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Experimental cultivation of *Gelidium pusillum* in open sea along the south east Indian coast

V.Veeragurunathan,[1,3*] Nilesh Vadodariya, Jai Prakash Chaudhary,[1,2] Azaz gogda,[2] K. R. Saminathan,[3] & Ramavatar Meena[1,2*]

[1] Academy of scientific and Innovative research (AcSIR)-Central Salt & Marine Chemicals Research Institute, G. B. Marg, Bhavnagar-364002 (Gujarat), India.
[2 *]Natural Products & Green Chemistry Division, CSIR-Central Salt and Marine Chemicals Research Institute, G. B. Marg, Bhavnagar-364002 (Gujarat), India.
[3 *] CSIR-CSMCRI-Marine Algal Research Station, Mandapam,Ramnad-623519, India. Email:

[E. Mail: rmeena@csmcri.res.in; ramavatar73@yahoo.com; veeragurunathan@csmcri.res.in]

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Experimental cultivation of *Gelidium pusillum* was attempted in the south east coast of India with three different cultivation methods to enhance the biomass production for obtaining superior quality agar with high gel strength. The maximum biomass yield (0.465 ± 0.34 kg.fr.wt m^{-2}) was recorded in net bag method whereas minimum biomass yield (0.144 ±0.03 kg.fr.wt m^{-2}) was recorded by net pouch method. Similarly, Daily Growth Rate (DGR) was more in net bag method (1.05 ± 0.529 %) than raft (0.679 ± 0.13 %) and net pouch (0.56 ± 0.256 %). Furthermore, best quality agar was obtained by net bag method [high gel strength: 2100 ± 50 g cm^{-2} in 1.5 % gel; gelling temperature: 35 ± 1 ^{o}C; ash content: ≤1 %; sulphate content: ≤0.34 %] essential for potential superior quality agar applications.

[**Keywords:** *G. pusillum*, Cultivation, Agar, Biomass]

Introduction

Agar is a galactan polysaccharide, extracted from red seaweeds which commonly known as agarophytes. It is a gelling polysaccharide available in various grades depending on the presence of sulphate content (0.10 to 0.35 % *w/w*). Superior quality agar or agarose is widely used in molecular biology applications such as DNA gel-electrophoresis and cell culture.[1-3] Till 2007, researchers had no idea about the extraction of superior quality agar from Indian agarophytes, but recently for the first time our research group has developed an eco-friendly, energy efficient and economical processes for superior quality agar extraction and have got superior quality agar from Indian agarophytes.[1-3]

Members of *Gelidiales* has been utilized for bacteriological and pharmaceutical grade gelling products and accounted for more than 33 % of the total agarophyte harvested annually worldwide (McHaugh,2003).[4] Spain, Portugal and Morocco represented almost 50 % of the world harvest of this important agarophyte *Gelidium* (Bixler and Porse, 2011)[5] Till now nearly 100 species of *Gelidium* has been reported in the world and widely distributed in tropical and temperate waters (Santelices,1991).[6] Out of these, only 8 species were reported from Indian waters (Oza and Zaidi,2001)[7]. In India, reports are available for native agar from *G.pusillum* (Balakrishnan et al.2009 and Meena et al.2011)[8,9]. Several researchers were attempted Gelidium cultivation in various countries. Aken et al (1993)[10] attempted by rope culture and net bag method whereas Fei and Huang (1991)[11] attempted with raft method.