

[SECTION 11.1]



Light, Chlorophyll and CO₂

What Do We Know? Empirical Evidence for
the Requirements of Photosynthesis.

The Chlorophyll Requirement



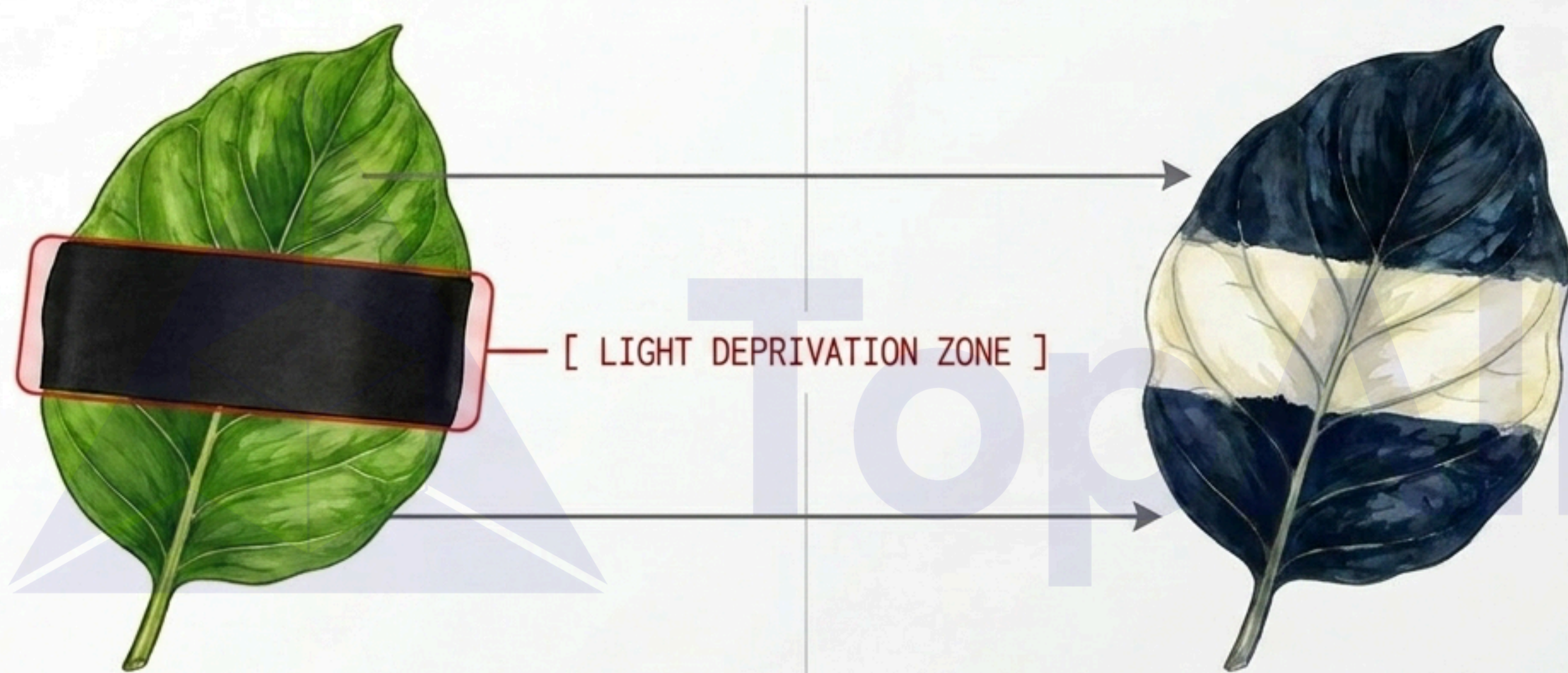
Subject: Variegated leaf (naturally containing both green and non-green tissue).

Action: Exposed to ambient sunlight for an extended period.

Observation: Photosynthesis only occurs in the green parts of the leaf.

Result: Starch formation is strictly localized to areas containing chlorophyll.

The Covered Leaf Experiment



Subject: Healthy, fully green leaf.

Action: Partially covered with opaque black paper, then exposed to light.

Observation: Photosynthesis requires continuous light exposure.

Result: Starch formation tests positive only in the exposed regions; the light-deprived band tests entirely negative.



