

Janta Vedic College, Baraut (BAGHPAT)

Dairy Science and Technology Department,

M.Sc Ag (III) Semester (D.S.T.)

J-3012 Elementary Food Science (2022-23)

TOPIC - ALCOHOLIC FERMENTATION

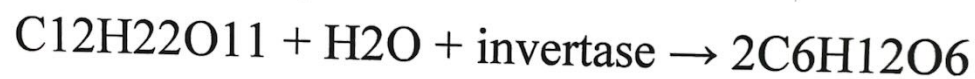
Ethanol fermentation, also called alcoholic fermentation, is a biological process which converts sugars into cellular energy, producing ethanol and carbon dioxide as by-products. Because yeasts perform this conversion in the absence of oxygen, alcoholic fermentation is considered an anaerobic process. Ethanol fermentation has many uses including alcoholic beverage and ethanol fuel production, and bread dough rising.

(1) A glucose molecule is broken down via glycolysis, yielding two pyruvate molecules. The energy released by this exothermic reactions is used to phosphorylate two ADP molecules, yielding two ATP molecules, and to reduce two molecules of NAD^+ to NADH. (2) The two pyruvate molecules are broken down, yielding two acetaldehyde molecule and giving off two molecules of carbon dioxide.(3) The two molecules of NADH reduce the two acetaldehyde molecules two molecules of ethanol; this converts NAD^+ back into NADH.

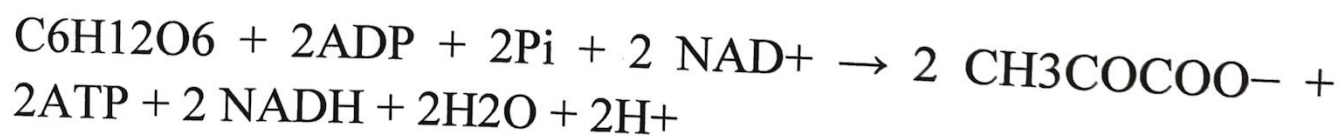
Chemical reaction-The chemical equations below summarize the fermentation of sucrose into ethanol. Alcoholic fermentation converts one mole of glucose into two moles of ethanol and two moles of carbon dioxide, producing two moles of ATP in the process.



Sucrose is a sugar composed of a glucose linked to a fructose. In the first step of alcoholic fermentation, the enzyme invertase cleaves the glycoside linkage between the glucose and fructose molecules.

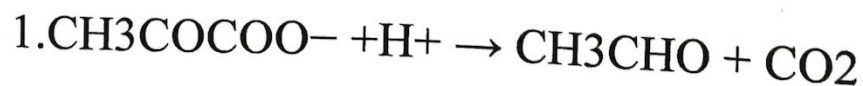


Next, each glucose molecule is broken down into two pyruvate molecules in a process known as glycolysis.[2] Glycolysis is summarized by the equation:

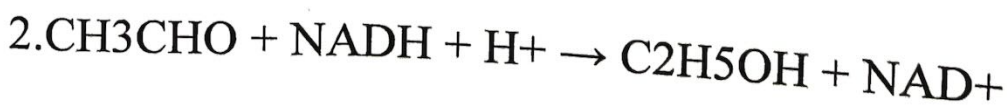


CH_3COCOO^- is pyruvate, and P_i is inorganic phosphate. Finally, pyruvate is converted to ethanol and CO_2 in

two steps, regenerating oxidized NAD^+ needed for glycolysis:



Catalyzed by pyruvate decarboxylase.



This reaction is catalyzed by alcohol dehydrogenase.

Microbes used in ethanol fermentation :-

YEAST – *Saccharomyces cerevisiae*.

BACTERIA – *Zymomonas mobilis*.

Alcoholic Fermentation

