

Research Question:

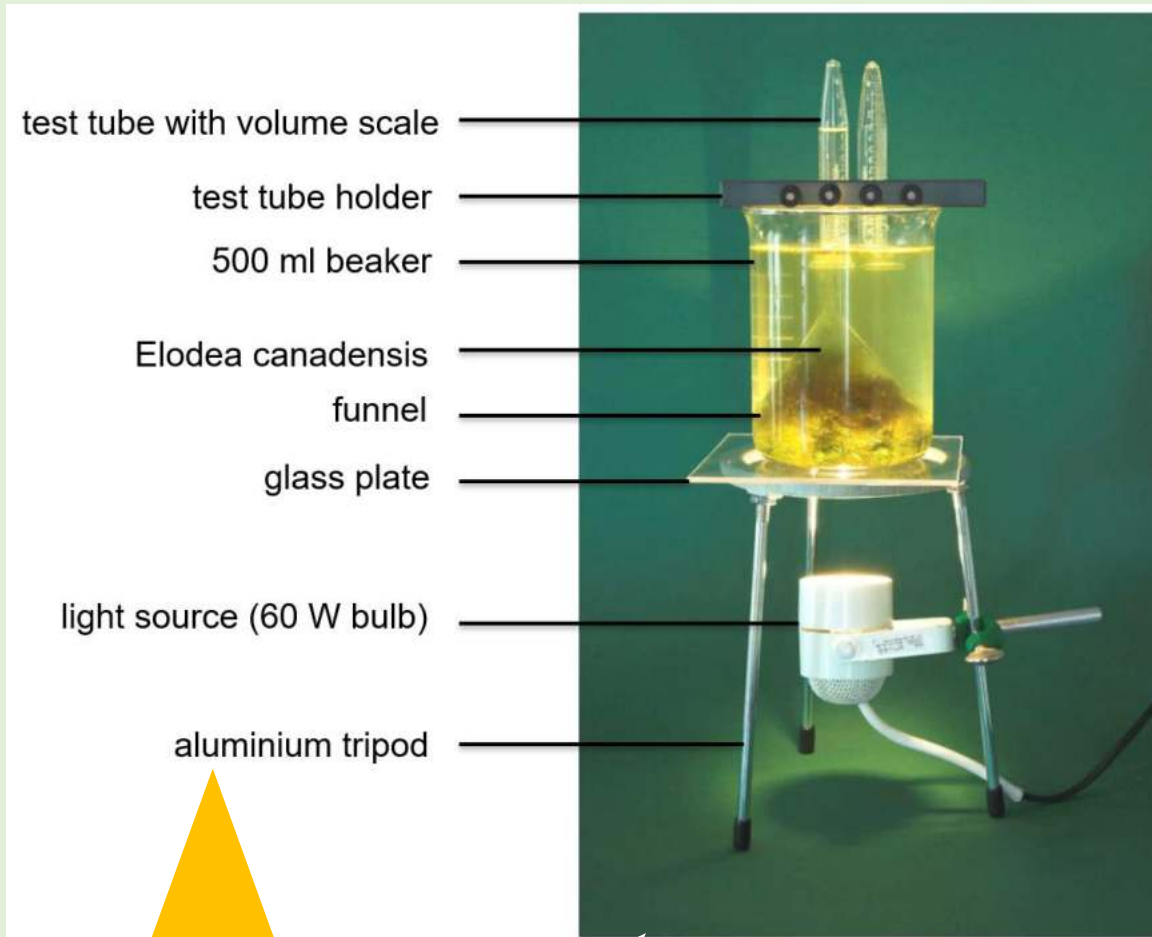
Is the oxygen one of the products of photosynthesis?

Hypothesis:

In a process of photosynthesis oxygen is one of the products.

