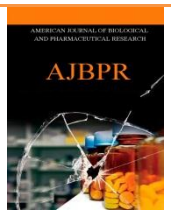
e-ISSN - 2348-2184
Print ISSN - 2348-2176

AMERICAN JOURNAL OF BIOLOGICAL AND PHARMACEUTICAL RESEARCH

Journal homepage: www.mcmed.us/journal/ajbpr



EVALUATION OF AMINO ACID CONTENTS FROM SOME PLANT SPECIES OF BARMER DISTRICT OF RAJASTHAN

Sunil Kumar[1] and B B.B.S. Kapoor[2]*

[1]Department of Botany, Ch. BRG Govt. Girls College, Sriganganagar-335001 - India.
[2]P.G. Department of Botany, Govt. Dungar College, Bikaner- 334001 - India.

Article Info

Received 29/08/2016
Revised 16/09/2016
Accepted 19/10/2016

Key words: - Amino acid content, Plant species, Barmer district, Rajasthan.

ABSTRACT

Evaluation of amino acid contents from three selected plant species growing in Barmer district of Rajasthan was carried out. The roots, shoots and fruits of *Clerodendrum phlomoides*, *Lycium babarum* and *Sida cordifolia* collected from study area were analysed for amino acid contents. It was found that out of twenty four amino acids, eighteen free and fifteen bound amino acids were detected in various plant samples tested. The maximum number of free amino acids free was found sixteen in fruits of *Clerodendrum phlomidis*. The maximum number of bound amino acids was found twelve in the fruits of *Sida cordifolia*.

INTRODUCTION

The scarcity of vegetation in North-west Rajasthan region restricts the choice of various plant species for their use as feed and fodder. The plants of Barmer region are potential source of nutritionally important compounds. The animals and human beings in this region are fully dependent on these plants for food, fodder, fibre and fuel. The plant species growing in this region besides their medicinal importance may contain sufficient amount of amino acid contents to be considered as livestock feed. A number of arid zone plants have been analysed for their amino acid contents [1-7].

MATERIALS AND METHODS

The present investigation deals with free and bound amino acid contents of roots, shoots and fruits of *Clerodendrum phlomoides*, *Lycium babarum* and *Sida cordifolia* growing in the Barmer district of Rajasthan.

Corresponding Author

B B.B.S. Kapoor
Email:- bbskapoor@rediffmail.co

These were collected from study area. Dried test material (5gm) from each sample was homogenized separately in Waring Blander in 25ml of 90% ethanol (1gm/5ml). Each of the homogenized test material was separately centrifuged (2500rpm) for 30 minutes and the residue was washed 3 times with 90% ethanol. The supernatants were removed and mixed with chloroform (1:3). The mixture was shaken vigorously. The resulting upper aqueous layer was removed, concentrated in vacuom and dried in vacuum desiccators at 26^{o}C. The residue thus obtained was dissolved in 10% iso-propanol and stored at 2^{o}C. The final concentration of each of the test samples was prepared in 50% ethanol (1gdw/0.5ml) before using it for analysis.

The bound amino acids of each sample were obtained by hydrolyzing the residues with 6NHCL at 100^{o}C for 24 hours. The hydrolyzed were evaporated to dryness and finally taken up in 50% ethanol (1gdw/0.5ml) for amino acid analysis. The extract (0.01ml) of each of the test samples was subjected to Thin Layer Chromatography and Rf values were calculated.

A regression curve of the different concentrations of each of the known amino acids was worked out against

its optical density, measured using Spectrocolorimeter at 400nm separately. The concentration of the various amino acids in the test samples was determined (mg/gdw) by comparing with that of the known amino acids [8-10].

RESULTS AND DISCUSSION

Concentration of the free and bound amino acid contents in the various plant parts (roots, shoots and fruits) of all the selected plant species collected from study area are presented in Table 1-2.