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

$$E=mc^2$$



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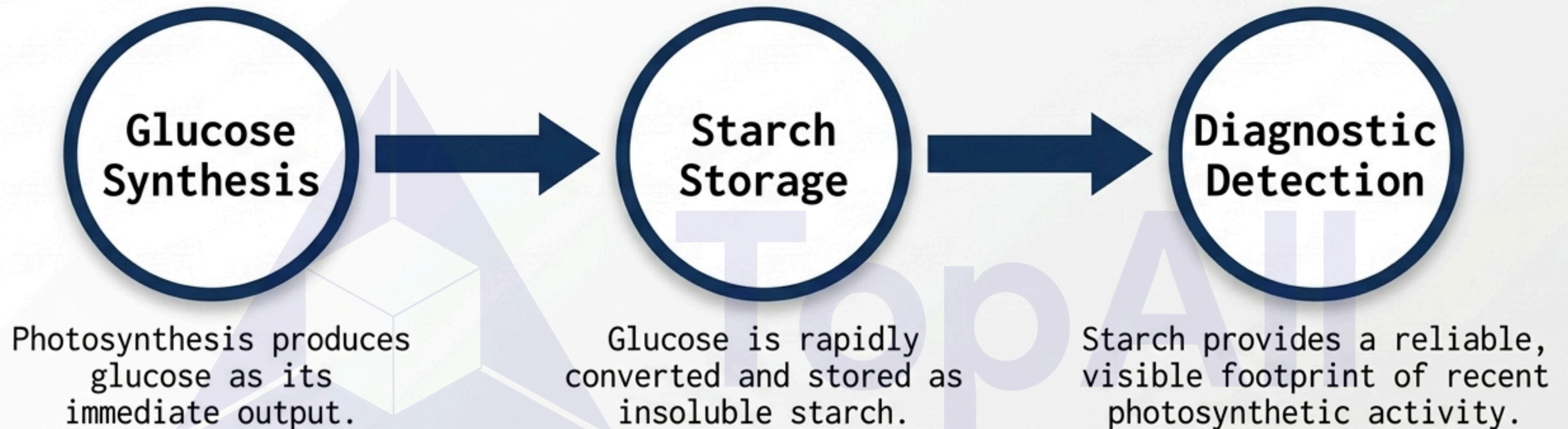


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EMPIRICAL PROXY: Starch acts as the definitive proxy for the process. If starch is present, it is proof that photosynthesis successfully occurred in that specific cellular tissue.

The Role of Potassium Hydroxide

Potassium Hydroxide acts as a highly effective chemical sponge, rapidly absorbing Carbon Dioxide from its immediate surrounding air.

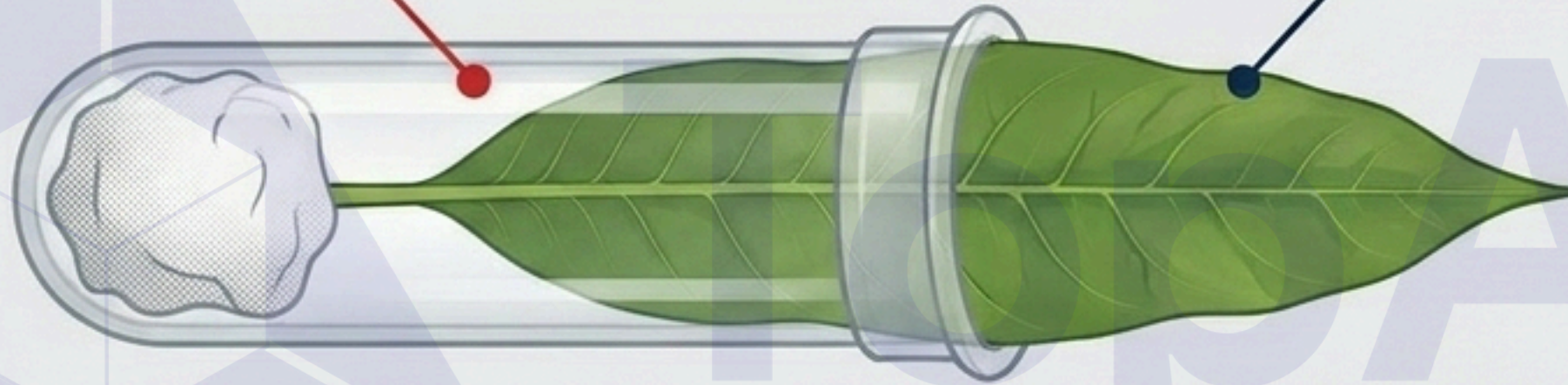


ENVIRONMENTAL VACUUM: Placing KOH-soaked cotton inside a sealed container completely strips the local air of CO₂, creating a targeted deprivation zone required for isolation experiments.

