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Hematological Screening of Some Seaweed Found At Karachi Coast

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Abstract: **Pakistan has rich algal flora in the coastal and in shore water of northern Arabian Sea. Keeping in mind the importance of seaweeds and other marine resources, present study has been designed to evaluate the hematological activities of some marine resources collected from Karachi coast. The seaweeds which were collected and identified for study were *Codium iyengarii* (green algae), *Codium flabellatum* (green algae), S*argassum binderi* (brown algae). Rabbits were used to investigate hematological effects of these seaweeds. The extracts of seaweed were given in the dose of 28mg/kg and slight decrease in Hemoglobin concentration, sight increase in ESR was seen by almost every type of seaweed with no significant effect on color index and hemoglobin content. This change in ESR is clinically important in establishing diagnosis and prognosis of certain diseases and also monitoring the response to therapy in certain inflammatory diseases.**

Keywords: **Hemoglobin concentration, sight increase in ESR , *Codium iyengarii* (green algae), *Codium flabellatum* (green algae), S*argassum binderi* (brown algae).**

1. INTRODUCTION

The exploration of sea weed for commercial utilization is under extensive investigation since the world is facing the damage of shorting of conventional food. Similarly the use of seaweed as a potential source of medicine could also contribute significantly in this field. Pakistan has rich algal flora in the coastal and in shore water of northern Arabian Sea [1]. Many seaweeds and marine algae species have shown to contain different ascorbic acid content. Apart from carbohydrate, fats and minerals, seaweeds are known to be rich in vitamins [2]. The increased demand for medicines prepared from algae attracted the attention of scientist to utilize the algae as a source of medicine. The Chinese and Japenese have used seaweeds for the cure of goiter and other glandular problems since 300 B.C. The Romans used seaweeds to heal wounds, burns and rashes. The English used Porphya to prevent scurvy on long voyages and chondrus for treatment of various internal disorders such as constipation, stomachaches and ulcers have been treated with chondrus, gracilaria and pteroclodra, all of these algae produce phycocolloids. The first record of antibacterial product from algae was a substance chlorellin [3] from chlorella. Extracts of vocca and walsh were effective against both gram positive and gram negative bacteria. Preliminary pharmacological investigation of the algae belonging to genus Dictyota was reported to possess considerable antibacterial, antifungal and antiviral [4,5] antimicrobial, antineoplastic [6] and cytotoxic activities.

Keeping in mind the importance of seaweeds and other marine resources, present study is designed to evaluate the hematological activities of some marine resources collected from Karachi coast. The seaweeds which were collected and identified for study are:

Codium iyengarii (green algae), *Codium flabellatum* (green), S*argassum bindarii* (brown).

Codium iyengarii and *Codium flabellatum* belong to the family Codium [1]. This family has two genera and six species. codium species have shown to contain sterol [7] and a sterol glycoside is isolated from *Codium iyengarii* [7]. One new steroid (iyengadione)and two new steroidal glycoside (iyengaroside-A and B) along with clerosterol galactoside. iyengaroside-A and clerosterol galactoside have bactericidal activity [8].

S*argassum binderi* belongs to the family Sargassaceae. this species contain phenolics (tannins) deterepiphytes. pigments contained are chlorophyll a, c; fucoxanthin; xanthophylls and carotene. cell wall contain alginate; fucoidin and xylan [9,10,11,12]

The alga Codium is well known for its haemagglutinic activity. The phytohaemagglutinin and lectins cause the clumping of the erythrocytes invitro [13]. Agglutinated cells become lodged in small capillaries throughout the body and over the period of hours the cells swell and rupture and release hemoglobin in the blood.

In this study effect of these seaweeds on erythrocyte sedimentation rate, hemoglobin concentration, erythrocyte count, hemoglobin content of erythrocyte and color index of erythrocytes is determined.

ESR measures the speed at which red blood cells fall to the bottom of an upright glass test tube. This measurement is important because when abnormal proteins are present in the blood, typically due to inflammation or infection, they cause red blood cells to clump together and sink more quickly. The rate is an indication of inflammation and increases in many diseases. When the disease worsens, the ESR increases; when the disease improves, the ESR decreases.