Observation:

Every 5 minutes number of bubbles consistently increased/ variation in size of bubbles



Research Question:

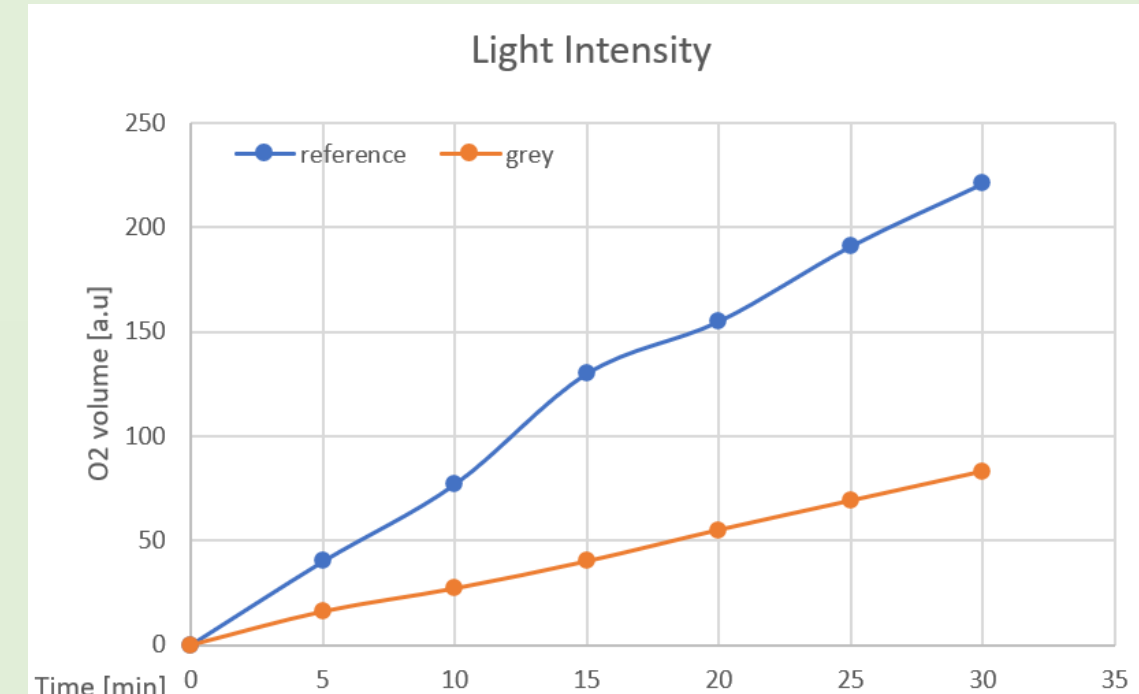
How does the intensity of light influence the rate of photosynthesis in pondweed *Elodea canadensis*?

Hypothesis:

If the intensity of light decreases the oxygen production will decline.

Observation:

Photosynthesis intensity using gray filter : Oxygen production slower but consistent increase in bubbles number



Conclusion:
Higher Light intensity leads into a higher rate of photosynthesis

Research Question:

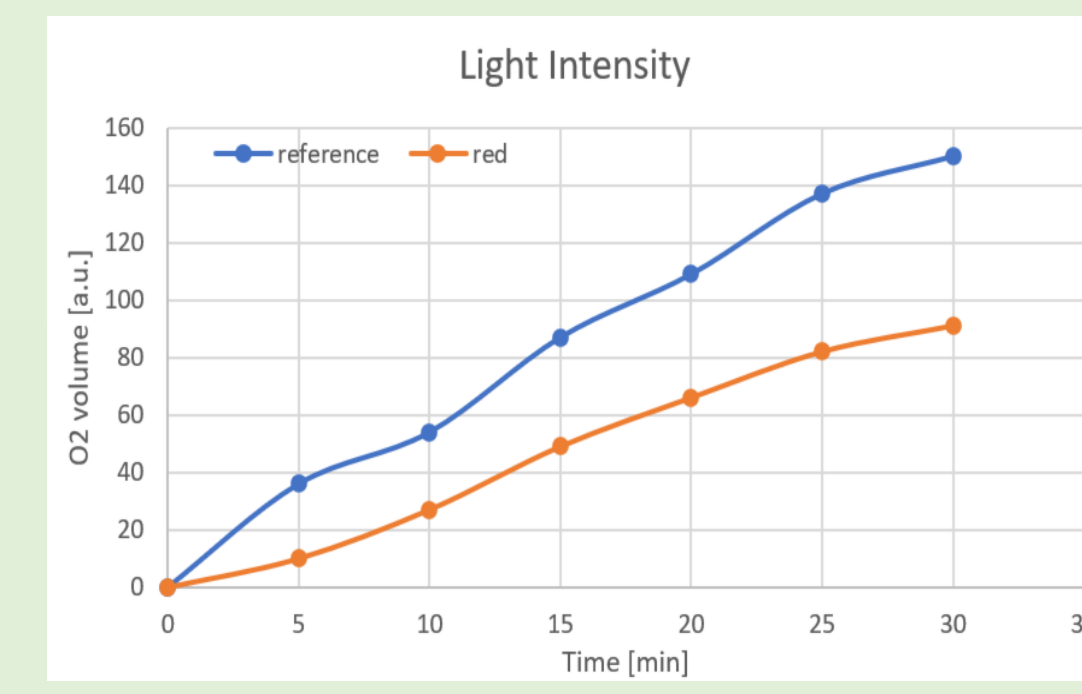
How does the colour of light influence the rate of photosynthesis in pondweed *Elodea canadensis*?

Hypothesis:

If only a fraction of the visible light spectrum is available , photosynthesis will become less effective

Observation:

Photosynthesis intensity using red filter : Oxygen production slowed down/ consistent increase in bubbles number



Conclusion:
The spectrum of the Light is relevant. Blue part of the spectrum is needed for photosynthesis.

Research Question:

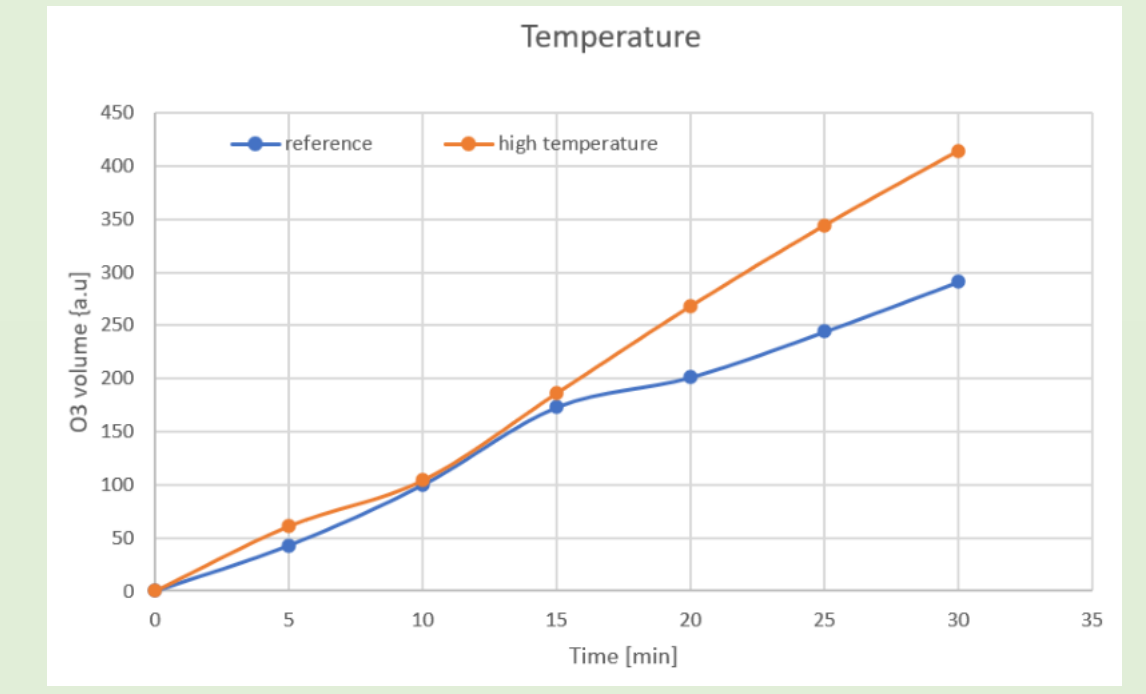
How does the water temperature influence the rate of photosynthesis in pondweed *Elodea canadensis*?

