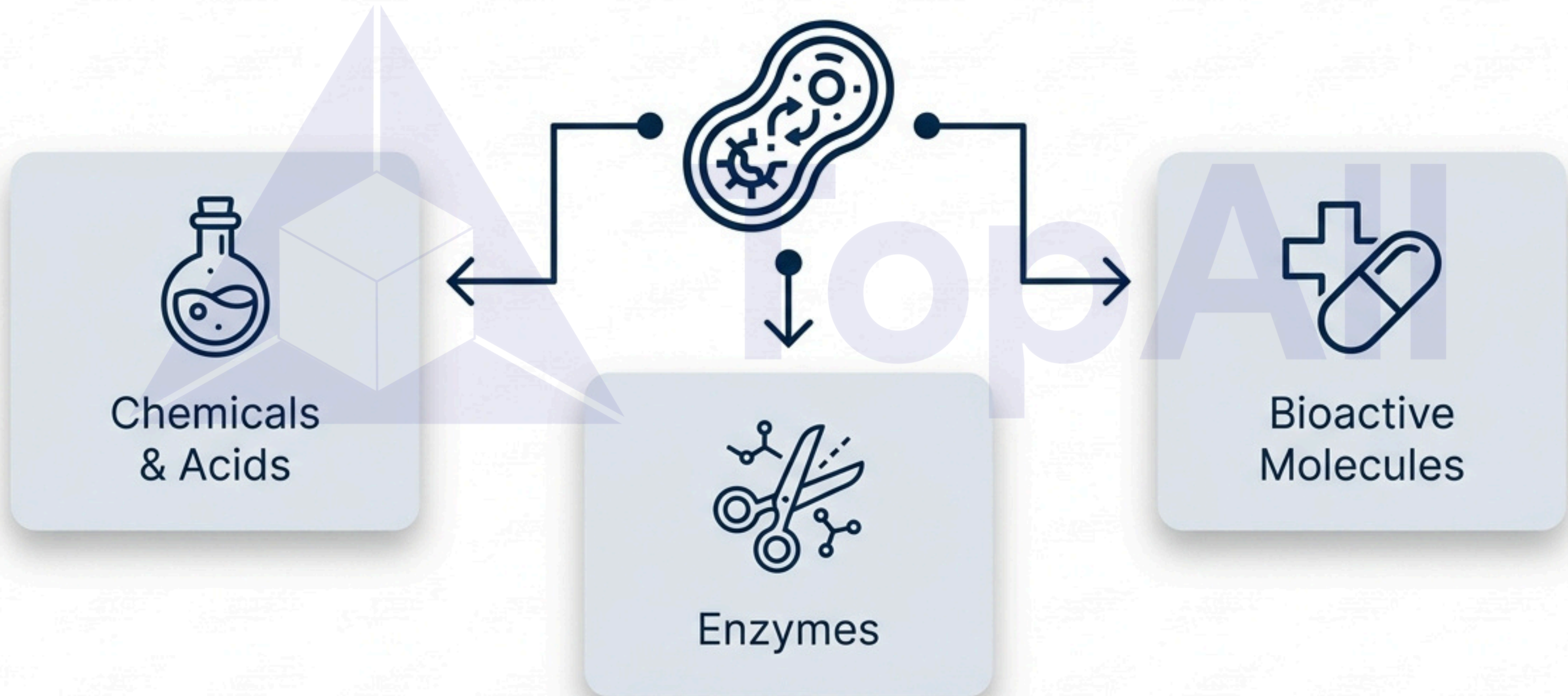


Microbes as Biochemical Factories

Industrial Chemicals, Consumer Enzymes, and Life-Saving Bioactive Molecules



Commercial synthesis happens at an industrial scale

Microbes are cultivated in massive vessels called fermentors to synthesize exact, high-value products essential for everyday human welfare.



**The Solvents Dept:
Organic Acids & Alcohols**



**The Consumer Dept:
Commercial Enzymes**



**The Medical Dept:
Bioactive Molecules**

Scale of Production: Requires highly controlled growth in industrial fermentors.



