

**OBSERVATIONS ON THE VEGETATIVE
PROPAGATION OF THE MARINE ALGA,
GELIDIELLA ACEROSA (FORSSK)
FELDMANN AND HAMEL**

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Abstract

Gelidiella acerosa is a very good source for quality agar production in India. There has been reports that the natural resource of the species is very sparse in distribution and very little in quantity compared to its demand. In view of this the present work on the vegetative propagation of the alga was planned. The cultures of the vegetative cut pieces of a frond of the species were grown in different culture media. The culture media were of sea water enriched with inorganic nutrient with addition of B₂ and growth hormones. The medium with myo-inositol was found to be most suitable to get more proliferations from the cut ends of the fronds of the species as compared to other culture media used.

Introduction

Gelidiella acerosa (Forssk) Feldmann et Hamel is the commercially important alga for the production of agar (Doshi et Rao 1969; Chauhan et Mairh 1978). Some efforts have been made in past for the culture of this alga at the laboratory as well as field level (Rao and Metha 1973; Tewari, 1975; Davidon, 1950; Patel *et al.*, 1977, 1979; Patel *et al.*, 1986, Datta *et al.*, 1988 and Mairh *et al.*, 1990). Most of the workers have attempted to grow the alga using defined culture media with some modification in micronutrients. Some of them have also tried to use growth promoting substances in their culture media. However none of them good growth with many proliferation from the cuts ends of the fronds of the alga under laboratory conditions. The present paper records culture studies of vegetative fragments of the alga with additions of different

growth hormones. The culture medium with myo-inositol was found to be the most suitable to get more proliferations under the given conditions.

Materials and Methods

Live plants of *Gelidiealla acerosa* were collected from the reef of Veraval (Lat.20° 54'N; Long.70° 22'E) and brought to the laboratory for the experiments. Sea water was also collected from the same area where the plants grew. Different culture media (Table-1) were prepared using the seawater after tyndallising (Provasali, 1963). The experiments were carried out in the temperature controlled ($22 \pm 2^\circ\text{C}$) culture room. Light was provided by cool day light fluorescent tube and photoperiod (16L : 8D) hours cycle was maintained. The cultures were presterilised in 250ml corning glass bowls. Different parts of the plants, viz, tip, frond and rhizoides were cut into 1 to 2mm long fragments and they were used for the experiments. Each experiment was carried out in six replicates.

Results and Discussion

Sea water possesses all the constituents required for the growth of algae. Bacteria, yeast and fungi are also present on the surface of the algae as well as in sea water. Myoinositol is present in algae and fungi but not in bacteria (Iwasaki, 1968). It is said that growth regulating substances are present in algae (Schiewer and Zibbert, 1961; Provasoli 1963; Schiewer, 1967 a,b, and Schiewer *et al.*, 1967). In the present study myoinositol has been tried for the first time as one of the ingredients in the culture medium.

The fragments of the plant grown in media 1 and 2 were found to decay after a week. However, in the other media the plants were healthy with increase in length of the axis with production of number of laterals.

In media 3 and 4 proliferations appeared within three days from both the cut ends of the algal fragments. However, in other media the proliferations appeared in 12 days (Table-2). It was noted that though the same light intensity and temperature were maintained for both culture media used, the growth of the fragments in medium 3 was comparatively greater. It seems IAA with myoinositol in the medium creates congenial conditions for cell division and for elongation of plant axis and for proliferations of the fragment.

Culture medium 5 is having only seawater with GA and myoinositol. The plant growth in this medium is very similar to that of culture medium 4.

Table 1 Different combinations of the chemicals used in the culture media

Different Media	Combination of medium per liter
1.	Impro ved MS Medium + myo-inositol (30 mg)
2.	Sea water +NH ₄ NO ₃ (200 mg)+K ₂ HPO ₄ (20 mg)+ myo-inositol (30 mg)
3.	Sea water + B2 (20 mg) + myo-inositol (30 mg)
4.	Sea water + B2 (20mg) - IAA (25mg)+ myo-inositol (30 mg)
5.	Sea water - GA (20mg) + myo-inositol (30mg)
6.	Sea water + NaNO ₃ (100mg) + Na ₂ HPO ₄ (20mg) + NaHCO ₃ (0.9 mg) + IAA (60 mg)

Table 2 Increase of growth over a period of 2 months in *Gelidiella acerosa* with different Media

Date of Observations	Medium No 3		Medium No.4		Medium No.5		Medium No6	
	L	W	L	W	L	W	L	W
03-09-85	2.8	0.062	2.8	0.070	2.7	0.060	2.6	0.052
17-09-85	2.9	0.066	3.3	0.085	2.9	0.062	2.8	0.060
07-10-85	3.1	0.070	3.1	0.091	3.0	0.065	3.0	0.062
24-10-85	3.3	0.078	3.3	0.092	3.1	0.053	3.1	0.051
29-10-85	3.5	0.084	3.4	0.094	3.4	0.049	3.2	0.048
05-11-85	3.6	0.088	3.6	0.102	3.6	0.046	3.3	0.045

