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ALGIN BEARING SEAWEEDS OF PAKISTAN COAST

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Five varieties of *Sarguassum* and one of *Cystoseira,* freshly harvested off the coast of Ras Mauri, Buleji and Sandspit were studied for their contents of alginic acid on dry basis. The study also includes the estimation of alginio acid in drifted brown seaweeds cast ashore at Sandspit and Hawkes Bay.

Key words: Alginic Acid; Sea Weeds; Nitrogen.

INTRODUCTION

Brown seaweeds are one of the potential wealth from the sea. However, the exploitation of the marine resources in Pakistan is still in its rudimentary stage and very little is known about the alginic acid content of brown seaweeds of the productive North Arabian Sea bordering Pakistan.

Thus keeping in view the above lacuna in the field of commercial utilization of seaweeds from this area and the importance of seaweeds as a natural resource, investigations were made to estimate the alginic acid content of some of the common brown seaweeds of Pakistan coast.

Ras Mauri [1] (Cape Monze), Sandspit [2], and Buleji [3] (a.b.) are well known for their rich algal growth, where a large number of species of seaweeds are represented. The present study deals with the five varieties of *Sargassum* species and one of *Cystophyllum,* belonging to the group of Phaeophyceae. This study also includes seaweeds collected as drift from Sandspit and Hawkes Bay [2]. Separation of the species has not been attempted in the case of drifted brown seaweeds because of the difficulties in distinguishing them in the field as these were collected in dried form from various spots on the beaches. However, specific differentiation of these drifted seaweeds will be of little importance in any commercial extraction of alginic acid.

MATERIAL AND METHODS

The investigation comprised experimental estimation of the total alginic acid content of six of the most common genera of brown seaweeds of the area as well as drifted followed by a study of the actual yields obtained under practical conditions. The samples of the fresh seaweeds were harvested in the month of October whereas the samples of drifted brown seaweeds were collected in January and February.

The estimation of actual alginic acid content of these seaweeds were carried out by the method described by Cameron, Ross and Pervical [4]. For determination of the actual yield of alginic acid from these seaweeds a modified method of Stanford (described by Tressler [5]) was applied. The collected samples were washed thoroughly with fresh water, the washed material was dried and treated with 5% solution of sulphuric acid in water, washed thoroughly with fresh water and soacked in an strong alkaline sollution of 1% sodium hydroxide and 2.5% sodium carbonate (modification in the Stanford method) diluted with water and filtered. The filtrate obtained was acidified. Alginic acid was collected and washed with water. It was dried in an oven at a temperature below 80^{o} and weighed thrice.

The percentage value of alginic acid in these seaweeds samples were being calculated on air dry basis (Table 1-2). The nitrogen contents of these seaweeds were calculated on the basis of estimation carried out of Kjeldahl's method. The amount of nitrogen obtained from fresh and drifted Seaweeds is given in Table 1 and 2.

RESULTS AND DISCUSSION

About five samples of drifted seaweeds were collected from different coastal areas of Karachi. This collection was made in the month of January and February of 1985, while six species of brown fresh seaweeds were collected in the month of October 1985. All these collected samples of seaweeds belong to the class Phaeophyceae.

These eleven collected seaweeds samples have been analysed for their specific and chemical contents, viz;. alginic acid, nitrogen and protein value. The results of the yield of alginic acid and nitrogen of drifted seaweeds are given in Table 1 Columns I and III, while the results of the

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Table 1.Drifted brown seaweeds

S. No.	Sample No.	Yield of alginic acid Column – 1	Percentage of nitrogen Column III	Yield of residue	Residue sample No. V	Percentage of N_2 Column – V
1.	X	9.0 %	1.5	40.5	X – R	3.9
2.	X_2	15.0 %	1.2	75.0	X_2 – R	2.1
3.	X_4	18.0 %	1.8	18.0	X_4 – R	2.0
4.	X_5	10.0 %	1.2	20.0	X_5 – R	2.1
5.	X_{10}	21.1 %	1.1	26.4	X_{10} – R	1.3

Table 2.Fresh brown seaweeds

S. No.	Sample No.	Yield of alginic acid Column – II	Percentage of nitrogen Column IV	Yield of residue	Residue sample No. VI	Percentage of N_2 Column VI
1.	I.B	30.5 %	3.1	13.0	I.B.R.	1.8
2.	II.B	22.6 %	3.3	41.0	II.B.R.	2.7
3.	III.B	27.8 %	2.9	28.0	III.B.R.	2.4
4.	IV.B	32.2 %	2.0	28.0	IV.B.R.	2.3
5.	V.B	27.0 %	2.6	27.0	V.B.R.	2.7
6.	VII.B	22.6 %	1.4	29.3	VII.B.R.	2.0

Table 3. Drifted and fresh brown seaweeds

S.No.	Sample No.	Percentage of protein Column VII	Sample No.	Percentage of protein Column IX	S. No.	Sample No.	Percentage of protein Column VIII	S. Sample No.	Percentage of protein Column X
1.	X	9.5	X – R	24.6	1.	I-B	19.6	I.B.R.	11.4
2.	X_2	7.3	X_2 – R	13.2	2.	II-B	20.4	II.B.R	16.8
3.	X_4	11.1	X_4 – R	12.4	3.	III-B	18.0	III-B.R	14.9
4.	X_5	7.4	X_5 – R	13.7	4.	IV-B	12.3	IV.B.R	14.2
5.	X_{10}	7.0	X_{10} – R	7.5	5.	V-B	16.2	V.B.R	17.0
					6.	VII-B	9.0	VII.B.R.	12.1

yield of alginic acid and nitrogen from fresh Seaweeds are given in Table 2 columns II and IV.

The other two columns V and VI of Table 1 and Table 2 respectively show the percentage of the nitrogen content of the samples of brown fresh seaweeds and drifted brown seaweeds residues, remained after the complete and thorough extraction of alginic acid from them.

The nitrogen and protein value recorded in the tables are estimated in aliquots by the standard micro-Kjeldahl procedure. The data collected comprising columns VII, VIII, IX X in Table 3 show that all brown seaweeds samples are rich in proteins.

The chemical composition of brown seaweeds given in the Tables show that the values of alginic acid and nitrogen are quite remarkable. Nevertheless significant amounts of the above mentioned chemicals present in brown seaweeds suggest to be good source for alginic acid and nitrogen.

It is also evident that the collected data for the yield

of alginic acid for brown seaweeds has been reported for the first time in Pakistan.

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