Out of twenty four amino acids, eighteen free and fifteen bound amino acids were detected in various plant samples tested. The maximum number of free amino acids free was found sixteen in fruits of *Clerodendrum phlomidis*. The maximum number of bound amino acids was found twelve in the fruits of *Sida cordifolia (*Table 1 & 2).

Maximum total amount (49.1mg/g.d.w.) of free amino acids was found in the fruits of *Clerodendrum phlomidis* while minimum (28.8 mg/g.d.w.) in the roots of *Lycium babarum* (Table 1).

Maximum amount (36.7 mg/g.d.w.) of the total bound amino acid was observed in the shoots of *Sida cordifolia* whereas minimum (21.4 mg/g.d.w.) in the fruits of *Clerodendrum phlomidis* (Table 2).

Table 1. Free Amino Acid Contents (mg/g.d.w.) of Various Plant Parts of Selected Plant Species

S. No.	Amino Acid	R_f (x100)	*Clerodendrum phlomidis*			*Lycium barbarum*			*Sida cordifolia*		
			Roots	Shoots	Fruits	Roots	Shoots	Fruits	Roots	Shoots	Fruits
1	Alanine	28	1.6	3.8	2.9	0.0	4.1	3.2	1.9	0.0	0.0
2	Arginine	14	1.9	0.0	4.6	1.7	3.5	0.0	0.0	2.7	1.3
3	Aspartic acid	25	2.4	2.6	0.0	0.0	3.2	1.4	1.8	3.1	1.4
4	Citrulline	23	0.0	1.4	3,6	0.0	2.8	0.0	4.0	0.0	2.4
5	Glutamic acid	35	3.0	2.9	1.2	3.5	0.0	1.6	3.2	4.6	2.4
6	Glycine	19	1.8	0.0	3.2	0.0	0.0	2.4	3.6	1.8	0.0
7	Histidine	13	0.0	4.8	2.3	0.0	2.9	3.6	2.4	0.0	1.9
8	Isoleucine	71	1.9	3.2	4.1	4.2	0.0	2.8	2.0	2.9	0.0
9	Leucine	72	2.1	0.0	3.2	3.6	2.4	1.5	1.5	3.6	3.2
10	Lysine	11	1.7	2.5	0.0	2.3	4.6	0.0	0.0	4.0	2.6
11	Methionine	51	2.4	0.0	3.9	1.6	0.0	2.4	1.7	2.4	4.2
12	Phenyl alanine	65	1.8	3.6	2.0	2.2	3.9	1.3	1.3	0.0	1.8
13	Proline	27	4.6	0.0	3.8	1.7	0.0	2.4	0.0	4.1	3.4
14	Serine	27	3.4	0.0	1.6	2.6	4.5	3.2	2.4	2.3	2.8
15	Threonine	24	2.3	3.8	1.9	0.0	2.8	1.3	2.4	3.2	0.0
16	Tryptophan	62	0.0	4.7	3.2	3.5	4.2	0.0	1.3	3.5	2.6
17	Tyrosine	45	1.9	2.8	4.2	1.9	2.9	1.7	2.7	3.8	3.2
18	Valine	58	1.8	2.1	3.4	0.0	2.9	1.7	2.7	3.8	3.2
	Total Amino acid contents		**34.6**	**38.2**	**49.1**	**28.8**	**44.7**	**30.5**	**34.9**	**45.8**	**36.4**
	Total No. of Amino acids		**15**	**12**	**16**	**11**	**13**	**14**	**15**	**14**	**14**

Table 2. Bound Amino Acid Contents (mg/g.d.w.) of Various Plant Parts of Selected Plant Species