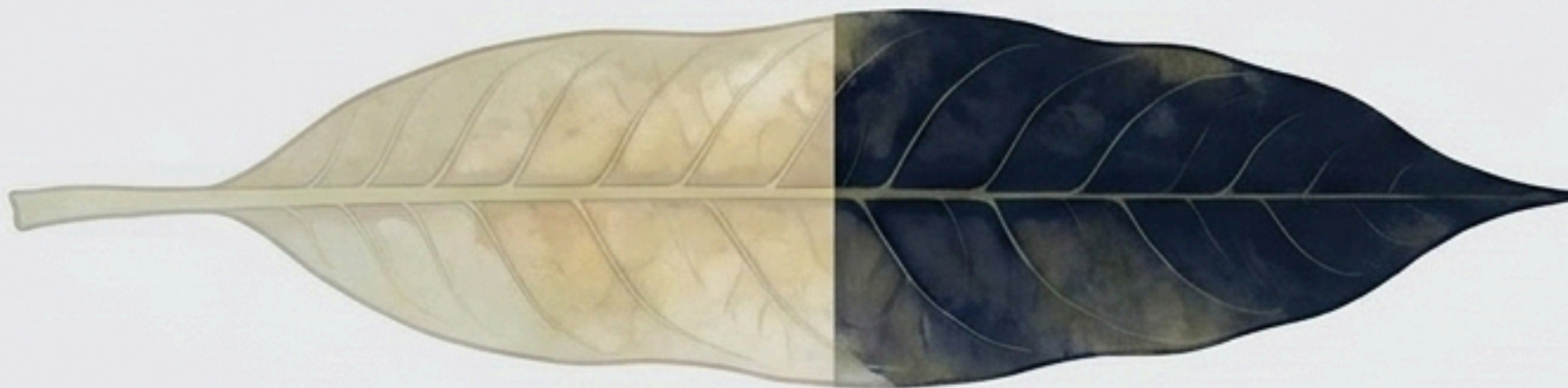
The Half-Leaf Experiment

A single leaf is divided across two micro-environments:

Enclosed Half
[Zero CO_2]:
KOH-soaked cotton
absorbs all local
carbon dioxide.

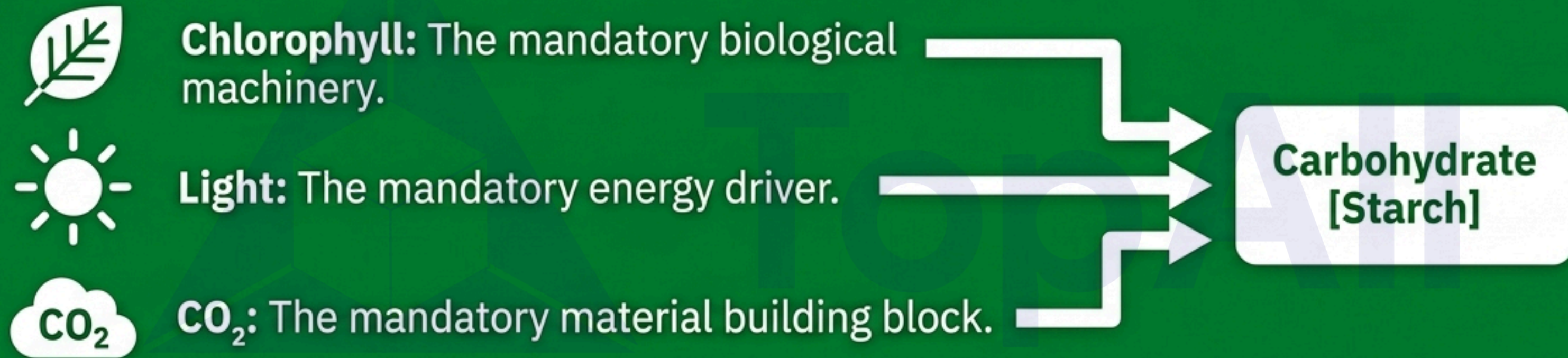


Exposed Half
[Ambient CO_2]:
Exposed to
normal
atmospheric air.



Observation: Upon testing for starch, the exposed portion tests positive, while the enclosed portion tests negative. CO_2 is strictly required for synthesis.

Photosynthesis is not a passive event; it is a highly specific physico-chemical process. The classical experiments prove it is entirely dependent on a strict triad of inputs.



If any single element is removed from the system, the synthesis of organic compounds instantly ceases.





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