

## Comparison of *Kappaphycus alvarezii* Growth at Two Different Places of Saurashtra Region

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**Abstract:** The development of seaweed farming together with its production potential is outlined. The 95 days filler trial experimental farming activity has resulted in some promising data. The article conclude with a consideration of the principles to ensure commercial farming at Diu and Okha area. Growth at Diu is superior in growth than Okha mandal coast.

**Key words:** *Kappaphycus alvarezii* • Seaweeds • Growth

### INTRODUCTION

In coastal waters, seaweeds are primary producers and they are minimally disruptive of the environment. Seaweeds are the natural sources of phyco-colloids such as agar- agar, algin and carrageenan and they are rich in vitamins, minerals, protein, essential amino acids and low in fat content [1].

Commercial cultivation of *K. alvarezii*, originated in Philippines in 1960 [2], since then countries like Japan, Indonesia, Tanzania, Fiji, Kiripati, Hawaii and South Africa are cultivating this species on large scale Subbarao *et al.* [3]. In India cultivation of this seaweed was initially started at Mandapam on the southeast coast of India [4]. While some preliminary experiments in tide pools on field cultivation of this seaweeds were carried out at Okha during 1994-95 [5]. Subbarao *et al.* [3] attempted to cultivate this seaweed in the open sea at three localities viz. Mithapur, Okha and Beyt Dwarka on experimental bases, he found that all the three sites were suitable for cultivation.

Several marine algae have been reported to possess medicinal value and traditionally used in many countries. Carrageenan is useful in ulcer therapy and alginate prolong the period of activity of certain drugs [6].

Seaweeds grow in many parts of the east and west coasts, but Tamil nadu coast is a paradise for seaweeds and no other coastline of our country can be compared

with Tamil nadu coast in diversity and density of seaweeds [7], but now Gujarat state is on momentum toward seaweeds cultivation and harvesting natural stock to fulfill the required industrial raw demand.

### MATERIALS AND METHODS

Experiment were taken up in two different season and in two different batches of 45 days (Table:1) at two different coastal villages of Saurashtra region. Date of experimental setup varies among site. Experiment was initiated with Okha coast on dated 12/12/2007 and ended with Diu coast. *K. alvarezii* young germplasm were selected for experiment. *K. alvarezii* total stocked procured around 60 kg, from Carrage Sea- Veg. Private Limited, Bhavnagar (Gujarat). The wet weight of *K. alvarezii* was transported by insulated van experimental site. Around 12.5 kg of *K. alvarezii* were planted into five floating raft (1 x 1m) at each selected coastal site. Water parameter were recorded fortnightly.

Table 1:

Winter season (S1)			
Sr. no	Place	Raft place on dated	Harvested date
1.	Okha	12/12/2007	26/01/2008
2.	Diu	17/12/2007	31/01/2008
Summer season (S2)			
1.	Okha	17/3/2008	1/05/2008
2.	Diu	25/3/2008	9/05/2008

**Loop Making:** Plastic rope of 3 mm thickness was used as a bits, where ten individual bunches of germplasm were tied by means of braider twine called as loop. Loops of about 2 cm were secured by one end through the line plaits at intervals of about 15-20 cm. The other end of the loops was left loose. To plant push line through the loop; inserted propagule; pull line snug to secure the germplasm. There were five numbers of main ropes in a raft with ten numbers of germplasms.

**Experiment Setup:** Floating raft was prepared using bamboo poles. Around 12.5 kg of *K. alvarezii* germplasm is utilized in a one selected site. Dividing 12.5 kg by five raft = 2.5 kg in one single floating raft.

Approximately 2.5 kg of *K. alvarezii* were planted in one raft (1 x 1 m). A raft has total five ropes of 3 mm thickness and a rope consists of five loops. The distance between two loop is 20- 22 cm. Total 25 loops in a raft and each loop is inserted with 100 g *K. alvarezii* young germplasm (initial wt). Similar procedure for all the rafts, at both the site.

## RESULTS AND DISCUSSION

**Raft Culture:** The growth and production of *Kappaphycus alvarezii* on bamboo rafts are shown in Table 3; Fig. 1 (A) during winter season the growth at Okha was 15.5 kg at 19.5°C whereas at Diu was 14.7 kg at 19°C. At observation during cultivation the tips of the

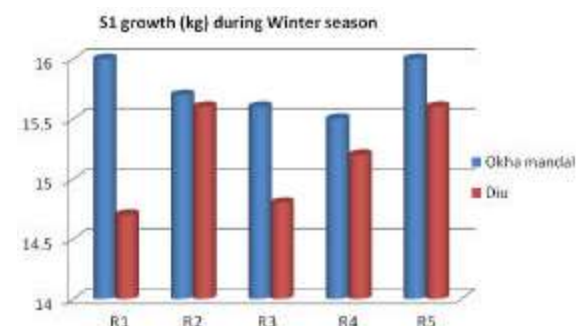


Fig. 1a:

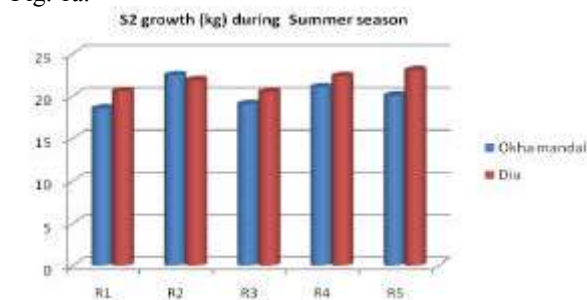


Fig. 1b:

plant was bleach and transparent, some tips were grazed (in the both the places). At Okha mandal and Diu,  $\text{NO}_3\text{-N}$  and  $\text{P}_2\text{O}_5$  (Table 2, Fig: 4) was higher during summer compare to winter (both the case). Mean growth at Okha mandal and Diu area during winter season was  $15.76 \pm 0.23$  and  $15.18 \pm 0.42$  respectively. Whereas during Summer season as per table-3; Fig. 1 (B) mean growth of *K. alvarezii* at Okha mandal and Diu were  $20.18 \pm 1.56$  and  $21.6 \pm 1.13$  respectively. The maximum growth in any raft at Okha mandal and Diu was 22.4 and 23.0 kg, respectively. As per Subharao [7], Gujarat waters especially along Diu and Okha mandal coasts provide conducive environments for large scale cultivation of seaweeds.