The Organism-Product Map: Acids and Solvents

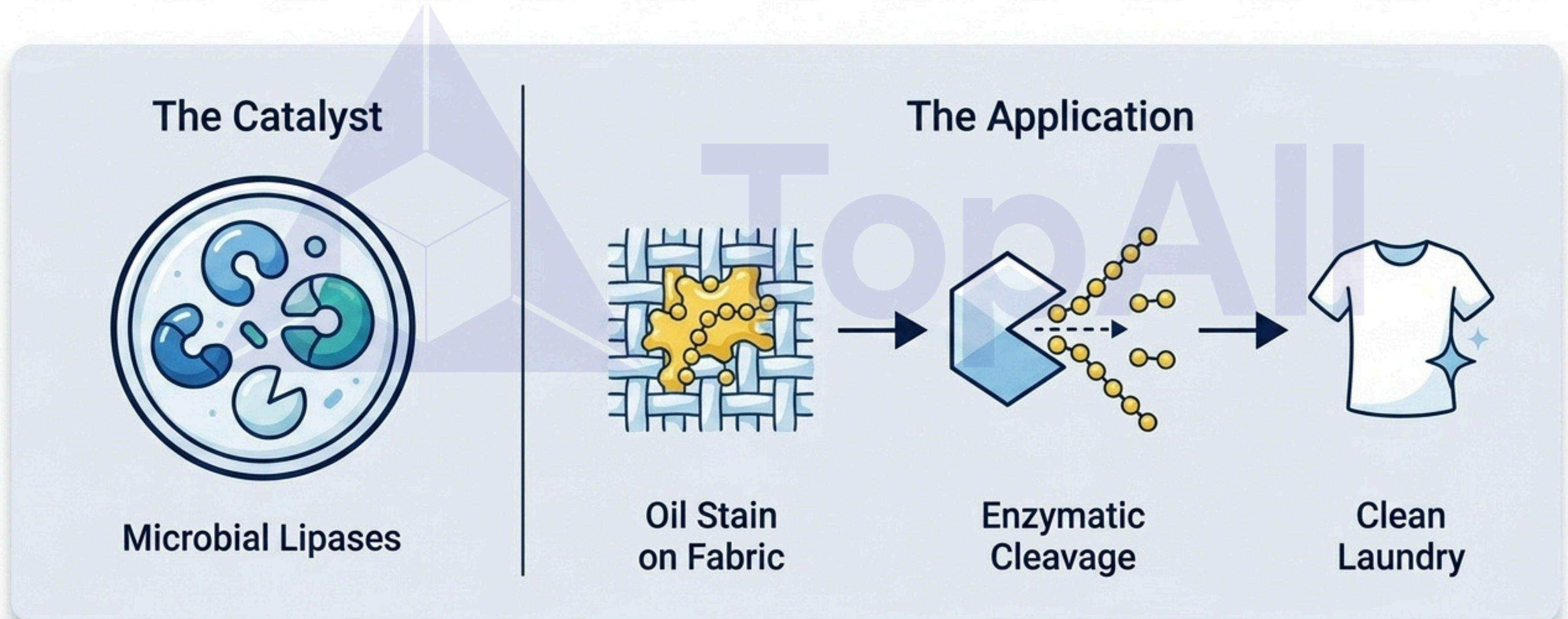


Specific microbial strains are utilized to harvest distinct organic acids and alcohols. Identifying the microbe's kingdom is critical for diagnostic accuracy.



Lipases engineer the removal of lipid-based stains

Microbial lipases are a core component of modern detergent formulations, deployed specifically to break down stubborn oil and fat molecules.