L - Length

W - Weight

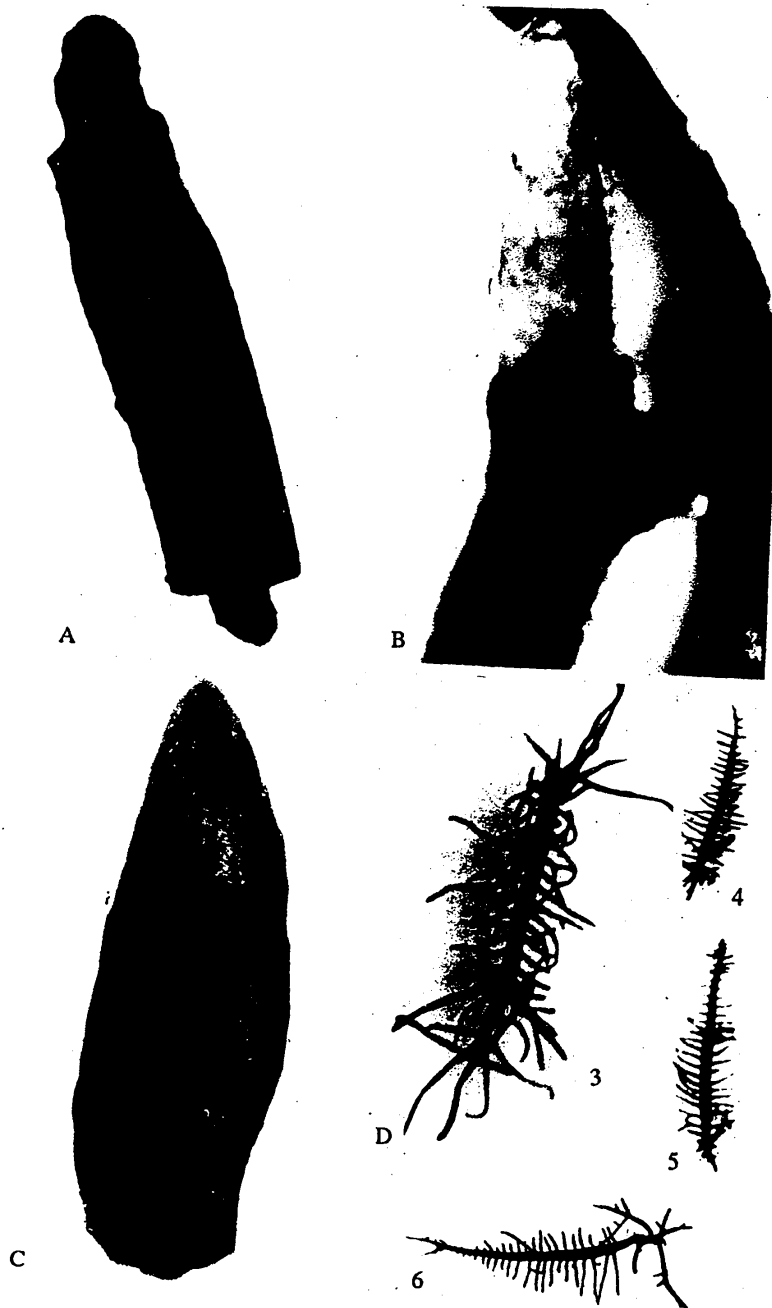


Plate 1. Fragments of *Gelidiella* grown in different media:
 A. Fragment of primary frond in medium No. 6. B. Fragment of rhizoid in medium No. 4. C. Fragment of apical part in medium No. 5. D. Tetraspores grown in media Nos. 3, 4, 5 & 6, after three months

An experiment was set up using a fertile branch with tetraspores in medium 3,4,5 and 6. After 8 days it was found that the tetraspores had germinated giving rise to spherical plantlets. After a month the plantlets had grown into a cylindrical axis with several branches (Plate 1d).

From the experiments it was found that myoinositol in the culture medium plays an important role in the growth of *Gelidiella acerosa* and addition of B₂ in the medium further improves the algal growth. Medium 6 does not contain either myoinositol or B₂, but contains IAA. This medium also supports good growth, though not as much as medium 4. It is therefore suggested that further studies using a combination of myoinositol, B₂, IAA and GA besides adding bicarbonate to an enriched seawater medium might be more useful in arriving at culture medium of maximum effect on growth of *G.acerosa*, whether it is from fragments or from tetraspores.

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