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ON THE YIELD AND QUALITY OF SODIUM ALGINATE FROM *SARGASSUM WIGHTII* (GREVILLE) BY PRE-TREATMENT WITH CHEMICALS

Reeta Jayasankar
Regional Centre of Central Marine Fisheries Research Institute
Mandapam Camp - 623 520

Abstract

Sundried and powdered *Sargassum wightii* was treated with 1% Hcl, 1% NaOH and 10% formalin and fresh material of the same species with different concentrations of formalin, 1-40%, with a view to assessing the effect of chemical pre-treatment on the yield and viscosity of the algin content. The study indicates that high yield and viscosity of the product could be obtained by pre-treating the fresh alginophytes with 1-5% formalin.

Introduction

The alginophytes growing in temperate climate, within a temperature range of 20°C or below it, are having good yield and viscosity, but those in tropical climate, though yield well, has low viscosity. The brown seaweeds such as *Sargassum* sps. and *Turbinaria* have been exploited from Gulf of Mannar at a rate of 3128t dry weight during 1988 for industrial purpose. Since 1966, *Sargassum wightii* has been commonly harvested for commercial use. Generally the material is preserved in liquid preservative like sulphur dioxide, which can eliminate the bacterial contamination (Tewari *et al.*, 1988). Works on preservation of seaweed and its related aspects have already been done in India (Tewari *et al.*, 1987).

Improvement of viscosity of sodium alginate by pre- treating the raw material in hydrochloric acid has successfully been attempted (Durairaj *et al.*, 1978). Pre-treatment of the material not only increases the quantity of the product but changes its physical property to a marked extent. In the present study, *S. wightii* was pre-treated with alkali, acid and formalin of different concentration with a view to increasing the yield and viscosity of the product.

Materials and Methods

Extraction of sodium alginate was done by the method of Visweswara Rao and Mody, 1965 with slight modification as follows :

1. 10g seaweed powder was directly extracted with 2% sodium carbonate avoiding pre-treatment with acid.
2. The filtrate was converted to alginic acid by adding 10% sulphuric acid rather than converting to calcium alginate.
3. The alginic acid was treated with 10% NaOH to form sodium alginate, the final product.

Pre-treatment of sun dried seaweed powder was carried out in different chemicals such as 1% Hcl at room temperature, 1% NaOH at 60°C, 10% formalin at room temperature for 30 minutes. Simple soaking with distilled water formed the control.

Pre-treatment of freshly collected seaweed was also done with different concentrations of formalin such as 1%, 5%, 10%, 20%, 30% and 40% for 24 hours at room temperature, dried, powdered and extracted by the above mentioned method. Sun dried material formed the control in this experiment.

Results and Discussions

From the table 1, it may be observed that the yield is slightly more in the material pre-treated with 1% Hcl but the viscosity is very high in formalin-treated material. It was also observed that the yield and viscosity were always more in pre-treated material compared to control.

The algin product obtained from the seaweed without pre-treatment often possess a dark brown colour which is undesirable for most of the industrial purposes. The industrial acceptability of the alginate isolates from the seaweeds is related to the degree of their whiteness and the viscosity of the solution (Eswaran *et al.*, 1967). They have mad an attempt to improve the colour of the product by using different decolourizing agents. In the present study, the calorimetric observations were made on the product and it was found out that the pre-treated material was having less brown colour than that of control. The product has shown highest transmittance (41%) in material treated with 10% formalin and the lowest of 12% in control with reference to distilled water. This indicates that formalin treated material can yield a product of

TABLE - 1.

Pre-treatment of sun dried powder to different chemicals (duration of exposure 30 minutes)

Treatments	Yield %	Viscosity CPS	Transmittance %
Soaking with distilled water (Control)	23.72	14.97	12
1% Hcl at room temp.	29.03	30.69	28
1% NaOH at 60°C	27.27	44.52	26
10% formalin at room temp.	26.40	87.22	41

TABLE - 2.

Pre-treatment of fresh seaweed to different concentrations of formalin (duration of exposure 24 h)

Treatments	Yield %	Viscosity CPS	Transmittance %
Sun drying (Control)	30.29	10.24	12
1% formalin	40.00	73.86	21
5% formalin	43.04	54.48	23
10% formalin	40.40	52.01	21
20% formalin	39.32	33.97	25
30% formalin	34.32	16.72	32
40% formalin	32.68	24.19	41

lighter colour which will suit to the industrial needs.

Table 2 shows that the fresh material treated with formalin always has higher yield than that of sun dried and powdered material. The yield was maximum when treated with 5% formalin, though the viscosity was maximum when treated with 1% formalin. The yield and viscosity exhibited decreases and transmittance increased with the increase in formalin concentration.

It has also been observed that seaweed powder reacts more easily than that of the fresh material to formalin. However, the former yielded less, presumably due to degradation of polysaccharides during drying and powdering. On the other hand, fresh material as it is being treated with formalin and preserved showed higher yield.

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