S. No.	Amino Acid	R_f (x100)	*Clerodendrum phlomidis*			*Lycium barbarum*			*Sida cordifolia*		
			Roots	Shoots	Fruits	Roots	Shoots	Fruits	Roots	Shoots	Fruits
1	Alanine	28	1.7	0.0	0.4	3.1	5.2	1.7	2.3	3.8	3.1
2	Arginine	14	3.1	3.2	1.8	2.6	4.8	3.2	0.0	0.0	0.9
3	Aspartic acid	25	1.2	0.0	0.0	0.0	0.0	0.0	4.7	5.6	3.7
4	Glutamic acid	35	1.7	2.9	1.6	1.8	3.7	2.1	2.3	0.0	2.9
5	Glycine	19	0.0	0.0	2.2	0.9	0.0	0.0	3.1	4.2	1.6
6	Histidine	13	2.7	3.6	1.9	0.0	0.9	0.9	0.0	0.0	0.0
7	Isoleucine	71	1.9	0.0	0.0	0.0	0.0	0.0	1.3	2.8	2.4
8	Leucine	72	3.6	2.2	4.2	3.8	4.4	4.3	2.5	3.6	3.2
9	Lysine	11	4.2	5.7	1.8	2.5	0.0	0.0	0.0	0.0	0.9
10	Methionine	51	0.0	0.0	0.6	1.4	0.0	2.0	0.0	2.6	0.0
11	Phenyl alanine	65	3.4	4.6	2.9	2.5	3.9	4.2	0.0	0.0	0.0
12	Proline	27	0.0	1.9	0.0	3.6	4.2	0.0	1.8	3.4	1.7
13	Threonine	24	1.7	2.2	0.6	0.0	0.0	0.0	2.5	3.9	2.9
14	Tryptophan	62	2.3	4.5	3.4	2.5	2.7	4.6	1.9	2.1	2.6
15	Valine	58	0.0	0.0	0.0	2.8	2.6	3.4	2.5	4.7	4.2

	Total Amino acid contents		**27.5**	**30.8**	**21.4**	**27.5**	**32.4**	**26.4**	**24.9**	**36.7**	**30.1**
	Total No. of Amino acids		**11**	**9**	**11**	**11**	**9**	**9**	**10**	**10**	**12**

CONCLUSION

The present study indicates that these plant species growing in the Barmer region of Rajasthan have sufficient amount of amino acid contents, which may be useful as feed and fodder for the livestock. These can also be used in drug and pharmaceutical industries.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST:
The authors declare that they have no conflict of interest.

REFERENCES

1. Bains NS, Harsh ML. (1996). Production of Free and bound amino acid from *Citrullus lanatus* and *Withania somnifera*. *Oikoassay*, 13(1-2), 7-10.
2. Kapoor BBS, Harsh G. (2003). Free and Protein Bound Amino acids of some arid zone plants. *I. J. of Env. Sciences*, 8(2), 117-118.
3. Kapoor BBS, Ranga P, Harsh G. (2003). Production of free and bound amino acid from some arid zone asteraceous medicinal plants. *Oikoassay*, 16(2), 65-68.
4. Bains A, Bains NS, Goswami A. (2005). Free and bound amino acid Production from *Prosopis cinereria* and *Salvadora persica*.*Oikoassay*, 18(1), 5-7.
5. Dayashree Y, Bains NS. (2008). Free and bound amino acid Production from different plant parts of some parasitic plants of the Thar Desert of Rajasthan. *Oikoassay*, 21(1-2), 13-16.
6. Vats A, Nagpal KL. (2013). Estimation of amino acid contents. *International Journal of Research in Engineering and Applied Sciences*, 3(1), 111-120.
7. Kadam VB, Deore SV, Bhagwat MG, Gaikwad VB. (2015). Determination of Alkaloids, Amino acids and Protein Contents in Leaves of Ten Medicinal Plants. *World Journal of Pharmaceutical Research*, 4(10), 45-49.
8. Awapara J. (1948). Application of Paper Chromatography for Estimation of Free Amino Acids in Tissues. *Arch. Biochem*, 19, 171-173.
9. Block RJ, Durrum EL, Zweig G. (1958). A Manual of Paper Chromatography and Paper Electrophorosis. Academic Press Inc. New York, 374-375.
10. Khanna P, Jain SC. (1973). Presence of free and bound amino acids in plant tissue cultures. *Indian J. Pharm*, 35, 63-65.