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Key Highlights

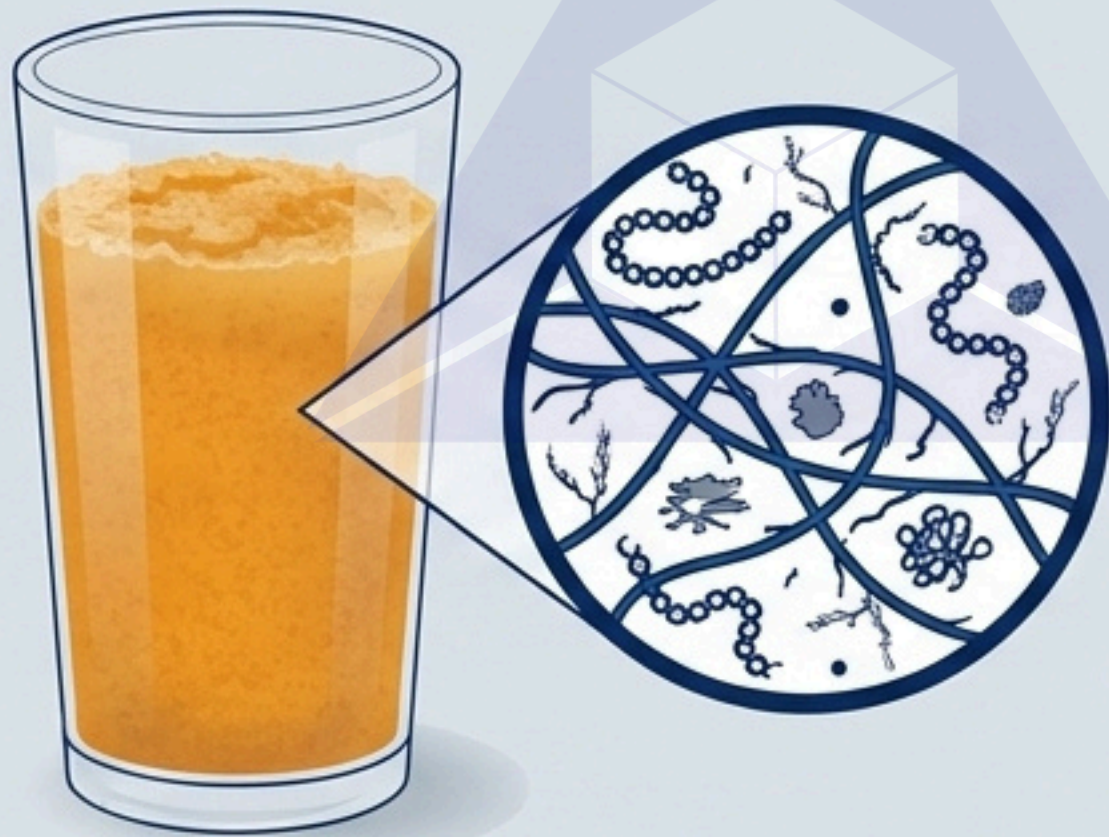
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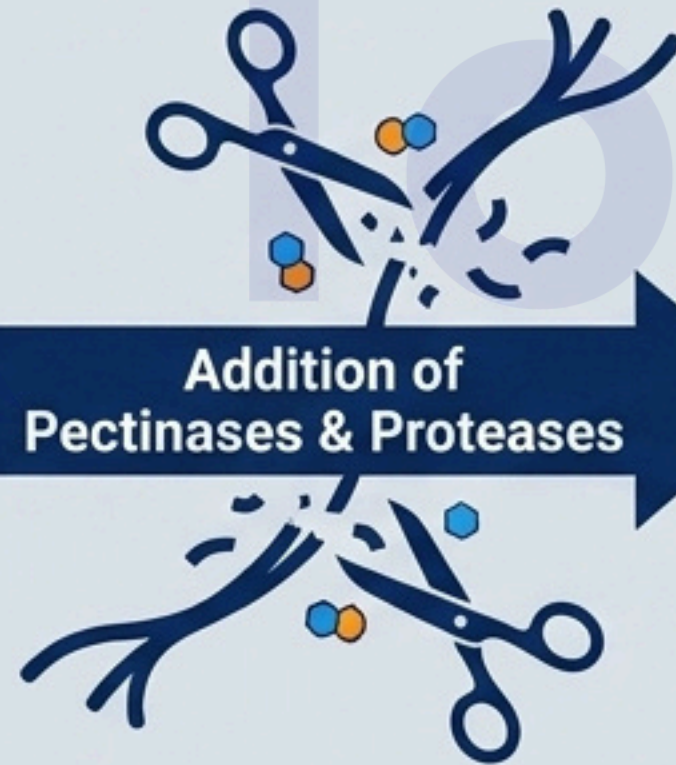
Pectinases and proteases clarify commercial fruit juices

Bottled juices are visually pristine compared to thick, cloudy homemade juices because specific enzymes are introduced to digest suspended plant fibers and proteins.

