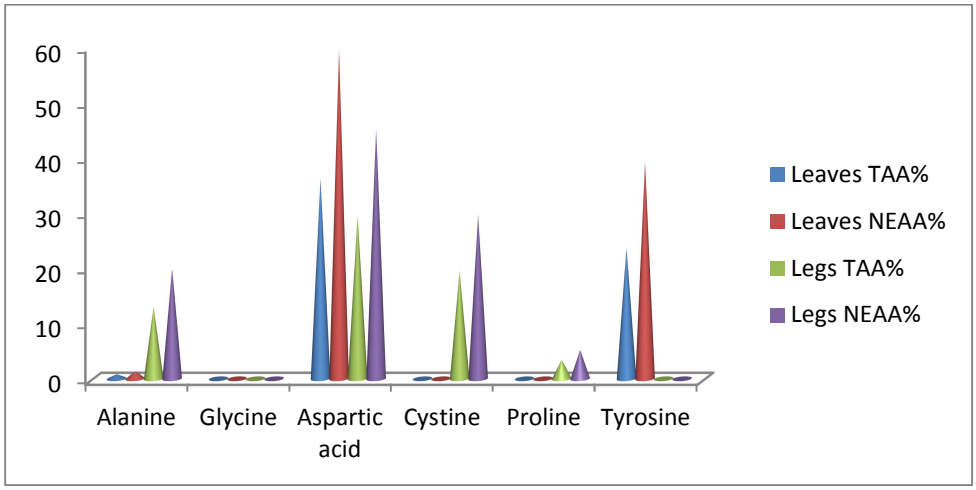

Figure (6): Percentage of Non-Essential Amino acid (NEAA%) of *Hybrid tea rose* (Leaves and Stems (Legs))

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