Hypothesis:

If the rate of photosynthesis will increase with increasing water temperature

Observation:

Photosynthesis intensity with increased water temperature : Oxygen production increased



Conclusion:
Increased water temperature leads into a higher rate of photosynthesis.



Research Question:

Will the content of carbon dioxide be reduced in the aqueous environment in the presence of the water plant (*Egeria densa*)?

Hypothesis:

The content of carbon dioxide in the aqueous environment in the presence of the water plant will be reduced

Observation:

Bottle filled only with soda water and kept in the dark (covered with aluminium foil) had pH value 5.5 (acidic due the carbon dioxide presence). The bottle with the water plant illuminated by the light (without aluminium foil) increased after 60 minutes the pH value to 6.5 (less acidic)

Time	reference		Egeria densa illuminated		Egeria densa covered with aluminium foil	
	colour	pH	colour	pH	colour	pH
0 min	orange	5.5	orange	5.5	orange	5.5
60 min	orange	5.5	light green	6.5	orange	5.5

Research Question:

Is there any difference in starch content between plant leaves exposed to sun and plant leaves kept in the dark for 24 hours?

Hypothesis:

The plant exposed to sunlight has a higher starch content than to the plant kept in the dark due the absence of photosynthesis.

The colour of the leaf before the experiment	Leaf kept in the dark	Leaf exposed to sunlight
	green	green
The colour of the leaf after it was boiled in the ethanol for 10 minutes	white (chlorophyll removed)	white (chlorophyll removed)
The colour of the leaf after you put the iodine solution on the leaf surface	reddish	black

Conclusion:

Glucose is the product of photosynthesis. It is stored in a plant as starch. In the absence of light starch is used as an energy source for the plant.



Research Question:

How does the density of stomata vary amongst leaf surfaces (upper versus lower surface of leaf)?

