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Ethanolamine Deaminase in *Proteus morganii*

In a previous paper,[1] authors reported that the intact cells of *Proteus morganii* decomposed ethanolamine into ammonia and acetaldehyde, and that the latter was further dismutated to give the final products, ethanol and acetic acid. In the series of these reactions, an enzyme which catalyzed the decomposition of ethanolamine into ammonia and acetaldehyde was tentatively named ethanolamine dehydrase. Further studies on the reactions using ^{14}C-labeled ethanolamine have disclosed the mechanism involved in these reactions. This communication describes a possible reaction scheme which is different in some respects from the previous proposal.

In the present experiments using 2-aminoethanol-1-^{14}C * as a substrate, metabolic products were separated and their radioactivities estimated. The experimental procedure and radioactivity of each fraction are shown in Chart 1. Thus it was found that the radioactivity of 2-aminoethanol-1-^{14}C was recovered almost quantitatively in CO_2 fraction.

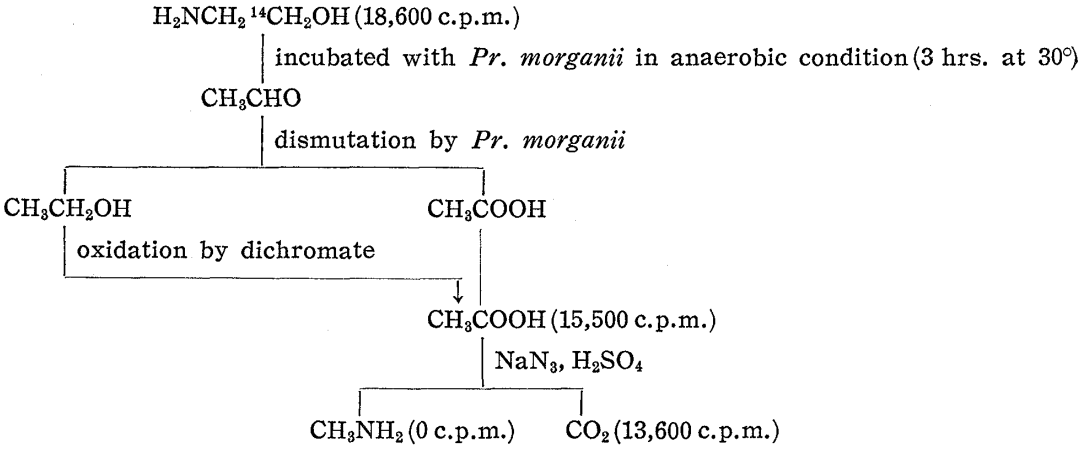

Chart 1.

In the decomposition of ethanolamine, three possible pathways may be considered as follows:

$$\text{a)}\quad H_2NCH_2{}^{14}CH_2OH \xrightarrow{-H_2O} [H_2NCH{:}{}^{14}CH_2] \longrightarrow [HN{:}CH^{14}CH_3] \xrightarrow{-NH_3} OHC^{14}CH_3$$

$$\text{b)}\quad H_2NCH_2{}^{14}CH_2OH \xrightarrow{-NH_3} [CH_2{:}{}^{14}CHOH] \longrightarrow CH_3{}^{14}CHO$$

$$\text{c)}\quad H_2NCH_2{}^{14}CH_2OH \xrightarrow{-NH_3} HOCH_2{}^{14}CH_2OH \longrightarrow {}^{14}CH_3CHO \text{ and } CH_3{}^{14}CHO$$

Cohen, *et al.*[2] reported that ethanolamine is decomposed by *Clostridium* sp. giving rise to the formation of ammonia and ethylene glycol. If this mechanism is also the case during the course of reactions in *Pr. morganii*, acetaldehyde formed from ethylene glycol may be labeled as shown in scheme (c). In this case the radioactivity should be divided equally into methylamine and CO_2 fractions. If, on the other hand, an alternate scheme (a) is possible in this system, the radioactivity should be recovered totally in methylamine fraction.

From these considerations, the result obtained by the present experiments leads us

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[2] G.N. Cohen, B. Nisman, M. Raynaud: Compt. rend., **225**, 647(1947).

to the final conclusion that the deamination reaction should occur at the first step of the ethanolamine decomposition as shown in scheme (b). The enzyme catalyzing the deamination reaction is named ethanolamine deaminase.

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Carotenoids of the Flowers of *Osmanthus fragrans*

On the carotenoids of the flowers of *Osmanthus fragrans* Lour. var. *aurantiacus* Makino, Ishiguro and co-workers isolated all-*trans* β-carotene during the course of their study on the aromatic component, osmane.⁽¹⁾ It appeared of interest to investigate this problem further, because, from their comparatively yellowish color and from the biogenetic standpoint, the presence of usual carotenoids other than β-carotene and that of these epoxides or furanoid oxides was anticipated.⁽²,³⁾ For our purpose, every precaution was taken to avoid the effect of light, heat, and air oxidation. All operations were carried out in a dark room, at room temperature, at the highest and *in vacuo* when necessary. The extraction of pigments from the fresh flowers was conducted by the usual method⁽⁴⁾ immediately after their collection. After the concentrated petroleum ether extracts were developed on calcium hydroxide column (5×40 cm.; developer, hexane), the following chromatograms were obtained.

Width of zone (mm.)	
69	Four yellow and one pink zones: unidentified
43	Colorless interzone
24	Orange, all-*trans* β-carotene (λ_{max}^{Hexane} 478, 450 mμ)
79	Interzone
8	Pale yellow, neo-β-carotene B (λ_{max}^{Hexane} 474, 444 mμ)
63	Interzone
18	Yellow, all-*trans* α-carotene (λ_{max}^{Hexane} 475, 445 mμ)
15	Interzone
6	Pale yellow, traces, unidentified

Up to the present, the expected epoxides or furanoid oxides have not been isolated yet, but besides all-*trans* β-carotene reported previously, all-*trans* α-carotene, neo-β-carotene B, and five other unidentified pigments were separated. It was also confirmed that such stereoisomer of β-carotene can exist in nature,⁽³,⁵⁾ though several isomers were obtained and studied extensively *in vitro*.⁽⁶⁾ The structure of neo-β-carotene B was assigned as 9,13′-di-*cis*-β-carotene.⁽⁷⁾ If this stereoisomer came secondarily from

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