was completely removed. Work in this area is under way, and we believe that many important practical applications may arise from the findings.

Other questions being investigated by us are: Is the antigenic property of the poison unaltered by exposure to light in the presence of the fluorescent substance? Are the fluorescent compounds effective in bringing about the inactivation by light of such other toxins as tetanal, diphtherial, staphylococcus, and gangrenous? Should the second question be answered affirmatively, it would then be possible to find a much easier way of preparing vaccines against these toxins and related diseases.

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Nonequivalence of Methyl and Carboxyl Groups in Photometabolism of Acetate by *Rhodospirillum rubrum*[1]

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It has been shown that the distribution of labeled carbon in carbonate and cell material produced during the dark aerobic dissimilation of C^{14}-labeled acetate by the photosynthetic bacterium *Rhodospirillum rubrum* is the same whether the acetate is labeled initially in the methyl or in the carboxyl group.[4] Hence, it is of interest to report that this equivalence of acetate carbons is not evidenced when labeled acetate is dissimilated photochemically by *R. rubrum*. Typical results are shown in Table 1. To facilitate direct comparison of different experiments, the data have been normalized to the same initial conditions, and amount of acetate metabolized. Experimental uncertainty in any of the values shown is less than 10%.

It will be noted that when methyl-labeled acetate is dissimilated photochemically the distribution in the end products of metabolism differs radically from that observed under identical conditions using carboxyl-labeled acetate. Thus, when 30 μM of acetate are photometabolized anaerobically, the methyl carbon finds its way practically entirely into insoluble cell material, whereas a large fraction of the carboxyl carbon appears as carbonate. Dark aerobic oxidation of the same quantity of methyl-labeled acetate results in the usual accumulation of labeled carbon in carbonate. For comparison of labeled carbonate production in light and dark metabolism it should be noted that observed yields of carbonate per mol acetate disappearing are 0.20 to 0.25 and 0.6 to 0.8 mols, in light and dark, respectively.

The labeled carbon content of the soluble cell material is of the same order of magnitude regardless of the experimental conditions used (Table 1). Extensive analysis of this fraction is not warranted because of the long duration of the dissimilation (~1 hr). However, it may be remarked that ~30% of the activity in this fraction can be identified by paper chromatography as tricarboxylic acid cycle intermediates (e.g., citrate, ketoglutarate, succinate, etc.). No increase in incorporation of labeled acetate carbon in this fraction is noted when carrier amounts of tricarboxylic acid intermediates are added as trapping agents, either in light or dark metabolism. Nor are any changes in distribution of acetate carbon observed when unlabeled substrates that evolve large amounts of CO_2 (malate, succinate, ketoglutarate) are metabolized simultaneously with labeled acetate.

TABLE 1

DISTRIBUTION OF LABELED CARBON AFTER DISSIMILATION OF 30 μM C^{14}-ACETATE BY RESTING SUSPENSIONS OF *Rhodospirillum rubrum**

Experimental conditions	Light, gas phase, He		Dark, gas phase, air
	Methyl-labeled acetate	Carboxy-labeled acetate	Methyl-labeled acetate
Insoluble cell material (ct/min)	12,500	6,300	4,300
Soluble cell material (ct/min)	975	1,440	1,340
Carbonate (ct/min)	510	6,200	11,450

* Initial acetate, 125 μM C^{14}-acetate. All data normalized to initial C^{14} content of 50,000 ct/min. Equal densities of cell suspensions used (22 mg dry wt) in total vol 8 ml phosphate buffer, pH 6.6; 25 μM $NaHCO_3$ also present initially. 90–95% recovery of labeled acetate carbon dissimilated is obtained in cell fractions shown.

These results indicate that anaerobic photodissimilation of acetate by *R. rubrum* very probably does not involve a cyclic mechanism requiring equilibration of the 2 acetate carbons. Such a mechanism, on the other hand, is very likely operative in the dark oxidation of acetate by the same organism. Furthermore, it can be concluded in agreement with previous findings[5] that a major fraction of the acetate undergoes photoassimilation without intermediary formation of carbonate. A detailed account of these researches is in preparation.

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[4] C. B. Van Niel and H. A. Barker, private communication; see also *Photosynthesis in Plants,* J. Franck and W. E. Loomis, Eds. Ames: Iowa State Press, 468 (1949). This observation has been confirmed in our laboratory.

[5] See Footnote 4.