Discussion. Immunization of the rabbits with human TSH is associated with transient elevations of serum lipids. The exact mechanism for this observation is not answered by this study. The apparent correlation of the lipid levels with the H-TSH antibody titers suggest that H-TSH antibodies may be cross reacting with the rabbit TSH, thus leading to hypothyroidism secondary to TSH insufficiency. Hypothyroidism is well-known to result in hypercholesterolemia[5] and hypertriglyceridemia[6,7]. The mechanism suggested by our data may not, however, entirely explain the hyperlipidemia. It has been stated that hypothyroidism secondary to pituitary insufficiency does not lead to hypercholesterolemia[8]. Further work is therefore necessary to understand the pathogenesis of this somewhat unusual form of experimental hyperlipidemia.

5 J. P. Peters and E. B. Man, J. clin. Invest. *22*, 715 (1943).
6 E. A. Nikkila and M. Kekki, J. clin. Invest. *51*, 2103 (1972).
7 B. R. Tulloch, B. Lewis and T. R. Fraser, Lancet *1*, 391 (1973).
8 D. S. Fredrickson, R. E. Levy and R. S. Lees, New Engl. J. Med. *276*, 34 (1967).

Induction of phycoerythrin in Anabaena ambigua Rao and its strains

A. K. Rai[1]

Department of Botany, Banaras Hindu University, Varanasi 221 005 (India), 28 June 1976

Summary. Phycoerythrin was not present in Anabaena ambigua Rao, and in its strains, Lh- and Ha-forms under normal culture conditions, but it developed in parent and Lh-form when treated with green light and nitrate. However, Ha-form appeared to be unable to form phycoerythrin.

In many of the blue-green algae, the red pigment phycoerythrin may not be present under general growth conditions, but its formation can be induced by a special treatment. However, some algae may not have the ability at all to synthesize the red pigment, due to the absence or loss of genes concerned with its formation. The present work describes for the first time induction of phycoerythrin in strains of blue-green alga Anabaena ambigua.

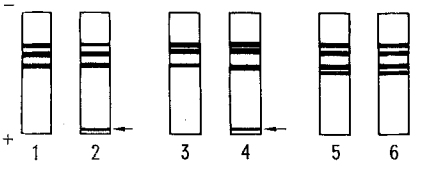

Fig. 1. Polyacrylamide gel electrophoresis of the phycobilin extracts of untreated strains, parent strain (1); Lh-form (3); Ha-form (5), and treated parent strain (2); Lh-form (4); and Ha-form (6) for the formation of phycoerythrin; → phycoerythrin band.

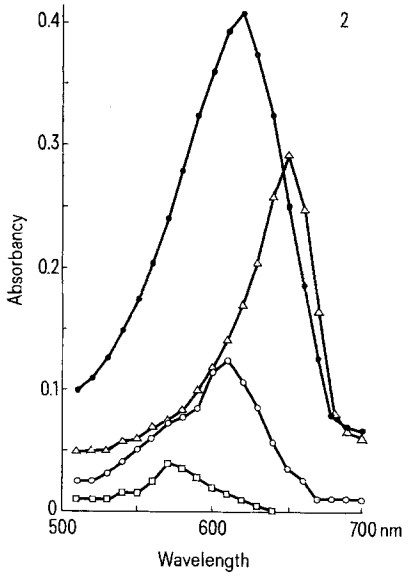

Fig. 2. The pigment bands obtained on gels (after the induction of phycoerythrin in A. ambigua) were cut separately and were eluted. The absorption spectra for individual fractions were determined; △—△ band No. 1; ○—○ band No. 2; ●—● band No. 3; and □—□ band No. 4.

Both phycoerythrin and phycocyanin are synthesized from a common precursor and this process is dependent on light in the presence of available nitrogen (nitrate) as shown in the case of Tolypothrix tenuis[2]. Phycoerythrin synthesis was strongly induced by blue-green light (541 nm), whereas synthesis of phycocyanin by red light (641 nm). These studies indicated that the common precursor can be switched towards the synthesis of either pigment by illumination with a wavelength close to its absorption maximum.

The ability to synthesize phycoerythrin was tested by giving a treatment as described by Fujita and Hattori[2] in A. ambigua strains, parent form, Lh-form and Ha-form, which do not contain phycoerythrin (Lh-form was originally obtained as natural mutant of A. ambigua, and Ha-form was obtained by treating the parent strain with hydroxylamine hydrochloride[3].)

The exponentially growing algal material, washed with sterile double-distilled water, was preincubated in Allen and Arnon[4] medium (without combined nitrogen) for 20 h in fluorescent tube light, and then it was treated with green light (541 nm) for 60 min and subsequently incubated in darkness for 24 h in the presence of potassium nitrate (0.4 mg per ml). In the parent and as well as in Lh-form, phycoerythrin formation was induced which can be seen as a distinct band on the polyacrylamide gels during the separation by electrophoresis (figure 1). However, Ha-strain did not show phycoerythrin formation. Evidently, the Ha-strain is a biochemical mutant that has lost the ability to synthesize the red pigment. The red band phycoerythrin was further characterized by determining its absorption spectrum, and showing the absorption peak at 570 nm (figure 2), which is consistent with absorption peak of diluted phycoerythrin[5].

1 My thanks are due to Atomic Energy Commission, India, for the financial assistance.
2 Y. Fujita and A. Hattori, Plant Cell Physiol. *3*, 209 (1962).
3 A. K. Rai, Ph. D. Thesis (1974).
4 M. B. Allen and D. I. Arnon, Plant Physiol. *30*, 366 (1955).
5 A. Bennett and L. Bogorad, Biochemistry *10*, 3625 (1971).