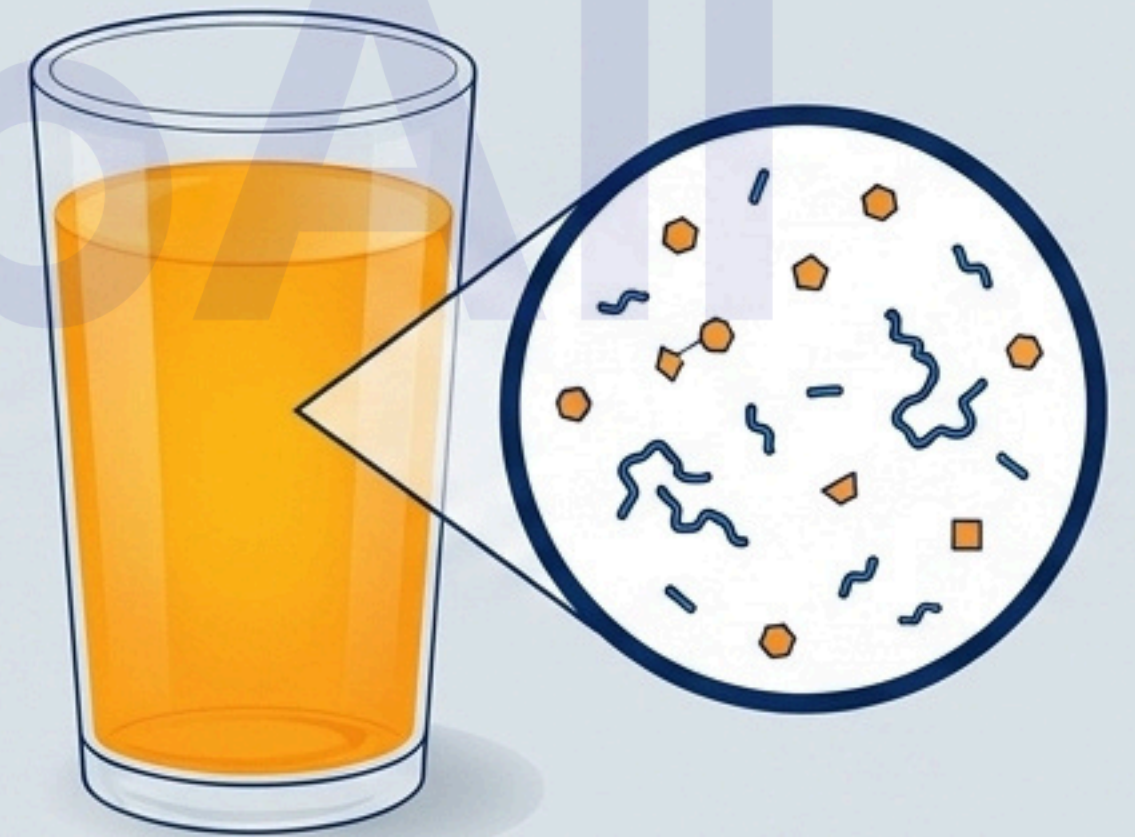
Home-made Juice



Addition of
Pectinases & Proteases



Market Bottled Juice

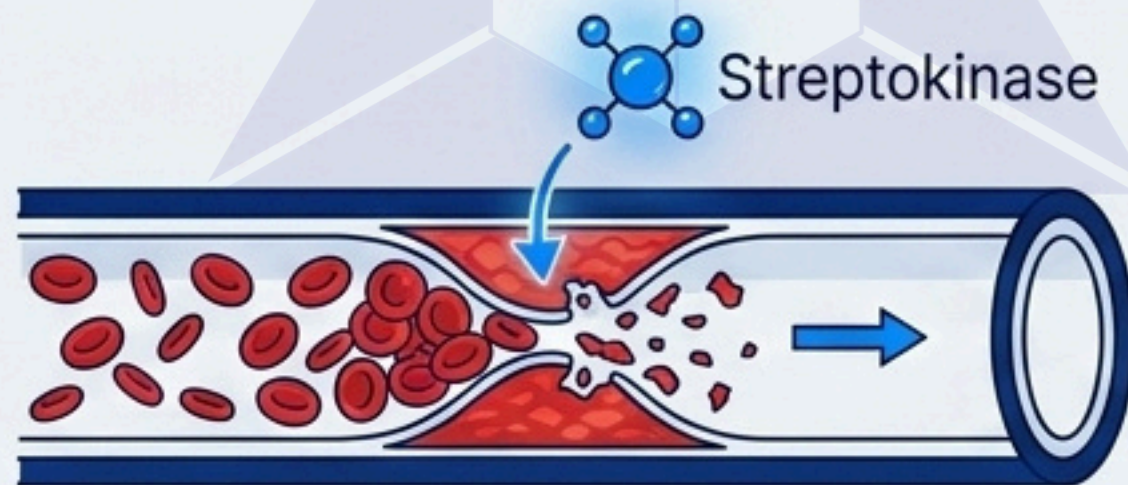


Bioactive molecules perform critical clinical interventions

