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CARBON DIOXIDE UTILIZATION IN ANIMAL TISSUES1, 2

By Dr. E. A. Evans, Jr.
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If we consider living organisms in terms of their nutritional demands upon the environment in which they live, we can place the plant with its ability to synthesize all the complex components of its structure from light energy and simple inorganic substances such as carbon dioxide, water and ammonia at one extreme and the animal with its fastidious demands for preformed dietary constituents such as vitamins, certain amino acids and certain fatty acids at the other. The carbon requirements of the plant can be satisfied completely by carbon dioxide. For animals the sources of carbon are the energy-rich organic molecules of the diet, and carbon dioxide is regarded traditionally as a metabolic end product. Experimentally, this is justified in that one can demonstrate a photosynthetic uptake of carbon dioxide in plants, while with animal tissues a continuous metabolic production of carbon dioxide is observed.

The photosynthetic process can be generally formulated:3

\[ \text{CO}_2 + 2\text{H}_2\text{A} + \text{energy} \rightarrow (\text{CH}_2\text{O}) + 2\text{A} + \text{H}_2\text{O} \]

[HA is any oxidizable substance; A the oxidation product of HA]


2 Read before the American Chemical Society at Memphis, Tennessee, on April 22, on the occasion of the conferring of the Eli Lilly and Company Award in biological chemistry for 1942.

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