

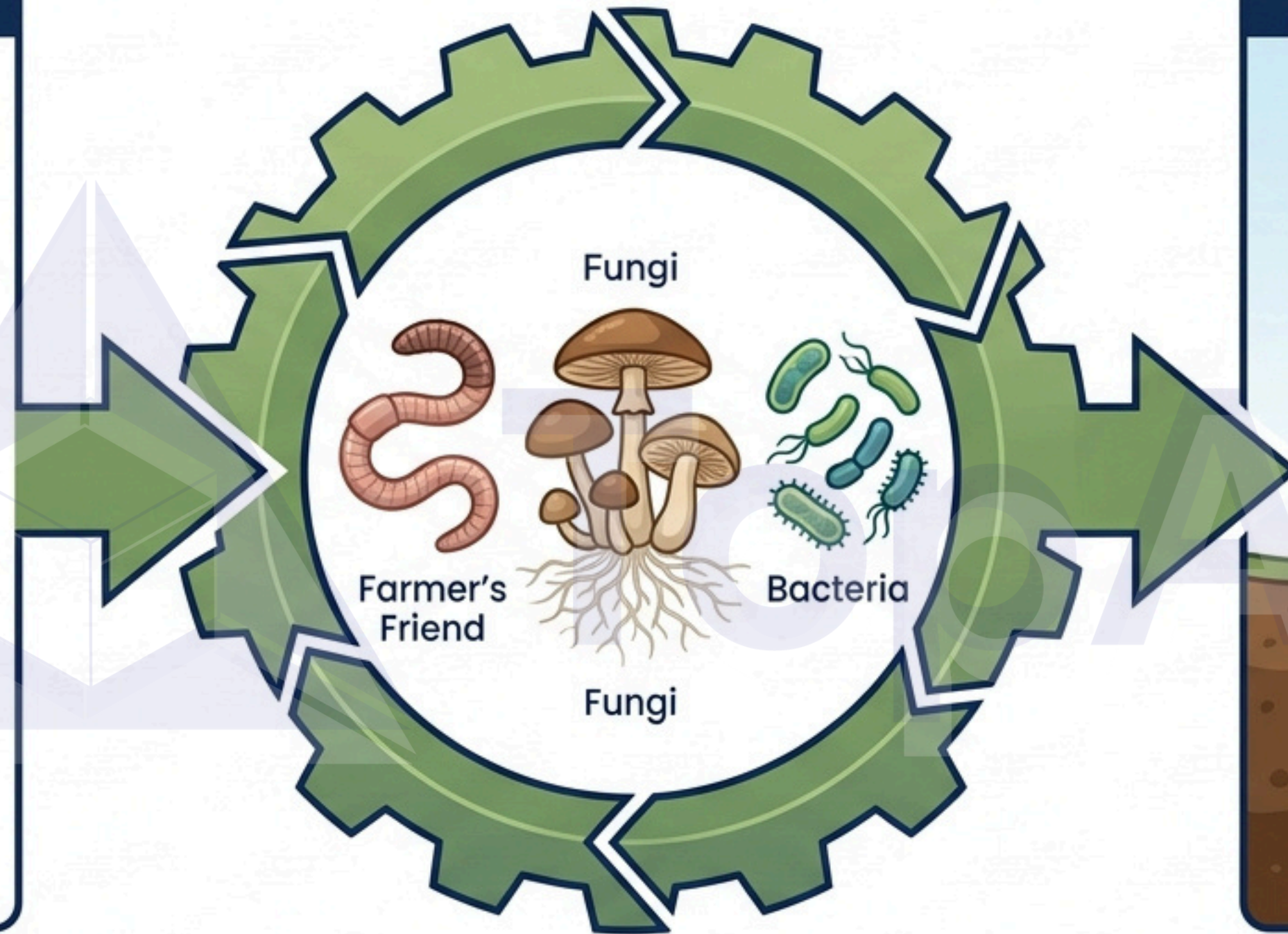
Decomposition: Recycling Dead Matter

The biochemical engine that transforms organic waste into the building blocks of new life.