Beyond everyday products, specific microbes secrete potent bioactive agents utilized in emergency medicine and complex surgeries.

The Clot Buster

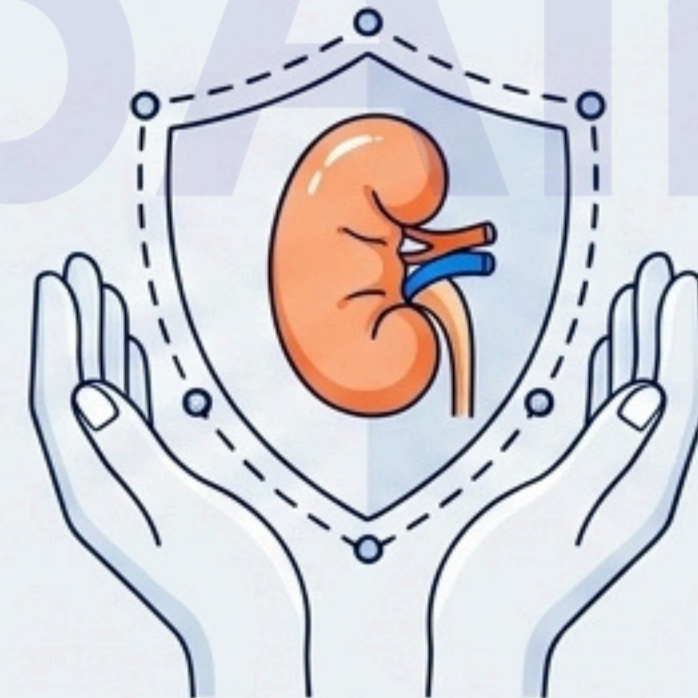
- **Source:** *Streptococcus* (Bacterium) → modified by genetic engineering
- **Product:** Streptokinase



