

アオウミガメ血清中のカロテノイド

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Short Paper

Carotenoids in Serum of Pacific Green Turtle,
*Chelonia mydas**1

The serum of Pacific green turtle, *Chelonia mydas*, living in the Ogasawara district has a light yellow color. It has been known that carotenoids and bile pigments are often found in the sera. For example, astaxanthin has been reported to occur in salmon serum¹⁾ and some carotenoids and bilirubin in human serum^{2,3)}. This paper deals with carotenoids in the serum of Pacific green turtle.

A female turtle weighing 125 kg captured off Hahajima Island on April 20, 1976 and another female weighing 117 kg reared at Ogasawara Fisheries Center in July, 1977 were used. Legs were cut off, and spouting blood was collected. The blood was left at room temperature to separate into blood clot and serum. The serum was frozen with dry ice and carried to the laboratory.

The serum sample was dialyzed against 0.05 M phosphate buffer, pH 6.5 containing NaCl at 0.5 M for 12 hours to record an absorption spectrum. It showed absorption peaks at 575, 540 and 515 nm and low peaks at 472 and 452 nm as shown in Fig. 1. An absorption spectrum of the serum of soft-shelled turtle, *Trionyx sinensis japonicus*, is shown for comparison.

The difference around 450 nm between the two spectra suggested that carotenoids or bilirubin might be contained in the serum of Pacific green turtle.

The carotenoids were extracted with acetone and dissolved in petroleum ether by the method of HATA *et al.*⁴⁾. They were separated and purified by thin-

layer chromatography (TLC). These procedures were performed in the dark at a low temperature.

The pigments extracted from 100 ml of the serum were subjected to TLC and developed in petroleum ether and acetone (7:3). The chromatogram showed 5 spots of which Rf values were 0.89, 0.47, 0.42, 0.33 and 0.25. Most of the carotenoids were found only in trace except that of Rf value 0.42 which was overwhelmingly dominant. The spots of Rf values 0.42, 0.33 and 0.25 were extracted, and their visible absorption spectra were measured. The carotenoid of Rf value 0.42 showed a lutein-like absorption spectrum having peaks at 469, 442 and 418 nm in petroleum ether. That of Rf value 0.33 showed a zeaxanthin-like absorption spectrum having peaks at 472 and 454 nm in acetone, and the one of Rf value 0.25, at 469, 439 and 417 nm in petroleum ether (Fig. 1). The absorption spectra and TLC behaviors of the carotenoid of Rf value 0.42 and lutein purified from the yolk⁵⁾ coincided with each other. The reduction with NaBH₄ did not change its Rf value on TLC. The saponification and subsequent TLC revealed that this carotenoid is of non-esterified form. From the above, it was evident that this carotenoid is non-esterified lutein. The lutein had a cis-peak in the ultraviolet region and did not show a strong band near 965 cm⁻¹ in the infrared absorption spectrum. In addition, irradiation with light in the presence of iodine and the thermal method with boiling hexane⁶⁾ were applied to the lutein. The Rf value was not changed by either of these treatments, suggesting that the lutein in the turtle serum should be a cis-isomer.

Based on the extinction coefficient⁷⁾, the total carotenoid content in the serum was determined to be 1.27 μg/ml. The concentrations were 1.21, 2.89 × 10⁻² and 3.45 × 10⁻² μg/ml for the carotenoids of Rf values 0.42 (lutein), 0.33 and 0.25, respectively.

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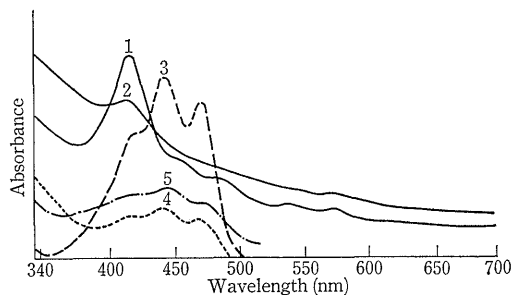


Fig. 1. Absorption spectra of the sera of turtles and carotenoids in serum of Pacific green turtle.

1, Serum of Pacific green turtle in 0.05 M phosphate buffer, pH 6.5, containing 0.5 M NaCl; 2, Serum of soft-shelled turtle in 0.05 M phosphate buffer, pH 6.5, containing 0.5 M NaCl; 3, Carotenoid of Rf value 0.25 in petroleum ether; 4, Carotenoid of Rf value 0.33 in acetone; 5, Carotenoid of Rf value 0.42 in petroleum ether.

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