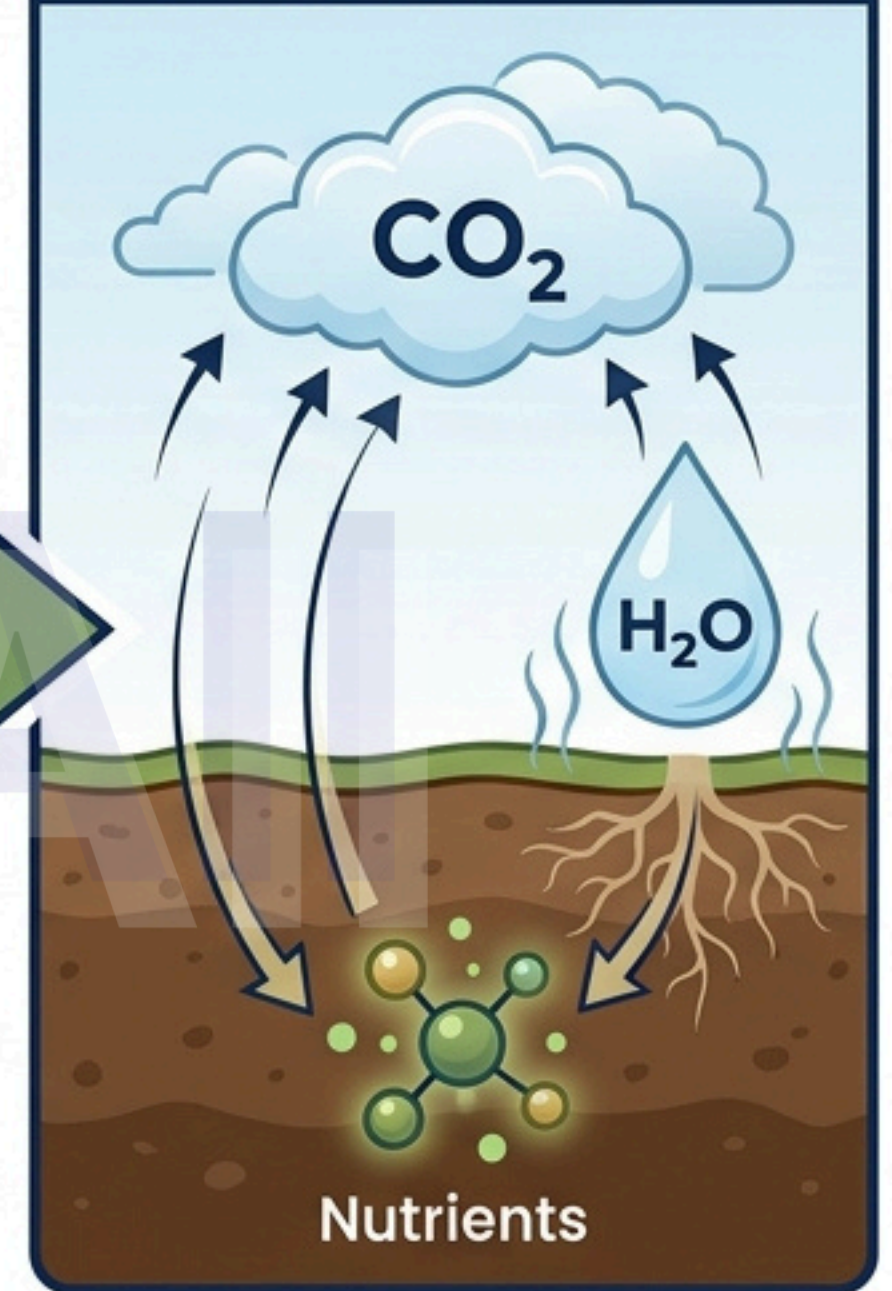
The Raw Material: Detritus



The Decomposers



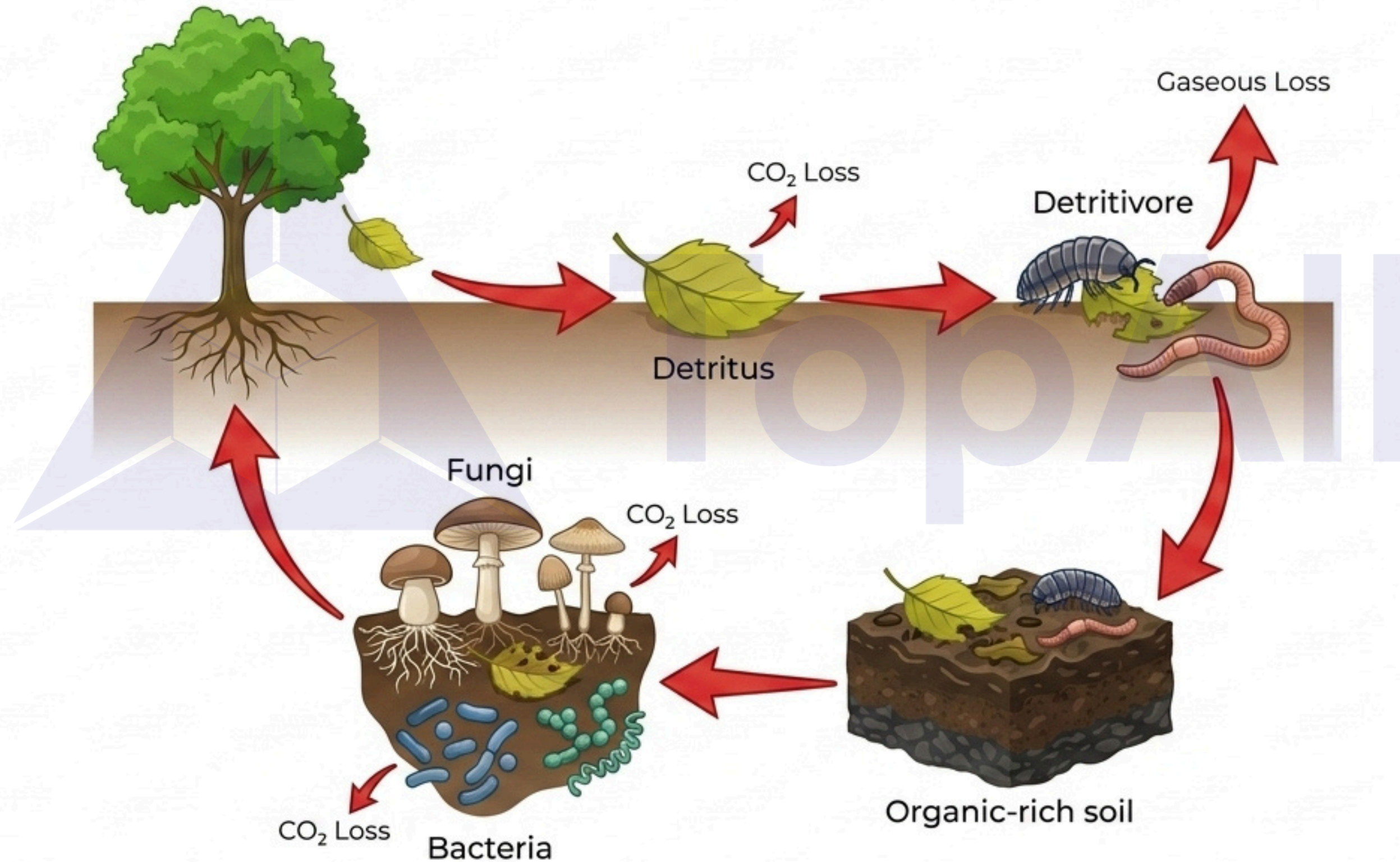
Inorganic Substances



Decomposition is the breakdown of complex organic matter into simple inorganic substances, serving as the primary recycling mechanism of the biosphere.

The Terrestrial Decomposition Cycle

A continuous, cyclical flow of energy and matter through the ecosystem.





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

$$E=mc^2$$



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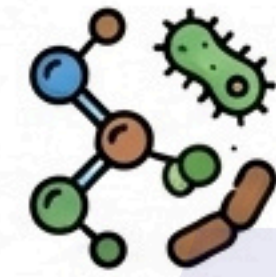
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CRITICAL NOTE: These three processes operate *simultaneously* on the detritus.

Fragmentation	Leaching	Catabolism
 The Actor Detritivores (e.g., Earthworms)	 The Actor Water	 The Actor Bacterial & Fungal Enzymes
The Action Physical breakdown of complex detritus into much smaller particles.	The Action Water-soluble inorganic nutrients wash down into the deeper soil horizons.	The Action Biochemical degradation of detritus into simpler inorganic substances.
The Result Increased surface area for microbial action.	The Result Nutrients get precipitated as temporarily unavailable salts.	The Result Chemical unlocking of cellular structures.

The Soil Builders: Final Stages of the Cycle

Humification

Process

Accumulation of Humus.

Characteristics

A dark coloured, amorphous, colloidal substance.

Ecosystem Role

Highly resistant to microbial action (decomposes at an extremely slow rate). Serves as the ultimate, stable **reservoir of nutrients.**

