# Seasonal Changes in Growth & Alginic Acid & Mannitol Contents in *Sargassum ilicifolium* (Turner) J. Agardh & *S. myriocystum* J. Agardh

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Young plants of *S. ilicifolium* and *S. myriocystum* appear in April and May and reach the maximum size in September or October. Alginic acid yield varies with the seasonal growth behaviour of these alginophytes, with maximum yield in July or August. Alginic acid content varies from 22.3 to 30.8% in *S. ilicifolium* and from 15.9 to 34.5% in *S. myriocystum*. Mannitol content ranges from 2 to 5 and 1.3 to 5% in *S. ilicifolium* and *S. myriocystum* respectively. The suitable harvesting period for getting the maximum yield of alginic acid appears to be between July and September.

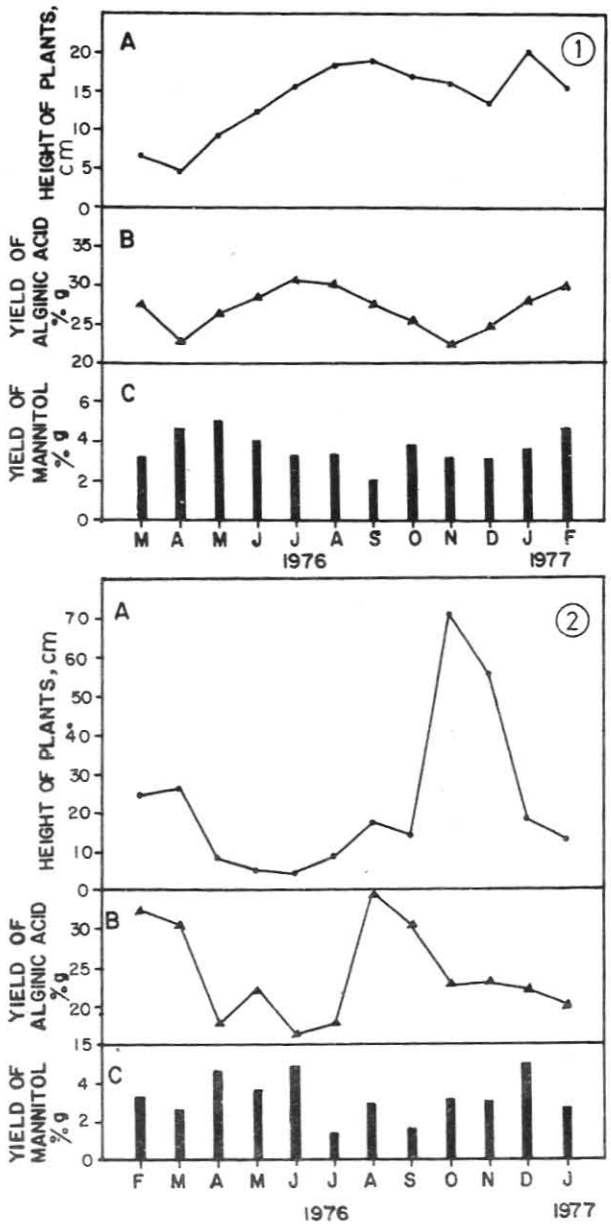
The polysaccharide alginic acid and the sugar alcohol mannitol occur in many brown algae and they have a wide industrial application. Species of *Sargassum* and *Turbinaria* are the main sources for the production of alginic acid in India. The alginic acid and mannitol contents of many Indian brown algae have been studied[1-12]. Only few of the above studies[5,7,9,10] provide information on the seasonal growth behaviour of the algae and changes in the chemical composition during their growth and development. Observations made for 1 yr on the variations in growth and alginic acid and mannitol contents of *S. ilicifolium* and *S. myriocystum* growing in Gulf of Mannar and Palk Bay respectively in the vicinity of Mandapam are presented in this paper.

Monthly collection of *S. ilicifolium* was made at Mandapam from intertidal rocks and *S. myriocystum* near Pamban Light House from the lower part of the littoral zone exposed during the spring tides. About 50 to 100 plants were collected each time and the total length of the main shoots arising from the base measured. From the data obtained, mean height of the plants were calculated for every month to show the variations in the growth of the algae studied. The plants were then washed thoroughly, sun dried for a few days and powdered for algin extraction and estimation of mannitol content. Extraction of alginic acid was made by the method outlined by Suzuki[13]. The per-iodic acid method of Cameron *et al.*[14] was followed for estimating the mannitol content. The analysis was repeated 4 times and the mean values are given on dry weight basis.

The present study on *S. ilicifolium* and *S. myriocystum* showed marked changes in the growth and alginic acid content of these algae (Figs 1 and 2). The growth behaviour and yield of alginic acid almost resembled those of *S. wightii*, *T. conoides* and *T. ornata*[5,7,15,16]; but differed from *T. decurrens* in which peak growth was reported between December and February and the yield of alginic acid ranged from 16.3 to 26.3%[9,17]. The maximum values in the yield of alginic acid obtained in *S. ilicifolium* and *S. myriocystum* during the present investigation agree with the values obtained for these 2 species occurring at Andhra Pradesh coast[6] and *S. cinereum* v. *berberifolia* growing at Dwarka[3]. The maximum values are more than that of *S. vulgare* of Andhra Pradesh coast[6]. The alginic acid yield in *S. ilicifolium* and *S. myriocystum* was higher than that obtained from *S. johnstonii* and *S. tenerrimum* occurring at Gujarat coast[3] and *S. tenerrimum* collected from Goa[8]. Similarly the analysis of other brown algae growing in different parts of the Indian coast, such as species of *Dictyota*, *Padina*, *Cystophyllum*, *Hormophysa*, *Colpomenia* and *Spatoglossum*[2,3,6,8,10] showed lesser alginic acid than in *S. ilicifolium* and *S. myriocystum*.

The mannitol content in the present 2 species of *Sargassum* was low compared to *S. wightii* and *Turbinaria* spp.[5,7,9]. It was found to be higher than that present in *Padina gymnospora*[10]. The maximum value of mannitol recorded in the present study was more than that of *S. tenerrimum* and *S. johnstonii*, but less than that of *S. cinctum*, *S. swartzii*, *S. vulgare*, *S. tenerrimum* and *S. wightii*[1,12].

There was no much monthly variation in the yield of alginic acid and mannitol in *S. ilicifolium* and *S. myriocystum* unlike in *S. wightii* and *T. conoides*[5] and in this aspect it is in conformity with the results obtained for *T. ornata*[7], *T. decurrens*[9] and *Padina gymnospora*[10]. But in general yield of alginic acid is high during July to September which almost coincides




Figs 1 and 2—Variations in growth (A) and alginic acid (B) and mannitol (C) contents of *S. ilicifolium* (1) and *S. myriocystum* (2)

with the peak growth period of these 2 algae while there is no relationship between the seasonal changes of the mannitol and growth behaviour. From the foregoing account it may be concluded that the yield of alginic acid in *S. ilicifolium* and *S. myriocystum* is moderately high and suitable harvesting period for getting the maximum yield appears to be between July and September. Comparison of the yield of alginic acid and mannitol throughout the year indicated that the quantity of alginic acid is more in *S. myriocystum* than in *S. ilicifolium*, whereas the quantity of mannitol is the same in both the algae studied.

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