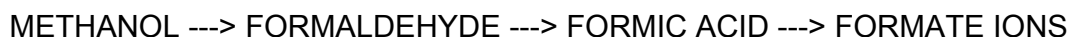


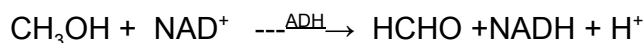
# Comparing the efficiencies of Ethanol and Fomepizole as Antidotes to Methanol Poisoning

How Does Methanol Poisoning happen ?



The formate ions inhibit Cytochrome C Oxidase from functioning causing a halt in ATP production. It also leads to metabolic acidosis, hypoxia etc.

The part of the reaction that we are interested in:

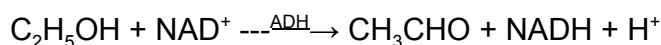


Antidotes in Question

Ethanol -  $\text{C}_2\text{H}_5\text{OH}$

Fomepizole-  $\text{C}_4\text{H}_6\text{N}_2$

The antidotes work by preventing NAD(Nicotinamide Adenine Dinucleotide) from reacting with Methanol by attaching itself to the molecule in the presence of the enzyme ADH(Alcohol Dehydrogenase). So we will be simulating the reaction of ethanol and fomepizole with  $\text{NAD}^+$  to find out which is a more efficient antidote by comparing the rates of reaction. For example, the reaction with ethanol would look like the following:



Here Acetaldehyde is formed instead of Formaldehyde. The Acetaldehyde formed is less toxic and meanwhile the methanol can be dumped from the body using hemodialysis. In case some Formate ions had been previously formed then they can be decomposed using Folinic acid. The metabolic acidosis can be treated with the addition of a suitable alkali like Sodium Hydrogen Carbonate ( $\text{NaHCO}_3$ ).

The problem is relevant as Methanol Poisoning kills many people but no study has compared the efficiency of these two antidotes, i.e, Ethanol and Fomepizole.