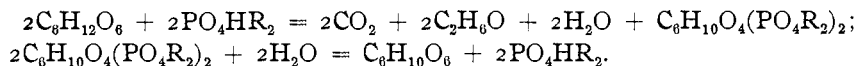


able because they present much of the newer work in a form that is not only readable but also stimulating in its suggestions. This effect is in good measure attributable to the author's intimate experimental acquaintance with the chemistry of fermentation. This is seen in the chapters on the two factors now recognized to have a remarkable influence upon the fermentation of sugars, namely, the presence of phosphates and likewise of the indispensable co-ferment or co-enzyme in the liquid.

The monograph reviews the experiments of Harden and Young leading to the conclusion that the addition of a soluble phosphate to a fermenting mixture of hexoses with yeast juice or zymine causes the production of an equivalent amount of carbon dioxide and alcohol. The evidence for the formation of a phospho-organic compound and its nature are discussed, an equation of alcoholic fermentation in which hexose phosphate is formed, being constructed as follows:



The role of zymase, hexose phosphate, and the problem of the co-enzyme discovered in boiled yeast juice are discussed. A brief chapter takes up inhibitory and accelerating substances.

The most interesting part, perhaps, is that dealing with those heretofore little understood so-called by-products of alcoholic fermentation. The masterly researches of Felix Ehrlich and others, showing conclusively that the alcohols and aldehydes of fusel oil are in reality derived from amino acids formed by the hydrolysis of proteins present in fermenting mixtures, are described in some detail. Harden points out that this so-called fermentation of amino acids is brought about only by the living yeast in the presence of fermentable carbohydrates. Here we learn how the cell is able to supply itself with indispensable nitrogen.

Other chapters take up the chemical changes in fermentation, especially the lactic acid theory, with the various possibilities of other intermediary products (methylglyoxal, glyceraldehyde, dihydroxyacetone), the mechanism of fermentation, etc., all preceded by an historical introduction telling the story of zymase.

This modern, though incomplete, story of alcoholic fermentation deserves to be read by the biologist as well as the technological chemist, because of the value of the fundamental newer contributions to an appreciation of the mode in which chemical changes are accomplished by living organisms.

LAFAYETTE B. MENDEL.

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