

Ethanol: Fermentation and Uses

Tracing the biochemical pathway from agricultural sugar to vital industrial solvent.

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

BIOCHEMICAL PATHWAY

INDUSTRIAL APPLICATIONS

Molecular Profile: Ethanol

SOLVENT

C_2H_5OH

IDENTITY

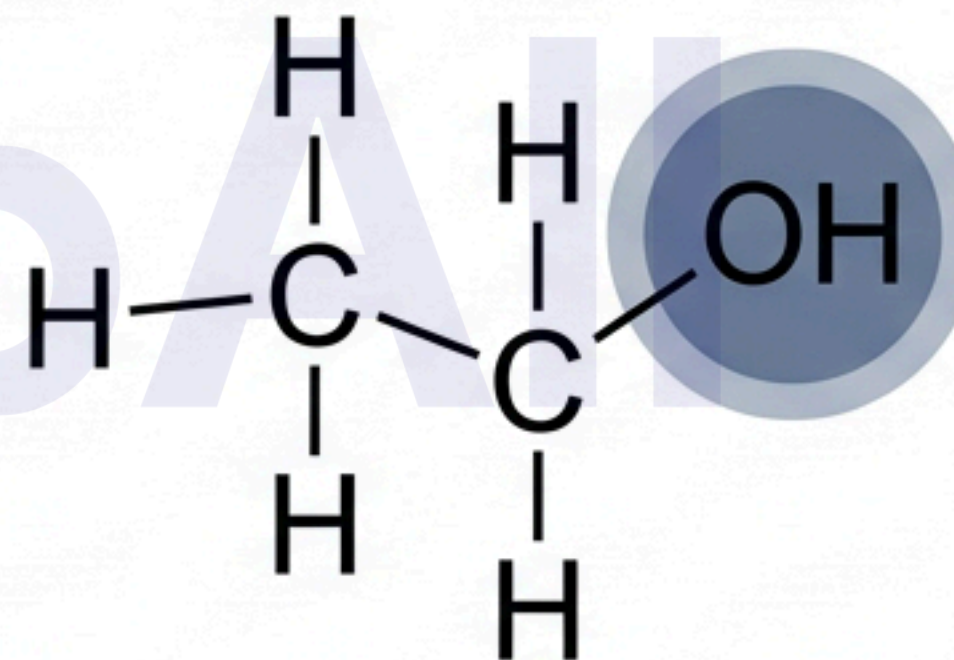
IUPAC Name: Ethanol | Common Name:
Ethyl alcohol / Ordinary spirit

CLASSIFICATION

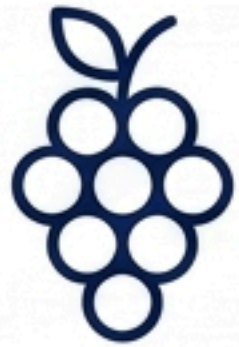
Primary, monohydric alcohol ($-OH$ group attached to an sp^3 hybridized carbon).

PROPERTIES

Colorless liquid, Boiling Point: 351 K.



Agricultural Inputs: Sources of Sugar



Pathway 1: Fruits (Grapes) - As grapes ripen, sugar content increases. Yeast naturally grows on the outer skin.



Pathway 2: Sugarcane & Molasses
- Extracted industrial plant sugars.

**SUGAR + YEAST
CONTACT**

The Catalyst Action:

Crushing the sources brings the internal sugars and the external yeast enzymes into direct physical contact, initiating the process.



