

ISOLATION OF BETAINE FROM *Desmarestia viridis*

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Desmarestia viridis belongs to the family Desmarestiaceae of the section Phaeophyta (brown algae).

The alga was collected in June in Peter the Great Bay at a depth of 3-5 m. The comminuted and dry raw material was extracted with ethanol. The extract from 300 g of algae was evaporated to dryness and treated with 30 ml of water. The aqueous solution was separated and chromatographed on a column (20 × 1.5 cm) of silica gel. Elution was performed with ethanol. The fractions giving a positive reaction with the Dragendorff reagent were combined, concentrated, and rechromatographed on the same column in 50% aqueous ethanol. This yielded 140 mg of a crystalline substance with mp 293°C (from n-propanol), R_f 0.42 (TLC on a fixed layer of silica gel, water). On the basis of its spectral characteristics, the substance isolated was identified as betaine. Thus, its IR spectrum shows an absorption band at 1600 cm^{-1} which is characteristic for an ionized carboxyl [1], and its UV spectrum in water had an absorption maximum at 262 nm with ϵ 21 (COO group) [2]. In the ^{13}C NMR spectrum there were three signals: at 52.4 ppm (CH_3), 65.3 ppm ($-\text{CH}_2-$), and 167.9 ppm (COO-) relative to external TMS (in water). In the spectrum taken with incomplete suppression of spin-spin coupling with protons, the first two signals split into a quartet and a triplet, respectively. In the mass spectrum (70 eV), in addition to the signal of the molecular peak at m/e 117, a signal of equal intensity was observed at m/e 116, and also a series of other peaks that are characteristic for the fragmentation of betaine under the action of electron impact [3-5].

Betaine is widely distributed in higher plants and in animals. However, there is only one example of its presence in algae - in *Gonyaulax catenella* from the section Cryptophyta [6], belonging to the group of microphytes. Betaine has not previously been identified in brown algae and other groups of marine macrophytes.

In addition to betaine, from *Desmarestia viridis* we isolated small amounts of another base (R_f 0.11) which, judging from its PMR and ^{13}C NMR spectra, was choline. It is known that choline is a precursor of betaine in organisms of higher plants and animals.

LITERATURE CITED

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