

INTRODUCTION

Acetaldehyde, CH_3CHO is an important intermediate in industrial organic synthesis. Acetic acid, acetic anhydride, n-butanol, and 2-ethylhexanol are the major products derived from acetaldehyde. Smaller amounts of acetaldehyde are also consumed in the manufacture of pentaerythritol, trimethylolpropane, pyridines, peracetic acid, crotonaldehyde, chloral, 1,3-butylene glycol, and lactic acid.

Acetaldehyde (ethanal) was first prepared by Scheele in 1774, by the action of manganese dioxide and sulfuric acid on ethanol. Liebig established the structure of acetaldehyde in 1835 when he prepared a pure sample by oxidizing ethyl alcohol with chromic acid. Liebig named the compound “aldehyde” from the Latin words translated as al (cohol) dehyd (rogenated). Kutscherow observed the formation of acetaldehyde by the addition of water to acetylene in 1881.

Acetaldehyde is an important intermediate in the production of acetic acid, acetic anhydride, ethyl acetate, peracetic acid, pentaerythritol, chloral, glyoxal, alkylamines, and pyridines. Acetaldehyde was first used extensively during World War I as an intermediate for making acetone from acetic acid.

Commercial processes for the production of acetaldehyde include: the oxidation or dehydrogenation of ethanol, the addition of water to acetylene, partial oxidation of hydrocarbons, and the direct oxidation of ethylene. It is estimated that in 1976, 29 companies with more than 82% of the world's 2.3 megaton per year plant capacity use the Wacker – Hoechst processes for the direct oxidation of ethylene.

Acetaldehyde is a normal intermediate product in the respiration of higher plants. It occurs in traces in all ripe fruits that have a tart taste before ripening; the aldehyde content of the volatiles has been suggested as a chemical index of ripening during cold storage of apples. Acetaldehyde is an intermediate product of alcoholic fermentation but it is reduced almost immediately to ethanol. It may form in wine and other alcoholic beverages after exposure to air, and imparts an unpleasant taste; the aldehyde ordinarily reacts to form diethyl acetal and ethyl acetate. Acetaldehyde is an intermediate product in the decomposition of sugars in the body and, hence, occurs in traces in blood. Acetaldehyde is a product of most hydrocarbon oxidations.