**You've Learned the Theory.
Let's Test Them Now.**

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



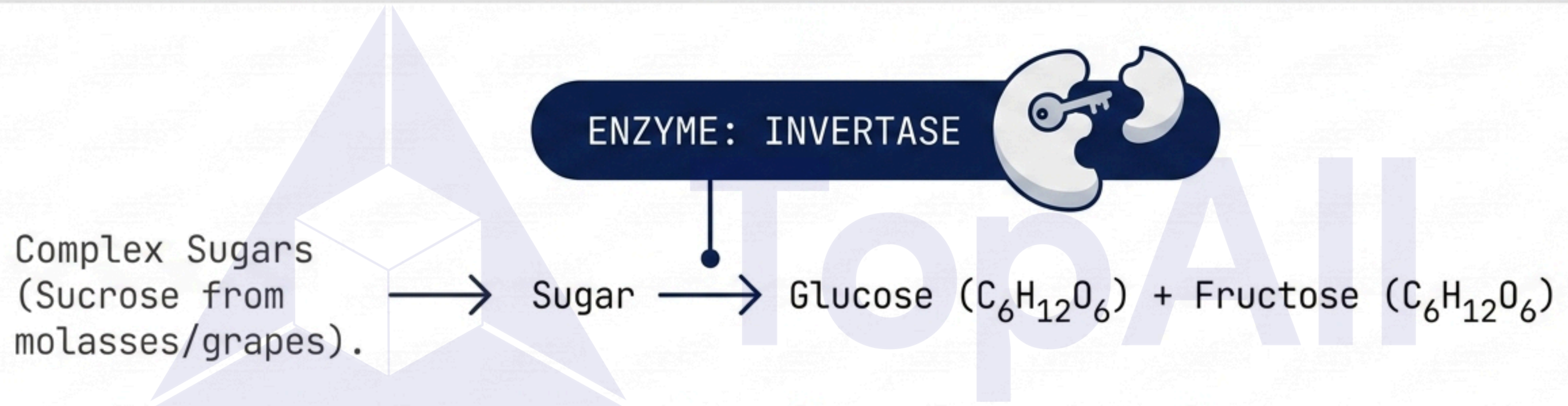
At prep.topall.app

Key Highlights

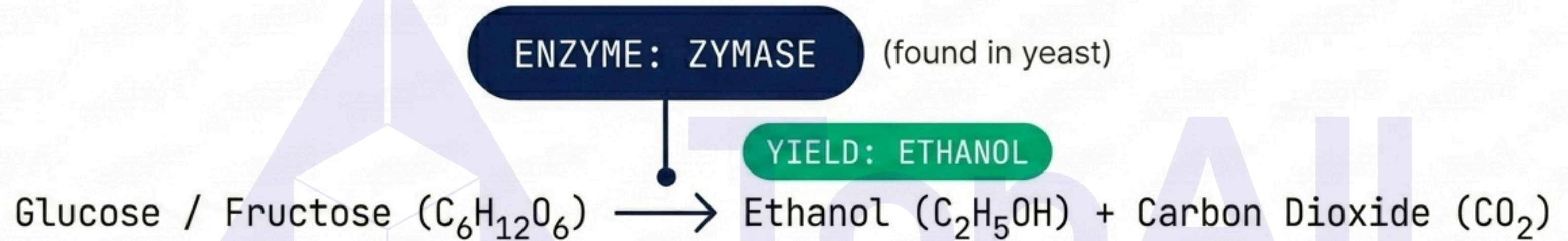
- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



Phase 1: The Invertase Step



Phase 2: The Zymase Step



 **Biological Limit:** The reaction is naturally inhibited once the alcohol concentration exceeds 14%.

The Critical Requirement: Anaerobic Conditions



Condition: Anaerobic (Absence of Oxygen).

Result: Successful fermentation into Ethanol and CO_2 .



