



## Hooch Tragedy

For Prelims: Hooch, Methanol, Ethanol, Alcohols, Fermentation Process, Enzymes.

For Mains: Effect of Spurious Liquor on the Human body, Pros and Cons of Liquor Ban, Government Policies & Interventions.

[Source: TH](#)

### Why in News?

Recently, around 34 people have died, and around 100 others have been hospitalised after consuming **hooch** or **spurious liquor** in Tamil Nadu's Kallakurichi district.

### What is Hooch?

#### ▪ About:

- Hooch is a commonly used term for **poor-quality alcohol**, derived from Hoochinoo, a native **Alaskan tribe** that was known to produce very strong liquor.
- It is often produced in **unregulated and unsanitary conditions**, leading to potential health risks.
- The **lack of quality control** in hooch production makes it difficult for consumers to know the **exact alcohol content** and any **potential contaminants** present.

#### ▪ Production Process:

##### ◦ Fermentation:

- The production process is similar to making beer or wine. It starts with a **sugary substance** like fruits, grains, or sugarcane. **Yeast** is added, which **ferments** the sugars into **alcohol** and **carbon dioxide**.

##### ◦ Distillation (Optional):

- Hooch often has higher potency (strength), unlike beer or wine, which have lower alcohol content. Distillation **increases the alcohol content** by **heating the fermented mixture**.
- **Alcohol evaporates** first due to its lower boiling point, and the **vapor is captured and condensed back into a liquid**, resulting in a **stronger alcohol concentration**.

### What is Alcohol Content in Liquor?

#### ▪ Alcohol in Liquor:

- **Ethanol** is the type of alcohol commonly found in **alcoholic beverages** and is the **psychoactive ingredient** responsible for the effects of intoxication.
  - Ethanol (C<sub>2</sub>H<sub>5</sub>OH) is a compound consisting of two carbon atoms, six hydrogen atoms, and one hydroxyl group (OH-).
- Liquor is differentiated by its **alcohol content**. It ranges from **5% in beer** to **40% in distilled spirits** such as vodka and whiskey.

- Inside the body, **ethanol** is metabolised in the liver and the stomach by **alcohol dehydrogenase (ADH) enzymes** to **acetaldehyde**.
  - Then, **aldehyde dehydrogenase (ALDH) enzymes** transform the acetaldehyde into **acetate**.
- **Spurious Liquor:**
  - It is a **fake** or **counterfeit alcohol** that is often made at home.
  - In this **methanol** is added to **make the alcohol stronger** in terms of its intoxicating effects or to **increase the quantity of the liquor** being produced. **It is a harmful substance** that can be dangerous if consumed in high amounts.
  - **Hooch production** carries inherent risk due to the presence of **toxic methanol** in the distilled fermented mixture, alongside consumable ethanol.
- **Regulation:**
  - The **Food Safety and Standards (Alcoholic Beverages) Regulations 2018** prescribe the maximum permissible quantity of methanol in different liquors.
  - These values span a wide range, including “absent” in coconut fenny, 50 grams per 100 litres of country liquor, and 300 grams per 100 litres of pot-distilled spirits.

## What is Key Facts About Methanol and its Consumption?

- **Methanol:**
  - Methanol, chemically represented as **CH<sub>3</sub>OH**, is a simple alcohol molecule consisting of one carbon atom bonded to three hydrogen atoms and one hydroxyl group (OH).
  - **Regulations:**
    - Methanol is classified under **Schedule I** of the **Manufacture, Storage and Import of Hazardous Chemical Rules 1989** in India.
    - **Indian Standard IS 517** specifies how the quality of methanol should be determined.
  - **Industrial Production:**
    - Methanol is primarily produced industrially by combining **carbon monoxide and hydrogen** in the presence of **copper and zinc oxide** catalysts, typically at pressures of **50-100 atm and temperatures around 250°C**.
      - Historically, methanol was also produced through the **destructive distillation of wood**, a method known since ancient times, including in ancient Egypt.
  - **Industrial Uses:**
    - Methanol serves as a crucial precursor in the production of acetic acid, formaldehyde, and various aromatic hydrocarbons. It is widely used as a solvent, antifreeze, and in various industrial processes due to its chemical properties.
- **Effect on Human Body:**
  - **Metabolic Acidosis:**
    - Methanol in the body is broken down into toxic byproducts, primarily **formic acid**. This acid disrupts the body's delicate **pH balance** in the blood, leading to a condition called **metabolic acidosis** (production of **excessive acid** that cannot be flushed out by kidneys).
    - This makes the **blood more acidic**, hindering its ability to function properly.
  - **Cellular Oxygen Deprivation:**
    - Formic acid also interferes with an enzyme called **cytochrome oxidase**, which is crucial for cellular respiration. This **disrupts the cells' ability to use oxygen, leading to a buildup of lactic acid** and further contributing to acidosis.
  - **Vision Impairment:**
    - Methanol can **damage the optic nerve and retina**, causing **methanol-induced optic neuropathy**. This condition can lead to permanent vision problems, including blindness.
  - **Brain Damage:**
    - It can cause **cerebral edema (fluid buildup in the brain)** and **hemorrhage (bleeding)**. These can lead to **coma and death**.
- **Treatment:**
  - **Pharmaceutical-Grade Ethanol: Medical ethanol** competes with methanol for the same enzymes (ADH) in the liver. Since the **body processes ethanol much faster**

(around 10x faster), it prevents the methanol from being converted into toxic formic acid.

- **Fomepizole:** It **binds to the ADH enzymes, slowing down the metabolism of methanol** to formic acid. This allows the body to **eliminate methanol before it causes serious harm.**
- **Dialysis:** It may be prescribed to remove methanol and its toxic byproducts (formic acid salts) directly from the bloodstream. This can help protect the kidneys and retina from damage.
- **Folinic Acid:** This medication helps the body **break down formic acid** into less harmful substances like carbon dioxide and water.

**Read more:**

- [Industrial Alcohol Regulation](#)
- [Ban on Liquor](#)
- [Crack Down on Illegal Liquor Supply](#)

**Drishti Mains Question:**

Evaluate the health consequences of methanol poisoning caused by illegal alcohol. What measures need to be taken to address it?

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### **Prelims:**

**Q. Bisphenol A (BPA), a cause of concern, is a structural/key component in the manufacture of which of the following kinds of plastics? (2021)**

- (a) Low-density polyethylene
- (b) Polycarbonate
- (c) Polyethylene terephthalate
- (d) Polyvinyl chloride

**Answer: (B)**

**Q. 'Triclosan', considered harmful when exposed to high levels for a long time, is most likely present in which of the following? (2021)**

- (a) Food preservatives
- (b) Fruit-ripening substances
- (c) Reused plastic containers
- (d) Toiletries

**Answer: (D)**

