Short Paper

Another Aerobic Bacterium which Contains Bacteriochlorophyll *a**¹

Bacteriochlorophylls used to be found only in the cells of photosynthetic bacteria which perform photosynthesis anaerobically in the light. Occurrence of bacteriochlorophyll *a*, however, was recently revealed in methylo-trophs by SATO¹⁾ and in an aerobic orange pigmented bacterium (OCh 101) by Harashima *et al.*²⁾. As the result of examination of many strains of marine pigmented bacteria, we could isolate another strain of aerobic bacterium (OCh 114) that contains bacteriochlorophyll *a*. In the present note, we describe the results of identification and determination of bacteriochlorophyll from the new strain and its taxonomic properties, compared with those of previously reported strains of the methylo-trophs and OCh 101.

Fig. 1. Absorption spectra of the blue-green pigment in diethyl-ether, before (—) and after (.....) the addition of one drop of concentrated hydrochloric acid. Solid line shows peaks at 358, 392, 575 and 771 nm, and dotted line at 358, 384, 525 and 750 nm.

The pink pigmented bacterium (OCh 114) was isolated from *Enteromorpha linza* collected at Aburatsubo Inlet, Kanagawa prefecture, in February 1978, by using PPES-II agar plate medium³⁾. This bacterium did not grow anaerobically (GasPak: BBL), but it grew under aerobic to microaerobic conditions. This organism could utilize glucose, malate, succinate, and peptone as

carbon source, when inorganic nitrogen source and a small amount of yeast extract were added. Therefore this strain OCh 114 does not belong to any known photosynthetic bacteria. The characteristics of this strain OCh 114 were as follows: Gram-negative rod; motile by means of polar or subpolar flagella; produce a small amount of acid from glucose, xylose, fructose and the other carbohydrates; oxidase-positive; catalase-positive; no utilization of methanol. Thus the present pink bacterium is clearly different from the methylo-trophs.

Bacteriochlorophyll *a* was prepared by means of column chromatography with DEAE-cellulose.⁴⁾ The absorption spectrum of the pigment obtained had peaks at 358, 392, 575 and 771 nm. The results of thin layer chromatography^{4,5)} revealed the identity of the pigment with bacteriochlorophyll *ap* obtained from *Rhodospseudomonas capsulata* (NCIB 8254) (, but not with bacteriochlorophyll *ag* from *Rhodospirillum rubrum* (NCIB 8255)).⁶⁾ The cells, grown in PPES-II liquid medium³⁾ aerated with bubbling of sterile air in the intermittent light, contained 5.5 nmol of bacteriochlorophyll *a* per mg dry weight. This amount is approximately 6 times as high as that of the strain OCh 101 grown aerobically²⁾ and 1/5 that of *Rhodospseudomonas sphaeroides* cultured anaerobically.⁷⁾ Further experiment is now in progress to elucidate the function of the pigment in the strains OCh 101 and 114.

We wish to express thanks to Dr. K. Harashima, Department of Agricultural Chemistry, University of Tokyo, for his helpful advice in the experimental work.

Tsuneo SHIBA,*² Usio SIMIDU,*³ and Nobuo TAGA*³

*² Otsuchi Mar. Res. Center, Ocean Res. Inst., Univ. of Tokyo, Otsuchi, Iwate 028-11.

*³ Ocean Res. Inst., Univ. of Tokyo, Nakano-ku, Tokyo 164.

References

- 1) K. SATO: *FEBS Lett.*, **85**, 208-210 (1978).
- 2) K. HARASHIMA, T. SHIBA, T. TOTSUKA, U. SIMIDU, and N. TAGA: *Agric. Biol. Chem.*, **42**, 1627-1628 (1978).
- 3) N. TAGA: *Bull. Misaki Mar. Biol. Inst. Kyoto Univ.*, **12**, 65-76 (1968).
- 4) N. SATO and N. MURATA: *Biochim. Biophys. Acta.*, **501**, 103-111 (1978).
- 5) K. EGGER: *Planta*, **58**, 664-667 (1962).
- 6) A. KÜNZLER and N. PFENNIG: *Arch. Mikrobiol.*, **91**, 83-86 (1973).
- 7) J. LASCELLES: *Biochem. J.*, **92**, 508-518 (1959).

(Received December 14, 1978)

*¹ バクテリアクロロフィル *a* を含有する新好気性細菌.

*² 芝 恒男: 東大海洋研究所 大槌臨海研究センター.

*³ 清水 潮・多賀信夫: 東大海洋研究所.