

**FREE AND COMBINED AMINO ACID COMPOSITION IN
SPECIES OF *BRYOPSIS* FROM SAURASHTRA COAST**

ABSTRACT

The free and combined Amino acid composition in the three species of the algae belonging to the genus *Bryopsis* from Saurashtra Coast were studied and the results are presented in this note.

THE amino acid constituents of the protein and free state are studied in the following species of *Bryopsis* collected from Saurashtra coast of India.

Bryopsis indica Gepp. and Gepp., *B. plumosa* (Huds.) Ag., and *B. ramulosa* Mont. The algae were collected from Port Okha.

Material and Methods : *B. indica* was collected in the month of January ; *B. plumosa* in November and *B. ramulosa* in March. Methods of collecting algal specimens and its preservation for detailed study, as well as preparation of protein hydrolyzates and chromatographic analysis of amino acids are according to Lewis (1973). Whatman No. 1 chromatographic grade filter paper is used here instead of No. 52. However, free amino acid extracts are prepared using resin technique of Dave and Lewis (1973).

Results : Results are given in Table 1 and 2. The amino acids in the protein hydrolyzates are expressed as g/16 g of protein nitrogen, while in free amino acids are given as $\mu\text{g/g}$ of dry weight of alga. The amino acids occurring below estimable level are denoted by sign ' + ' while the blank indicates that the compound is not detected.

TABLE 1. *Amino acid composition in the protein hydrolyzates of Bryopsis from Okha Port*
(Amount in grammes per 16 g of protein nitrogen)

	<i>B. indica</i>	<i>B. plumosa</i>	<i>B. ramulosa</i>
L-Alanine	4.43	4.46	5.41
γ -Aminobutyric acid	0.54	0.53	0.52
Glycine	2.14	2.08	1.58
Leucine(s)	4.23	5.27	4.47
Valine	3.67	5.93	4.69
Serine	1.85	2.71	1.53
Threonine	2.02	1.81	3.53
Aspartic acid	21.04	15.14	24.00
Glutamic acid	12.95	4.44	9.60
Arginine	4.27	6.10	3.28
Lysine	2.88	4.28	4.19
Ornithine	1.44	1.92	1.64
Cysteic acid	0.79	1.44	1.12
Cystine	1.33	1.82	2.47
Methionine	0.41	0.74	0.74
Phenylalanine	4.71	10.40	6.30
Tyrosine	1.66	1.97	2.68
Histidine	6.74	14.40	10.16
Proline	7.23	6.58	7.59
Tryptophan	0.43	0.29	0.53
Total number detected	21	21	21
Total number estimated	21	21	21
Total amount estimated	84.76	92.31	101.03
Total protein N (% dry wt.)	3.445	3.258	3.053
% recovery of protein nitrogen	72.26	88.31	94.51

Protein Hydrolyzates : In all, twenty-one amino acids are detected and estimated in the protein hydrolyzates of three species of *Bryopsis*. *B. indica* is the richest in total proteins and *B. ramulosa* is the poorest. Qualitatively there is no difference in amino acid composition but quantitative variations are observed with regard to individual compounds among the three species studied. Aspartic acid is the dominant amino acid present in the protein hydrolyzates of all the three species studied. Glutamic acid in *B. indica*, phenylalanine and histidine in *B. plumosa* and histidine in *B. ramulosa* also occur in large amounts ; the other estimated compounds are in fairly good quantity while γ -aminobutyric acid, methionine and tryptophan are found in small amounts.

TABLE 2. Free Amino acid composition of three species of *Bryopsis* from Okha Port
(Parts per million of dry alga)

	<i>B. indica</i>	<i>B. plumosa</i>	<i>B. ramulosa</i>
α -Alanine	1535.0	2511.0	1977.0
β -Alanine	831.3	—	515.0
γ -Aminobutyric acid	307.8	—	199.0
Glycine	726.6	343.9	869.0
Leucine(s)	683.0	141.5	958.0
Valine	178.6	41.3	151.0
Serine	398.8	157.1	505.0
Threonine	584.1	343.9	1329.0
Aspartic acid	826.2	1610.0	597.4
Glutamic acid	1624.0	2790.0	1463.0
Asparagine	—	1915.0	—
Glutamine	959.6	—	—
Arginine	1421.0	571.8	650.9
Lysine	541.6	736.6	514.9
Cysteic acid	316.2	139.5	271.3
Cystine	966.0	381.8	304.8
Methionine	128.2	—	185.3
Phenylalanine	1098.0	++	645.0
Tyrosine	845.0	51.6	1287.0
Histidine	798.1	1473.0	1030.0
Hydroxyproline	++	++	+
Proline	++	2289.0	++
Tryptophan	269.4	173.1	194.7
Total number detected	23	20	22
Total number estimated	21	18	20
Total amount estimated	15,038.5	15670.1	13646.9

Free Amino Acids : In *B. indica* among the twenty-three amino acids detected twenty-one are estimated, in *B. plumosa* among the twenty detected eighteen are estimated ; and in *B. ramulosa* among the twenty-two detected twenty are estimated in the free state.

In general, total amount of free amino acids does not show much differences. However, qualitative composition and quantities of individual compounds shows variations among the three species studied. Glutamic acid in *B. indica* and *B. plumosa*; α -alanine in *B. ramulosa* are found to be dominant free compounds. In *B. indica*, β -alanine, aspartic acid, glutamine, arginine, cystine, phenylalanine, tyrosine and histidine ; in *B. plumosa*, aspartic acid, asparagine, histidine and proline ; and in *B. ramulosa*, glycine, leucine(s), threonine, tyrosine and histidine occur in fairly large amounts. Valine, methionine and tryptophan usually occur in small quantities. Hydroxyproline and proline are in trace amount except in *B. plumosa*, where proline is present in very large amount. Asparagine and glutamine are not common compounds. Asparagine in *B. plumosa* and glutamine in *B. indica* are found in fairly large quantities.

Authors wish to express their grateful thanks to Dr. D. J. Mehta, Scientist-in-Charge, Central Salt & Marine Chemicals Research Institute, Bhavanagar for permitting them to publish this work, and Dr. (Mrs.) Franciska Thivy, for confirming the identification of the taxa studied here.

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