Mineralisation

Process

Degradation of Humus.

Characteristics

Specific microbes target the resistant humus over time.

Ecosystem Role

The slow, steady release of trapped inorganic nutrients back into the soil for plant reuse.

Decomposition is largely an oxygen-requiring process. Its speed is heavily dictated by chemical composition and climate.

Quicker Decomposition



Chemical Factors

Detritus rich in Nitrogen; presence of water-soluble substances like Sugars.

Climatic Factors

Warm temperatures; Moist environments. (These favor optimal soil microbe activity).

Slower Decomposition



Chemical Factors

Detritus rich in Lignin; Detritus rich in Chitin.

Climatic Factors

Low temperatures; Anaerobiosis (lack of oxygen).

Result of Braking

Inhibits decomposition, leading to a massive build-up of organic materials.

The NEET Takeaway: High-Yield Synthesis



The Enzyme Target

Catabolism is strictly driven by bacterial and fungal enzymes, not physical chewing.

The Simultaneous Rule

Fragmentation, leaching, and catabolism do NOT happen sequentially; they operate simultaneously.

The Humus Paradox

Humus is highly resistant to microbial action, making it a slow-release colloidal reservoir rather than an immediate nutrient source.

The Chemical Brakes

Remember the specific chemical inhibitors: Lignin and Chitin drastically slow the rate of decomposition.

The Climatic Ideal

Maximum decomposition requires three conditions: Warmth, Moisture, and Oxygen (Anaerobiosis halts the process).



You've Learned the Theory.

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