

Plant nutrition

Photosynthesis

Carbon dioxide + water → glucose + oxygen

Light energy Chlorophyll in chloroplasts

Balanced equation **Supplement**

$6\text{CO}_2 + 6\text{H}_2\text{O}$ $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

Uses of carbohydrate

Starch store Cellulose cell walls Respiration Sucrose in phloem Nectar

Mineral ions

Nitrate: amino acids Magnesium: chlorophyll

Starch test

Destarch Boil, ethanol, iodine Variegated, foil, soda lime

Limiting factors **Supplement**

Light intensity Carbon dioxide Temperature

Rate investigations

Lamp distance Hydrogencarbonate Water bath

Hydrogencarbonate indicator

Yellow: high CO_2 Red: air Purple: low CO_2

Leaf structure

Large and thin

More light Short diffusion path

Palisade mesophyll

Many chloroplasts Near top

Spongy mesophyll

Air spaces CO_2 diffuses

Stomata and guard cells

Gas exchange Open and close

Vascular bundle

Xylem: water Phloem: sucrose

Cuticle and epidermis

Waxy Transparent