

PG: III
Enzyme
Calvin Cycle

RN College

Description of Various Steps involved in Calvin Cycle

or
List Major Intermediates of Calvin Cycle
or

Describe what portion of G₃P is
recycled & why

or
How Calvin Cycle is related to
light reaction.

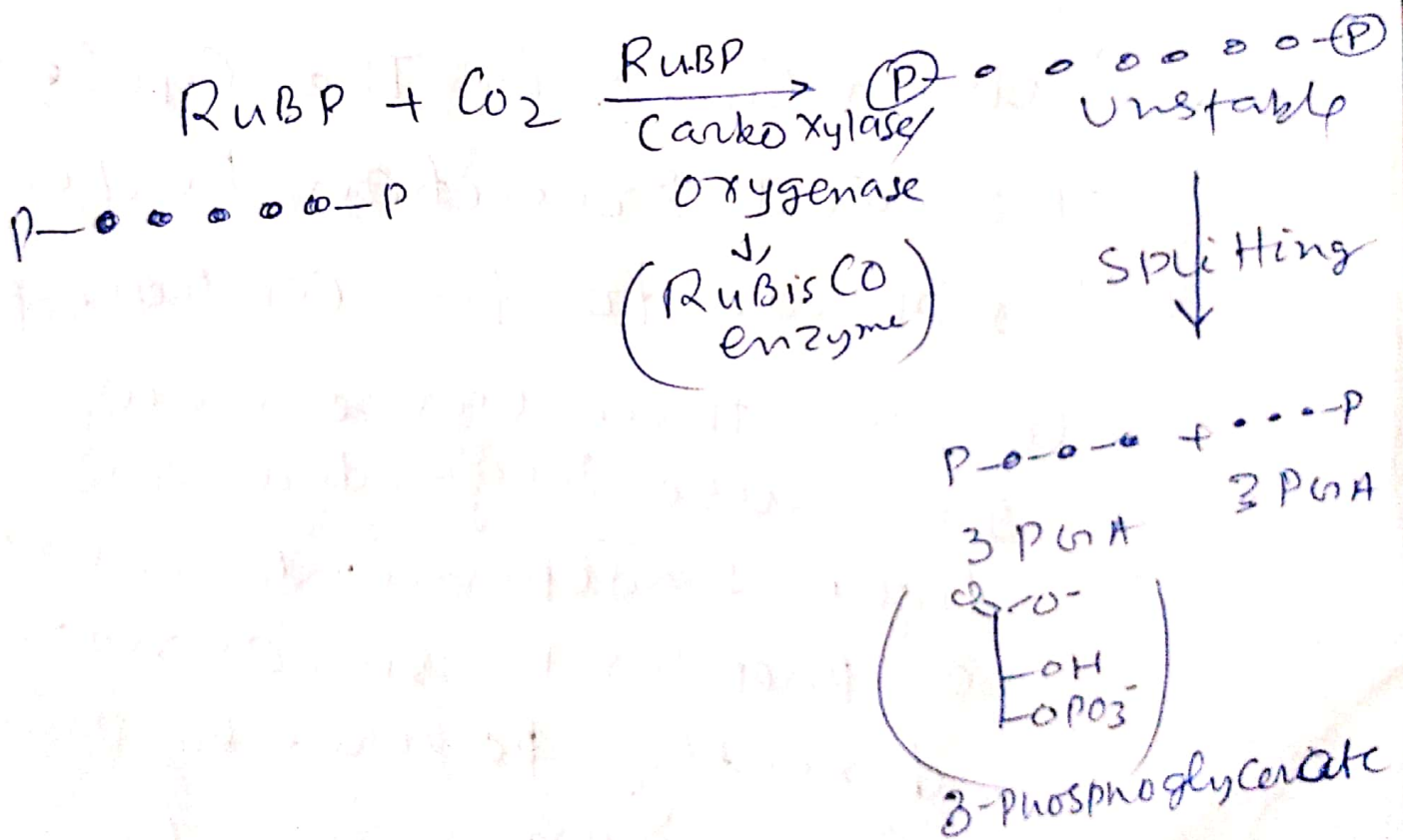
- Calvin Cycle is The Cycle of
chemical reaction performed
by plants to fix carbon from

CO₂ in three Carbon Sugar
- It is also regarded as
light independent reactions
of photosynthesis, as not
directly powered by photons
from Sun.

