

UNIT 10 • BIOMOLECULES

Enzymes and the Mechanism of Enzyme Action

Essential Terminology

Biocatalyst

Globular proteins that coordinate and accelerate life processes.

Activation Energy

The magnitude of the energy barrier a reaction must overcome to proceed.

-ase Suffix

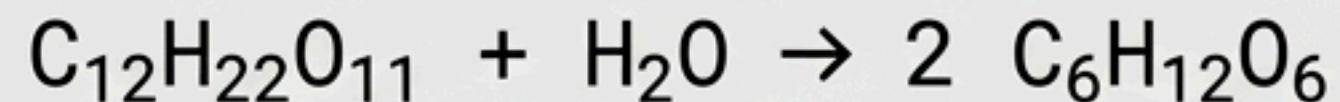
The standard ending used in chemical nomenclature to identify an enzyme.

Two Conventions for Naming Enzymes

Based on Substrate

Maltose → Malt**ase**

Maltase



Based on Reaction Type

Oxidation/Reduction
→ Oxidoreduct**ase**

Catalyses the oxidation of one substrate with the simultaneous reduction of another.



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$$E=mc^2$$



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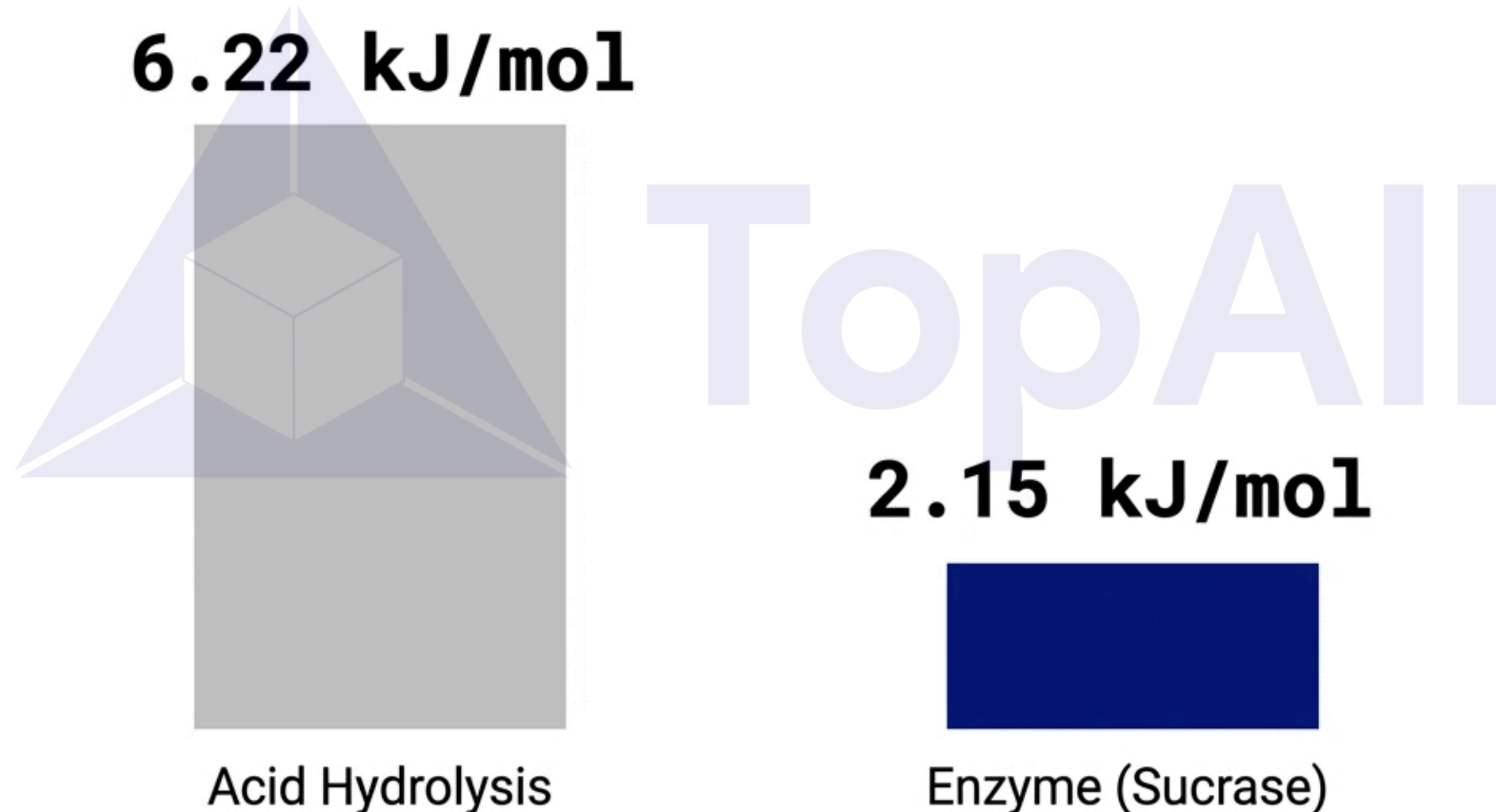
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The Efficiency of Biological Catalysts

Activation energy required for Sucrose Hydrolysis



The Mechanism of Action

Enzymes = Biocatalysts

Enzymes operate on the exact same logic as chemical catalysts: they reduce the magnitude of activation energy required for a reaction to proceed.

However, unlike harsh chemical catalysts, these globular proteins perform this function under the very mild conditions required by living organisms.

Watch for This: Nomenclature

❗ Check Both Conventions

A common mistake is assuming enzymes are only named after their substrates (like maltase). Remember that they are frequently named after the reaction type they catalyze (like oxidoreductase). Always evaluate both possibilities.

Summary



- Enzymes are protein-based biocatalysts that drastically lower activation energy (e.g., sucrase lowers sucrose hydrolysis from 6.22 kJ/mol to 2.15 kJ/mol).
- The -ase suffix is standard, but the root name can be derived from either the specific substrate or the type of reaction being catalyzed.



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