Short Paper

The Structure of a New Carotenoid Tethyanine in Sea Sponge *Tethya amamensis**1

The six carotenoid hydrocarbons isolated from *Tethya amamensis* were already reported in our previous work,^{1,2)} and furthermore two minor pigments isorenieracastene and renieracastene have been structurally elucidated.³⁾

The present study reports on the isolation of a new aromatic carotenoid, which is shown to be 3,4-didehydro- β,ϕ -carotene (I).

The crude carotenoid was extracted with acetone and separated on an alumina column (G-III) using 1% acetone in petroleum ether (PE.) as a developing solvent. The second fraction was rechromatographed on a MgO column developed with 3% acetone in PE. and then purified through a sucrose column developed with PE. The objective pigment was crystallized from PE.

The characteristics of this pigment run as follows: m.p.: 130–132°C, $\lambda_{\max}$ (PE.): 456 nm, MS: M^+ (530), M-2 (528), M-92 (438), M-106 (424), M-133 (397), M-158 (372), M-175 (355), M-188 (342), M-198 (332), M-201 (329), 133 (base peak), $^1\text{H-NMR}$: δ 1.04 (s, 6H), 1.88 (s, 3H), 1.98 (s, 9H), 2.08 (s, 3H), 2.23 (s, 3H), 2.26 (s, 6H), 5.76–6.96 (m, 18H), IR (KBr): 3025, 2970, 2920, 2860, 2820, 1460, 1444, 1365, 1358, 1005, 968, 830, 809, 730 cm^{-1} .

Although the IR spectrum and mass spectrum of this pigment were much similar to those of tethyatene, the visible absorption spectrum had the shorter wavelength of one maximal absorption compared with that of tethyatene as shown in Fig. 1. The signals of methyl protons in $^1\text{H-NMR}$ spectrum at δ 1.04 and 1.88 indicated that the one end group of this pigment is 3,4-didehydro- β -carotene, while δ 2.23 and 2.26 denoted that the other end group is ϕ -carotene.⁴⁾ From these

Fig. 1. Visible absorption spectra of tethyanine (1) and tethyatene (2).

results, therefore, we proposed tethyanine, 3,4-didehydro- β,ϕ -carotene as a new aromatic carotenoid from *Tethya amamensis* and named tethyanine as a meaning of a structural isomer of tethyatene.

This pigment was contained at a rate of ca. 2% of total carotenoid in *Tethya amamensis*.

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References

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*1 海綿動物 *Tethya amamensis* 中の新カロテノイド Tethyanine の構造.

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