- Calvin Cycle is powered by
ATP & NADPH which is
created by harnessing the
energy from photons in light dependent
reaction.

Ist-Phase - Carbon fixation

This step involves combination of CO_2 with 5-C-Acceptor ribulose-1,5-bisphosphate (RuBP) which results 6-C-compound which splits into two molecules of 3-C (called 3-phosphoglyceric acid (3-PGA))



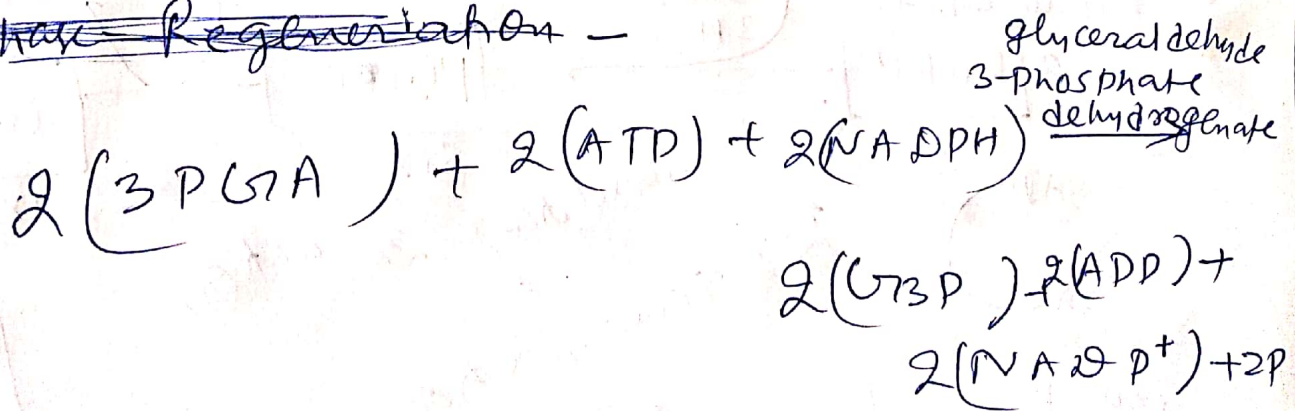
II Phase - Reduction Step \rightarrow Phosphorylation of 3PGA

This step involves conversion of 3PGA molecules (created in carbon fixation) into molecules of simple sugar - glyceraldehyde-3-phosphate (G3P)

This step uses energy from ATP and NADPH (created in light dependent reaction of photosynthesis). Thus in this step plant converts energy from sunlight into long-term storage molecules of sugar.

In this reduction step NADPH donates electrons to 3PGA \rightarrow generate G3P

~~II Phase~~ Regeneration -

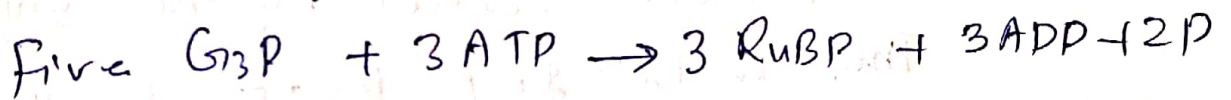


Thus two NADPH are utilized per CO_2 fixation

III Step - Regeneration Step - It involves regeneration

of RuBP in which five G3P molecules produce 3 RuBP using three ATP.

Thus fixation of three CO₂ produces six G3P, of which five are used to generate RuBP leaving one G3P available for subsequent conversion of hexose



Thus in overall process nine ATPs ~~used~~ and six NADPH used per three CO₂ molecules include.

The whole cycle is summarized in diagram.