TopAll



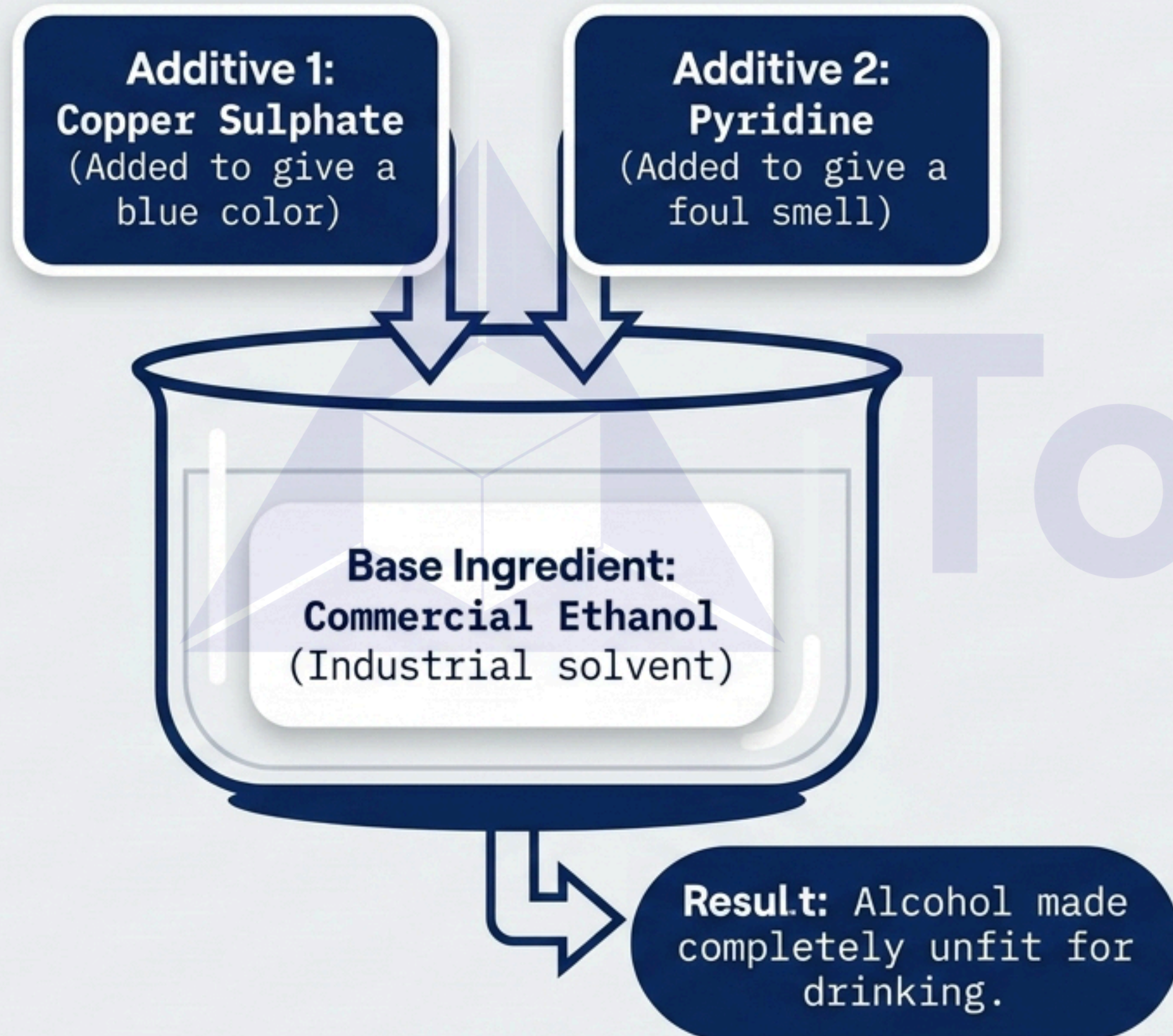
Condition: Aerobic (Presence of Oxygen).

Result: Oxygen rapidly oxidizes ethanol.

Oxidation to Ethanoic Acid

Impact: Completely destroys the taste of alcoholic drinks.

Industrial Protection: Denatured Alcohol



Toxicity Context:

Unlike ethanol, **Methanol (wood spirit)** is highly poisonous.

If consumed, it oxidizes to **methanal** and **methanoic acid** in the body, causing blindness or death.

Key Takeaway: The Dual Nature of Ethanol



A naturally occurring primary alcohol ($\text{C}_2\text{H}_5\text{OH}$) harvested through the anaerobic, enzymatic fermentation of plant sugars (Invertase $\rightarrow$ Zymase).



A foundational industrial chemical (Boiling Point 351 K). Essential as a commercial solvent for paints and as a precursor for synthesizing countless complex carbon compounds.

BIOLOGICAL BYPRODUCT $\rightarrow$ CRITICAL INDUSTRIAL TOOL



You've Learned the Theory.

Now Let's Test It.

Reading notes gets you knowledge.

Practicing MCQs gets you marks.

That's exactly what TopAll Pro is built for.

Try TopAll Pro Now

What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**
AI Recommendation Analysis your Tests and tell you where you need to improve.



Practice the moment you finish studying
Jump in while the concept is still fresh in your head

4.5L+
MCQs

1.5L+
Students

AI Powered
In-Depth Analysis