Treats Myocardial Infarction

The Immunosuppressant

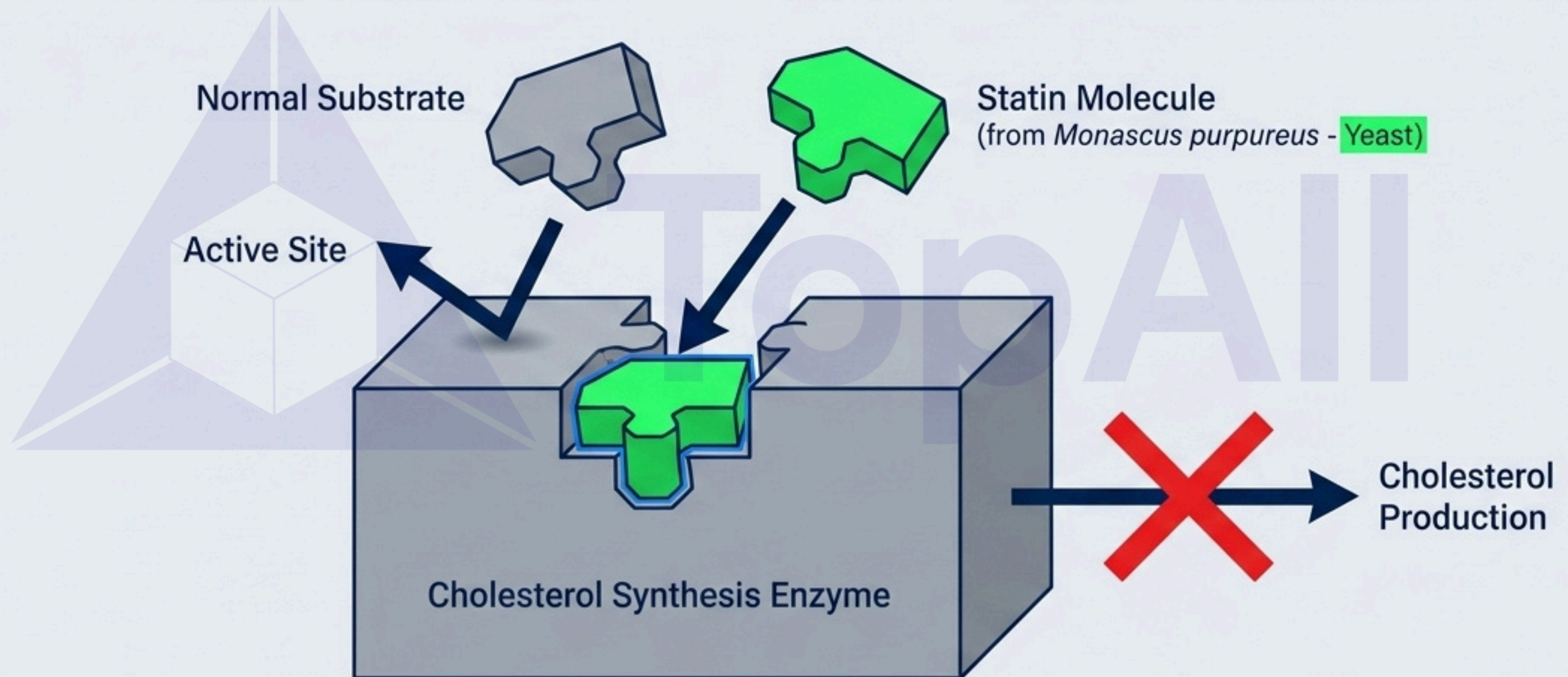
- **Source:** *Trichoderma polysporum* (Fungus)
- **Product:** Cyclosporin A



Prevents Organ Rejection

Statins manage blood cholesterol via competitive inhibition

Harvested from yeast, statins do not destroy cholesterol; rather, they trick the body's synthesis machinery by blocking the active site of the manufacturing enzyme.



The NEET Synthesis Matrix: Microbes and Products

The definitive inventory of commercial and medical microbial products.



Organism Name	Taxonomy	Active Product	Commercial/Medical Use
<i>Aspergillus niger</i>	Fungus	Citric acid	Organic acid
<i>Acetobacter aceti</i>	Bacterium	Acetic acid	Organic acid
<i>Clostridium butylicum</i>	Bacterium	Butyric acid	Organic acid
<i>Lactobacillus</i>	Bacterium	Lactic acid	Organic acid / Curd
<i>Saccharomyces cerevisiae</i>	Yeast	Ethanol	Alcoholic beverages
<i>Streptococcus</i> (genetically mod.)	Bacterium	Streptokinase	Clot buster (Myocardial infarction)
<i>Trichoderma polysporum</i>	Fungus	Cyclosporin A	Immunosuppressant (Organ transplant)
<i>Monascus purpureus</i>	Yeast	Statins	Blood-cholesterol lowering agent



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