**Epiphytes:** Buschmann *et al.* [8] reported that large algae may grow on the farmed plants and thereby compete with the farmed plants for sunlight and nutrients. Same trend was observed in present study with epiphytic growth such as *Ulva*, *Entromorpha* and *Chaetomorpha* (Chlorophyta), *Polysiphonia* sp. (Phaeophyta) and *Gracilaria* sp. (Rhodophyta) were attached to the raft. Profuse settlements of barnacle spp., bivalves and mussel were observed on the thalli and branches of *K. alvarezii*. Fishes like grouper, squirrel fish, mullet fingerlings etc were recorded in cultivated raft basement.

As per the record obtain both the places are conducive for mass scale cultivation of *Kappaphycus alvarezii*, only constraint during cultivation was tidal amplitude and sea bottom. It was very difficult to get a sandy shore with productive water because usually rocky coast or turbid water or unpredictable rough weather condition.

Table 2: Water parameter recorded in both the season

		Water parameter			
		W. temp °C	Salinity ‰	$\text{NO}_3\text{-N}$	Total P
Okha mandal	S1	21	32	16.37	1.58
	S2	27.25	32	18.12	2.59
Diu	S1	22.5	32	14	1.71
	S2	27.25	32	16.22	2.22

Table 3: Seasonal growth of *Kappaphycus alvarezii* (kg)

S1 (Winter season)							
Place	R1	R2	R3	R4	R5	Mean	SD
Okha mandal	16	15.7	15.6	15.5	16	15.76	0.23
Diu	14.7	15.6	14.8	15.2	15.6	15.18	0.42
S2 (Summer season)							
Place	R1	R2	R3	R4	R5	Mean	SD
Okha mandal	18.5	22.4	19	21	20	20.18	1.56
Diu	20.5	21.8	20.4	22.3	23	21.6	1.13

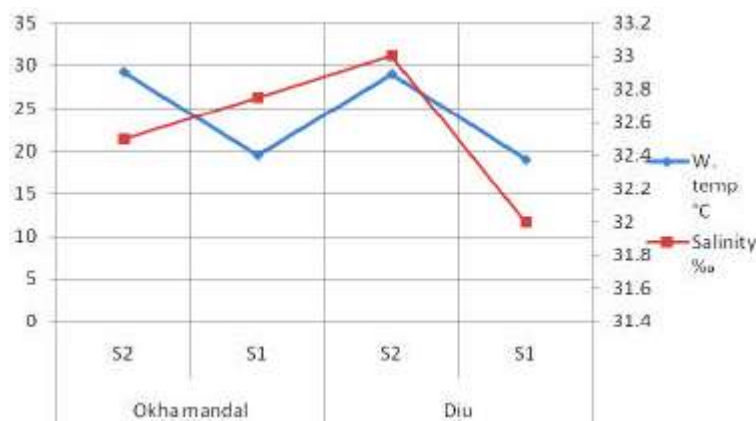


Fig. 3: Comparison of water temperature and salinity at two places



Fig. 4: Availability of micro nutrient in water of both the places

### REFERENCES

1. FAO. 2003. A guide to the seaweed industry. (Ed. by D.J. Mc Hugh). FAO Fisheries Technical Paper, 441: 51-60.
2. Doty, M.S. and V.B. Alvarez, 1975. Status, problems, advances and economics of Eucheuma farms. J. Marine Technological Society, 9: 30-35.
3. Subharao, P.V., K. Sureshkumar, K. Ganeshan and T. Chandra, 2008. Feasibility of cultivation of *Kappaphycus alvarezii* (Doty) Doty at different localities on the Northwest coast of India. Aquaculture Res., 1-8.
4. Eswaran, K., P.K. Ghogh and O.P. Mairh, 2002. Experimental field cultivation of *Kappaphycus alvarezii* (Doty) Doty. ex. P. Silva at Mandapam region. Seaweed Research and Utilization, 24: 67-72.
5. Mairh, O.P., S.T. Zodape, A. Tewari and M.R. Rajyaguru, 1995. Culture of marine alga *Kappaphycus striatum* (Schmitz) Doty on the Saurashtra region, west coast of India. Indian J. Marine Sci., 24: 24-31.
6. Kaliaperumal, N., P. Kaladharan, R. Jayasankar and G. Mohmmud, 2005. Culture of seaweed. CMFRI Annual bulletin, pp: 56-57.
7. Subba Rao, P.V. and V.A. Mantri, 2005. Gujarat coast: Untapped the environment condition. Transact. Oceanol Limnology, 2: their chemistry and utilization. Souvenir, pp: 26-30.
8. Buschmann, A.H., O.A. Mora, P. Gomez, M. Bottger, S. Buitano, C. Retamales, P.A. Vergara and A. Guiterrez, 1994. *Gracilaria chilensis* outdoor tank cultivation in Chile: use of land-based salmon culture effluents. Aquaculture Engineering, 13: 283-300.