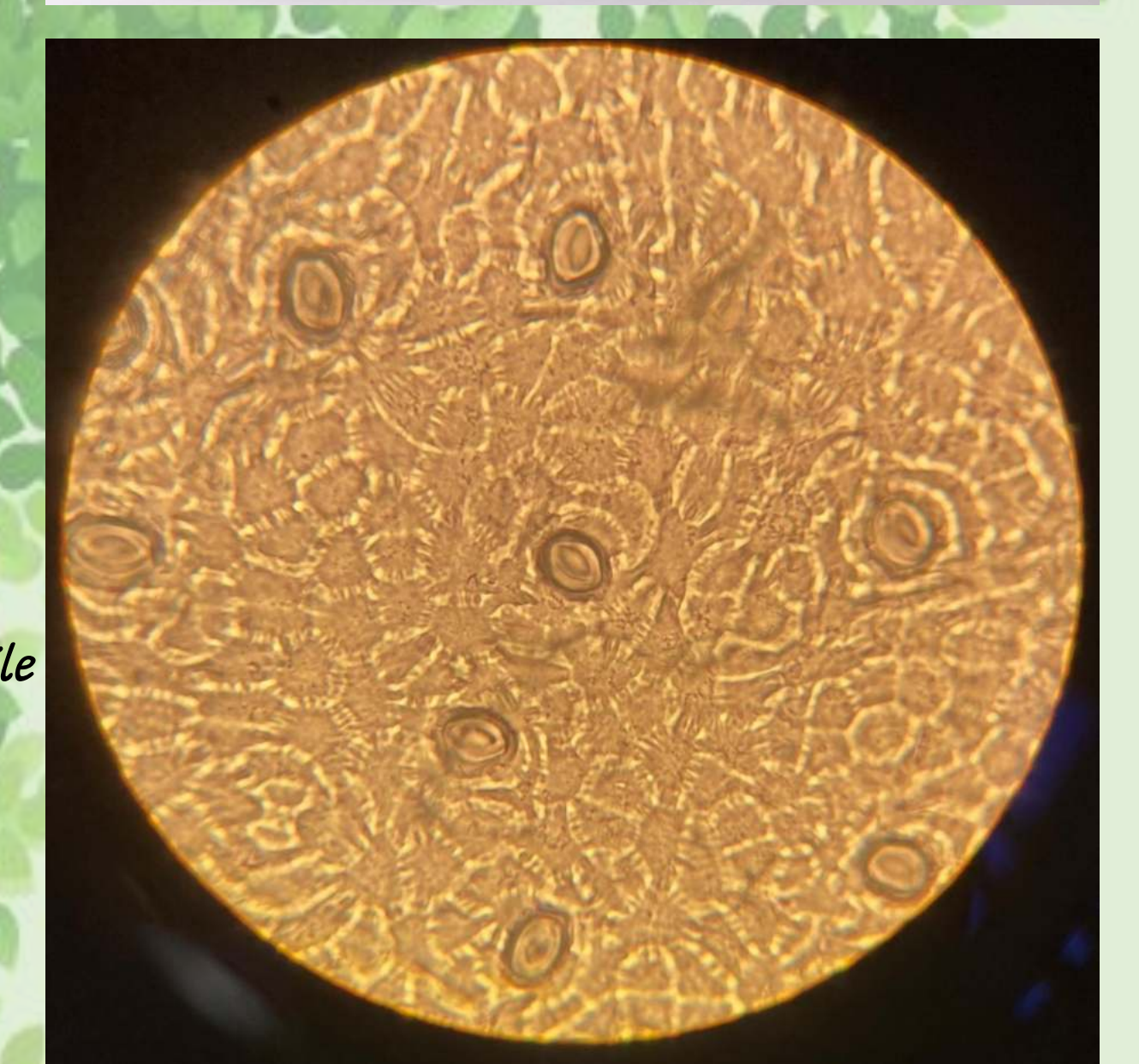
Hypothesis:

According to the maximal effectivity of the photosynthesis there will be higher amount of stomata in the lower epidermis of a leaf

	LOWER EPIDERMIS	UPPER EPIDERMIS
SURFACE AREA OF THE LEAF (A _L)	67cm ²	67cm ²
AVERAGE NUMBER OF STOMATA IN THE FIELD OF VIEW (N)	159	0
FIELD NUMBER	18	18
AUXILIARY LENS MAGNIFICATION	10	10
OBJECTIVE MAGNIFICATION	40	40
FIELD OF VIEW (FOV)	0.045	0.045
SURFACE AREA OF FIELD OF VIEW (A _{FOV}) IN CM ²	0.0000159	0.0000159
NUMBER OF STOMATA ON THE LEAF	669.818.854	0

Conclusion:

A dominant fraction of stomata is detected on the lower epidermis. The upper epidermis is optimized to absorb light while the lower epidermis is optimized for gas exchange.



Research Questions:

Does cytoplasmic streaming occur in plant cells? Why is it happening? How are the chloroplasts moving through the cell?

Hypothesis:

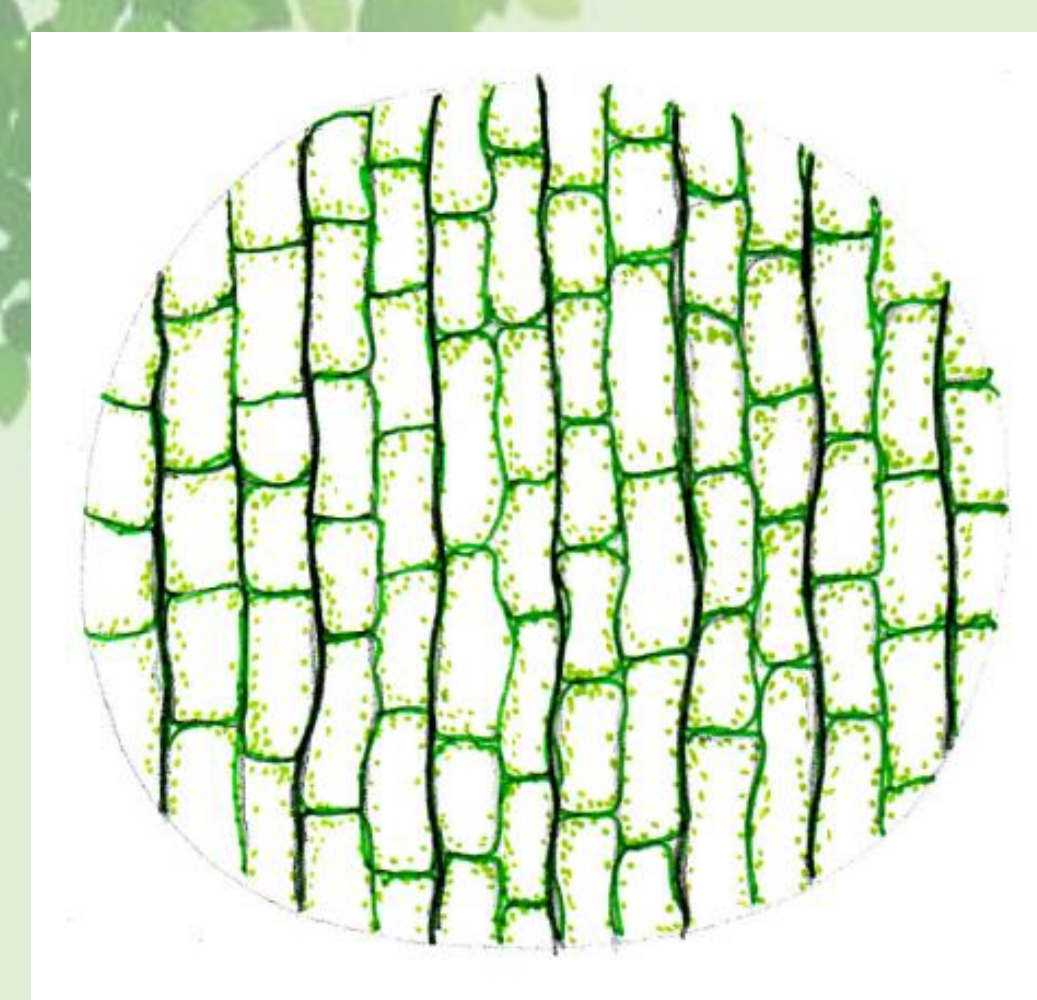
The movement of chloroplasts in the plant cells does occur

Observation:

Chloroplasts move around the periphery of the cell around the vacuole near the cell wall/ stopped after while

Conclusion:

Movement is necessary for effective photosynthesis for the optimal position/ stopped because the perfect position was achieved



Research Question:

Which plant pigments are present in the green leaves of spinach?

Hypothesis:

Present are the photosynthetic green pigments (chlorophyll a & chlorophyll b)

