

ETHYL ALCOHOL (ETHANOL)

Ethyl alcohol is a monohydroxy alcohol manufactured by fermentation of sugars. It is a colourless, volatile, inflammable liquid. The ethanol content of various alcoholic beverages ranges from 4-55%.

Actions

1. *Local* On topical application, ethanol evaporates quickly and has a cooling effect. It is an astringent—precipitates surface proteins and hardens the skin. 40-50% alcohol is rubefacient and counter irritant. Alcohol is also an antiseptic. At 70%, it has maximum antiseptic properties which decrease above that. It is not effective against spores.
2. *CNS* Alcohol is a CNS depressant. Small doses cause euphoria, relief of anxiety and loss of social inhibitions. Moderate doses impair muscular coordination and visual acuity making driving dangerous. With higher doses mental clouding, impaired judgement, drowsiness and loss of self control result. High doses cause stupor and coma. Death is due to respiratory depression.
3. *CVS* The actions are dose dependent. Small doses cause cutaneous vasodilation resulting in flushing and feeling of warmth. Large doses cause hypotension due to depression of myocardium and vasomotor centre.
4. *GIT and liver* Alcohol is an irritant— increases gastric secretion and produces vasodilation and warmth. It is an appetizer. Chronic alcoholism results in peptic ulcer. Chronic consumption of moderate amounts of alcohol results in accumulation of fat in the liver, enlargement of the liver, followed by fatty degeneration and cirrhosis. Alcohol induces microsomal enzymes.
5. *Other effects* Though alcohol is called an aphrodisiac, this effect could be due to loss of inhibition. Low doses taken over a long time increases HDL and lowers LDL cholesterol. Alcohol is a diuretic (decrease ADH secretion). It interferes with folate metabolism and may cause megaloblastic anaemia. Though alcohol causes a feeling of warmth, heat loss is increased due to vasodilation and should not be used for ‘warming up’ in cold surroundings. Food value is 7 calories/gram.

Mechanism of Action

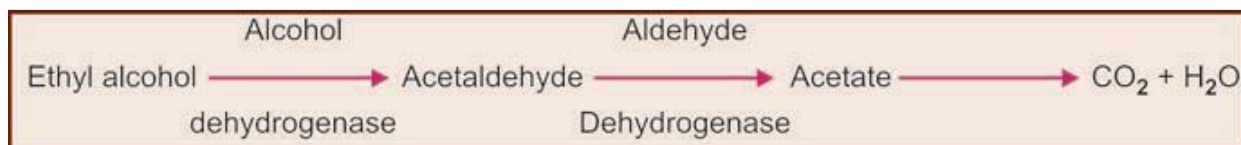
Ethanol acts by -

1. inhibiting central neuronal nicotinic acetylcholine receptors.

2. inhibiting excitatory NMDA (N-methyl-D-aspartate receptors mediate excitatory responses in the CNS and kainate receptor functions.
3. promoting the function of 5 HT₃ receptors.
4. ethanol also influences many ion channels including K⁺ channels

Pharmacokinetics

Alcohol is rapidly absorbed from the stomach and is metabolised in the liver by alcohol and aldehyde dehydrogenase. Metabolism follows zero order kinetics—a constant amount is metabolised per unit time, i.e. about 10 ml absolute alcohol is metabolised per hour. It is excreted through kidneys and lungs.



Drug Interactions

1. Alcohol potentiates other CNS depressants including hypnotics, opioids and antipsychotics.
2. Sulfonylureas, metronidazole and griseofulvin have disulfiram like effects on alcohol consumption.
3. Alcohol is an enzyme inducer.

Uses

1. *Antiseptic*—70% alcohol is applied topically.
2. *Bedsore*s—When rubbed onto the skin, alcohol hardens the skin and prevents bedsore.
3. *Fever* Alcoholic sponges are used for reduction of body temperature in fevers.
4. *Appetite stimulant*—About 50 ml of 6-10% alcohol given before meals is an appetite stimulant.
5. *Neuralgias*—In severe neuralgias like trigeminal neuralgia, injection of alcohol around the nerve causes permanent loss of transmission and relieves pain.

Disulfiram

Disulfiram inhibits the enzyme aldehyde dehydrogenase. If alcohol is consumed after taking disulfiram, acetaldehyde accumulates and within few minutes it can produce flushing, throbbing headache, nausea, vomiting, sweating, hypotension and confusion - called *the antabuse reaction*, due to accumulation of acetaldehyde. The effect lasts for 7-14 days after stopping disulfiram.

Mechanism of Action of Disulfiram

