

Hellebust J A. Excretion of some organic compounds by marine phytoplankton. *Limnol. Oceanogr.* **10**:192-206, 1965. [Woods Hole Oceanographic Institution, Woods Hole, MA]

The release of organic substances synthesized from photoassimilated $^{14}\text{CO}_2$ was determined for a large number of marine microalgae. Similar investigations were also made with natural marine phytoplankton populations to evaluate the importance of excretion in relation to primary productivity. [The *SCI*[®] indicates that this paper has been cited over 170 times since 1965.]

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"This was my first study of marine algae and also my first completely independent research venture. For my PhD research with R.G.S. Bidwell at the University of Toronto, I had investigated protein turnover in higher plants.

"When I arrived at the Woods Hole Oceanographic Institution in 1962 with a Ford Foundation fellowship to work with John H. Ryther, it was my intention to make use of my biochemical background to study adaptation of algae to changes in light and nutrient conditions. Ryther, an authority on the dynamics of the productivity of the sea, had just been appointed director of a major study of the Indian Ocean and would therefore be away during most of my intended stay at Woods Hole. However, he had become concerned about the possibility that a large fraction of photoassimilated carbon by marine phytoplankton is excreted, and suggested that I might look into this problem.

"The determination of amounts and identity of minute concentrations of excreted substances by dilute suspensions of algae in marine media turned out to be very difficult even with the use of ^{14}C -tracer techniques. I was,

however, very fortunate to be able to work in the laboratory of Robert R. L. Guillard who is internationally recognized for his expertise in isolating and culturing microalgae for physiological work. I am only one of the many fortunate individuals from all over the world whom Guillard has generously instructed in the fine art of phytoplankton culture.

"Most of my field work was done during a cruise on *Atlantis II* in the Gulf of Maine in April 1963. During the latter part of the cruise we received news that the brand-new nuclear submarine *Thresher* had disappeared, and we were the closest ship to its last known location. We spent several days unsuccessfully trying to locate the sunken submarine during which time I was able to continue my excretion studies under almost ideal conditions of rapid phytoplankton growth. I was then able to compare the results of this work with those from later studies of a declining inshore phytoplankton population which had much higher relative excretion rates.

"Following submission of my work to *Physiologia Plantarum* I was very disappointed to learn from the reviewers that it was not sufficiently interesting to warrant publication. This obviously did not help to build my confidence as a young scientist, but, as a seminar on my research at Harvard University in 1964 had landed me a job as assistant professor, I assumed that my work could not have been entirely without merit. A later submission to *Limnology and Oceanography* was enthusiastically received by the reviewers.

"The obvious reason why this paper has been cited so frequently is that it is the first publication of an extensive study of quantitative and qualitative aspects of excretion by cultured species of marine microalgae as well as of natural populations. This area of research has received considerable attention in the last 15 years."^{1,2}

1. **Hellebust J A.** Extracellular products. (Stewart W D P. ed.) *Algal physiology and biochemistry*. Oxford: Blackwell Scientific Publications, 1974. p. 838-63.

2. **Mague T H, Frieberg E, Hughes D J & Morris I.** Extracellular release of carbon by marine phytoplankton; a physiological approach. *Limnol. Oceanogr.* **25**:262-79, 1980.