

NOTE**Biosynthesis of Alginic Acid-C-14 (G)**

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The brown algae are characterised by their accumulation of polysaccharides, the more important ones being laminarin, fucoidin and alginic acid. It has been established by Bidwell et al. ^(1, 2), that alginic acid is the most rapidly accumulated insoluble product on photosynthesis. The rapid appearance of such a large proportion of photosynthetic carbon in alginic acid suggests a possible method for the biosynthesis of radioactive alginic acid-C-14 (generally labelled, G). Such a synthesis is now carried out on laboratory scale and the details are given. The radioactive alginic acid-C-14(G) thus synthesised finds many uses, such as (1) for quantitative determination and estimation of alginic acid present in various seaweeds and (2) for ascertaining the role alginic acid plays in the metabolism of brown algae.

METHOD.

The material (*Sargassum swartzii*) was collected from Okha. Saurashtra coast at low tide on a sunny morning in March 1967. Randomly selected samples, consisting of 20 g (fresh weight) of sterile fronds cut into 3 cm lengths, were immediately prepared and suspended in 100 ml of fresh filtered seawater. Two ml of $\text{NaHC}^{14}\text{O}_3$ (specific activity 17.2 mC/mM) with a total activity of 1 m and 500 mg of NaHCO_3 were added immediately to the suspension which was then allowed to undergo photosynthesis. The original activity in this solution was measured by barium precipitates of aliquots (1 ml) under an end window G.M. counter. The material was illuminated in sunlight (5 390-5 670 ft. candles) using a water screened glass filter at 30° C for 7 hr.

At the end of the experiment, the plants were rinsed quickly with distilled water and then soaked in 25-30 ml of 0.25 N hydrochloric acid for 1 hr. They were then washed free of acid, and 6 ml of 6 per cent Na_2CO_3 was added. The mass was stirred in a Waring Blender for about 30 min, kept overnight and then centrifuged or filtered. The clear solution was bleached with 1 per cent sodium hypochlorite (3 ml) and stirred well till the dark brown colour turned to pale yellow. The bleached solution was added dropwise to 80 per cent

ethanol with constant stirring, and sodium alginate-C-14(G) was precipitated in the form of flakes. The sodium alginate-C-14 thus obtained was dried in a hot air oven at 50-60° C for 4 hr., and its activity and specific rotation were determined. For obtaining pure alginic acid-C-14, the above sample was dissolved in water and then reprecipitated as calcium alginate with 10 per cent calcium chloride. This was washed free of calcium chloride and then treated with 3 N hydrochloric acid to form free alginic acid, which was washed with absolute alcohol, dried and weighed.

The yield of sodium alginate-C-14 was 536 mg with a specific activity of 225 $\mu\text{C/g}$ sodium alginate. The amount of radioactive sodium alginate synthesized during the experiment was 2.2 per cent (dry weight) with a total alginic acid content of 13.3 per cent. The purity of the sample was checked by determining the specific rotation. Our sample of sodium alginate-C-14 had a value $[\alpha]_{\text{D}}^{20} = -134 \pm 10^{\circ} \text{C}$ which agreed well with the values for sodium alginate in the literature ⁽³⁾ and confirmed in our laboratory : $[\alpha]_{\text{D}}^{20} = -135 \pm 10^{\circ} \text{C}$.

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Y. A. DOSHI and P. S. RAO

Central Salt and Marine Chemicals Research Institute Bhavnagar, India
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