2. MATERIAL AND METHOD

Extraction:

The collection of seaweeds were carried out from Paradise point and Manora of Karachi. The identification phase was followed after collection. The collected seaweeds were drained of sea water and epiphytes as well as the calcarious deposits were removed. Fresh water was dried completely and then soaked in methanol (about 2lit) for thirty days. After thirty days, the extract was filtered through filter paper and the residue left was methanolic extract tested for hematological activities.

Experimental animals:

Rabbits were used to assess hematological parameters. Rabbits used were of 0.85- 1.5kg weight. They were divided into 4gps. Each group has six rabbits. Three groups were fed by *Codium iyengarii* (green algae), *Codium flabellatum* (green), S*argassum bindarii* (brown) respectively and one group was kept as control.

Dosing protocol:

Different doses were tried to observe the effect and then the dose was selected at which the optimum response was noted hence for rabbits of 1700 grams the extract was given as 40 mg (28mg/kg). The experiment was conducted for 21 days.

The parameters selected were as follows:

Estimation of hematological parameters:

Sahlis method was used to estimate the concentration of Hb in blood and color index, westergen method was used to measure ESR, erythrocyte count and Hb content was also determined.

3. RESULTS

Since the seaweeds are shown to possess hemagglutinin activity and anticoagulating activities [14]. The hematological parameters may be evaluated and help in assessing the abilities of seaweed for therapeutic purposes.

Effect on ESR:

All seaweeds have slightly iincreased the ESR value when it was compared with the control.

Effect on Hb concentration:

The seaweeds produced slight decrement in the level of Hb which is statistically evaluated and compared with the control.

Effect on erythrocyte count:

Slight decrease in the count of erythrocyte after the administration of seaweed was noted.

Effect on color index of erythrocytes:

The color index of erythrocyte was not significantly changed after the administration of different seaweeds.

Effect on Hb content of erythrocytes:

The Hb content was insignificantly decreased after the administration of different seaweeds.

Table- 1: EFFECT OF SEAWEEEDS ON HEMATOLOGICAL PARAMETERS

EFFECT OF SEAWEEEDS ON HEMATOLOGICAL PARAMETERS					
Groups	**ESR**	**Hemoglobin**	**Erythrocyte count**	**Color index of RBC**	**Hb content of RBC**
Control	2.1 ± 0.1	13 ± 0.7	4.8 ± 0.1	8.2 ±0.9	26.1 ± 1.4
Codium Iyengarii	3.1 ± 1.3	12.2 ± 1.5	4.5 ± 0.6	8.2 ± 0.7	27.1 ± 2.7
Codium Flabellatum	2.9 ± 1.2	12.5 ± 1.5	4.8 ± 0.6	0.7 ± 0.3	26.2 ± 1.5
Sargassum binderi	2.8 ± 0.9	12.6 ± 1.2	4.5 ± 0.5	8.5 ± 1.1	27.8 ± 3.7

4. DISCUSSION

The seaweeds are shown to possess hemagglutinin activity and anticoagulating activities [14]. The alga Codium is well known for its haemagglutinic activity. The phytohaemagglutinin and lectins cause the clumping of the erythrocytes invitro [13]. Agglutinated cells become lodged in small capillaries throughout the body and over the period of hours the cells swell and rupture and release hemoglobin in the blood. Keeping in view this aspect we can say that probably this reaction of agglutination of erythrocytes and hemolysis is responsible for getting the reduction in the concentration of hemoglobin and erythrocyte although the decrease in Hb is slight. Color index is the ratio related to the erythrocyte count and hemoglobin concentration and as both are decreased by these algae, color index is also decreased. ESR measures the speed at which red blood cells fall to the bottom of an upright glass test tube. This measurement is important because when abnormal proteins are present in the blood, typically due to inflammation or infection, they cause red blood cells to clump together and sink more quickly. The rate is an indication of inflammation and increases in many diseases. When the disease worsens, the ESR increases; when the disease improves, the ESR decreases. Our results suggest that although ESR is increased by these algae which can be linked by agglutination of RBCs but this increase is slight and insignificant which indicates that these algae have no pronounced hematotoxicity and they can be used safely. According to the Rogers et al, 1990, there may be anticoagulant activity of the proteoglycan that is found in Codium species and leads to decreased fibrinogen which favours reduced ESR.

5. CONCLUSION

Thus a safe conclusion can be made that these findings help us to say that the seaweeds have no toxicity on haematological parameters and if it is used as a food substitute then it will be a safe alternative and could prove beneficial as it is anxiolytics which is reported in another study [15].

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