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Research Article

EVALUATION OF AMINO ACID CONTENTS FROM SOME CAPPARIDACEOUS PLANT SPECIES OF ARID ZONE OF RAJASTHAN

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ABSTRACT
Evaluation of amino acid contents from three selected plant species growing in arid zone of Rajasthan was carried out. The roots, shoots and fruits of *Capparis decidua*, *Cleome gynandra* and *Cleome viscosa* were collected in polythene bags. The samples were dried powdered and then used for their estimation of amino acid contents. It was found that out of twenty four amino acids fifteen free and fourteen bound amino acids were detected in various plant samples tested. The maximum number of free amino acids free was found twelve in fruits of *Cleome gynandra*. While bound amino acids ten in the fruits of *Capparis decidua*, roots and fruits of *Cleome gynandra*.

Keywords: *Amino Acid Contents, Capparidaceous Plant Species, Arid Zone, Rajasthan*

INTRODUCTION
The scarcity of vegetation in arid zone of Rajasthan restricts the choice of various plant species for their use as feed and fodder. The plants of this 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 analyzed for their amino acid contents by various workers (Bains and Harsh, 1996; Kapoor and Harsh, 2003; Kapoor *et al.*, 2003; Bains *et al.*, 2005; Dayashree and Bains, 2008; Vats and Nagpal, 2013; Kadam *et al.*, 2015).

MATERIALS AND METHODS
The present investigation deals with free and bound amino acid contents of roots, shoots and fruits of all the three selected plant species were collected from study area.
Plant parts of *Capparis decidua*, *Cleome gynandra* and *Cleome viscosa* of family Capparidaceae were collected in polythene bags. The samples were dried powdered and then used for their estimation of amino acids. 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 vacuo and dried in a 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 (Awapra, 1948; Block *et al.*, 1958; Khanna and Jain, 1973).

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)	*Capparis Decidua*			*Cleome Gynandra*			*Cleome Viscosa*		
			Roots	**Shoots**	**Fruits**	**Roots**	**Shoots**	**Fruits**	**Roots**	**Shoots**	**Fruits**
1	Alanine	28	-	-	4.0	3.1	2.6	3.2	2.4	-	3.9
2	Arginine	14	-	3.1	2.9	-	-	3.4	-	-	2.9
3	Aspartic acid	25	2.2	-	3.6	2.1	3.4	-	2.4	3.2	4.7
4	Glutamic acid	35	3.2	4.4	-	3.4	-	3.6	-	4.8	5.6
5	Glycine	19	-	3.9	4.2	-	-	3.8	2.7	3.2	4.0
6	Histidine	36	2.2	3.4	3.9	2.6	-	4.2	2.0	-	-
7	Isoleucine	71	2.8	-	3.1	-	4.4	3.4	-	1.8	3.0
8	Leucine	72	-	4.6	3.9	3.0	4.2	-	-	4.1	-
9	Phenyl alanine	65	-	1.6	3.0	1.9	3.8	4.1	-	2.0	-
10	Proline		-	-	-	3.2	-	4.1	-	2.3	3.4
11	Serine	33	-	-	3.1	2.4	2.2	3.4	3.2	4.8	5.6
12	Threonine	24	2.6	3.5	2.9	2.4	1.4	1.8	4.4	-	-
13	Tryptophan	62	1.1	-	-	1.8	2.0	-	1.4	2.9	-
14	Tyrosine	40	2.7	3.0	3.5	-	-	4.6	-	-	2.4
15	Valine	58	1.3	2.5	-	2.4	1.6	2.6	3.6	1.6	3.1
	Total Amino acid contents		**18.1**	**30.0**	**38.1**	**28.3**	**25.6**	**42.2**	**22.1**	**30.7**	**38.6**
	Total No. of amino acids		**8**	**9**	**11**	**11**	**9**	**12**	**8**	**10**	**10**

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)	*Capparis Decidua*			*Cleome Gynandra*			*Cleome Viscosa*		
			Roots	**Shoots**	**Fruits**	**Roots**	**Shoots**	**Fruits**	**Roots**	**Shoots**	**Fruits**
1	Alanine	28	2.4	2.8	3.2	1.4	2.2	3.8	-	2.0	3.1
2	Arginine	14	2.8	-	-	3.6	-	3.9	2.9	-	-
3	Aspartic acid	25	3.8	4.2	6.6	1.9	2.2	5.4	1.6	2.4	-
4	Glutamic acid	35	-	2.5	2.8	5.4	-	5.8	3.8	-	-
5	Glycine	19	2.8	-	4.6	-	3.2	5.0	2.2	-	2.5
6	Histidine	36	1.8	2.5	-	2.2	3.5	-	2.1	3.4	3.0
7	Isoleucine	71	-	2.9	3.2	-	-	4.0	-	2.3	3.6
8	Leucine	72	3.6	4.2	-	3.4	-	5.6	-	2.6	-
9	Phenyl alanine	65	2.4	-	-	-	4.0	4.2	-	2.8	-
10	Proline		-	-	3.2	2.9	-	-	3.8	-	4.2
11	Serine	33	-	-	2.9	3.1	-	-	2.2	3.4	5.2
12	Threonine	24	2.1	2.8	-	2.9	-	2.2	-	3.1	-
13	Tyrosine	40	2.9	-	3.4	-	-	2.4	-	-	2.1
14	Valine	58	3.7	2.9	-	2.4	1.6	-	2.2	1.8	2.4
	Total Amino acid contents		**28.3**	**29.8**	**29.9**	**29.2**	**16.7**	**42.3**	**20.8**	**23.8**	**26.1**
	Total No. of amino acids		**10**	**8**	**8**	**10**	**6**	**10**	**8**	**9**	**8**

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.

It was found that out of twenty four amino acids fifteen free and fourteen bound amino acids were detected in various plant samples tested.

The maximum number of free amino acids free was found twelve in fruits of *Cleome gynandra*. While bound amino acids ten in the fruits of *Capparis decidua*, roots and fruits of *Cleome gynandra*.

Maximum total amount (42.2 mg/g.d.w.) of free amino acids was found in the fruits of *Cleome gynandra*, whereas minimum (18.1 mg/g.d.w.) in the roots of *Capparis decidua*.

Maximum amount (42.3 mg/g.d.w.) of the total bound amino acid was observed in the fruits of *Cleome gynandra* whereas minimum (16.7 mg/g.d.w.) in the shoots of *Cleome gynandra*.

Conclusion

The present study indicates that these Capparidaceous plant species growing in the arid zone 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.

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