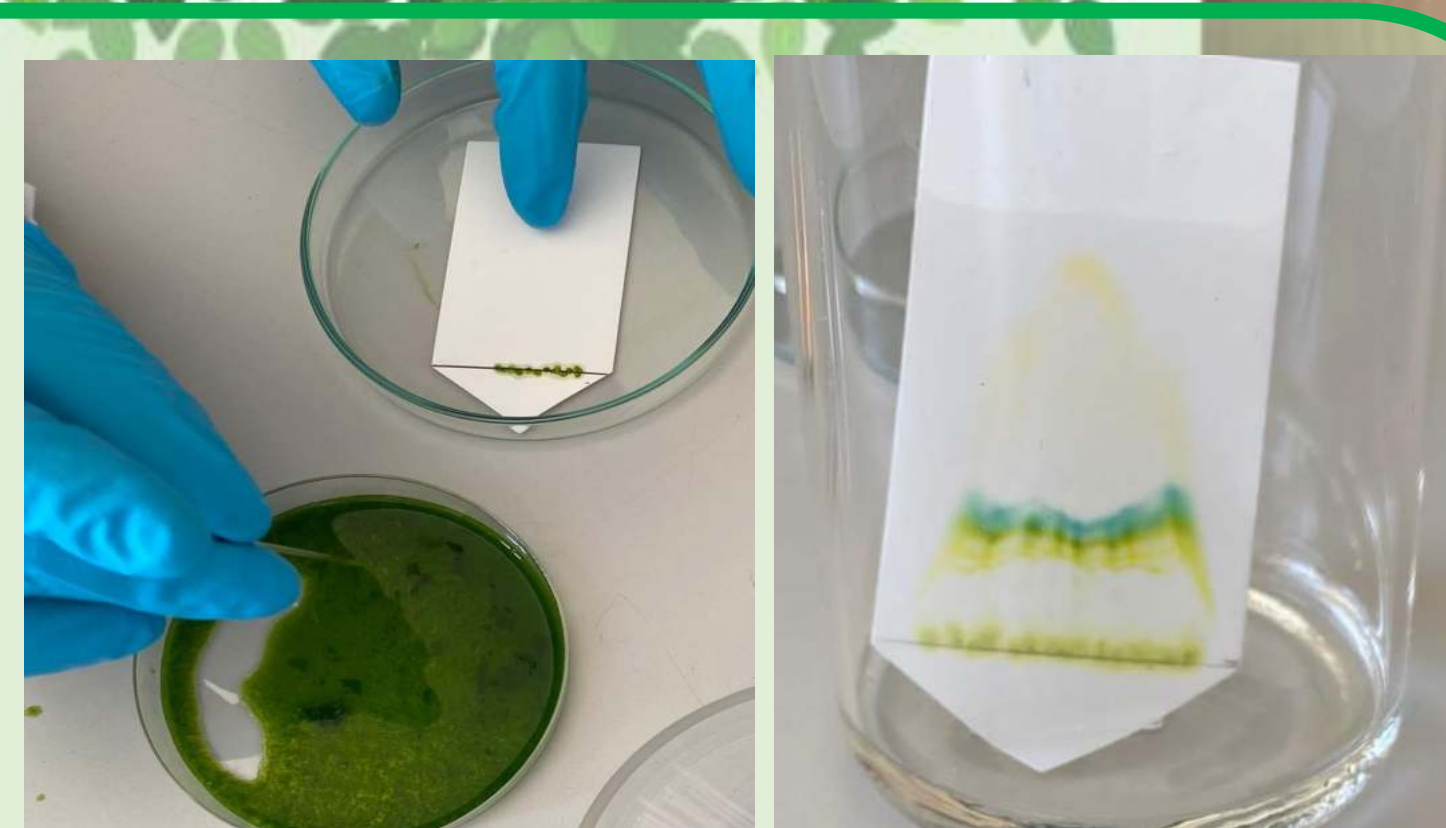
Observation:

The different types of pigments were carried along the chromatography paper not at the same rate. Various pigments were distributed at different distances from the point of origin.

PIGMENT	PIGMENT COLOUR	DISTANCE FROM ORIGIN	SOLVENT FRONT	Rf VALUE
XANTHOPHYLL	yellow	14mm	49mm	0.246
CHLOROPHYLL B	light green	21mm	49mm	0.368
CHLOROPHYLL A	dark green	29mm	49mm	0.509
CAROTENE	orange	53mm	49mm	0.929

Conclusion:

The colour of the leaf is defined by combination of various pigments. Based on the Rf value the following colours can be detected: xanthophyll, chlorophyll b, chlorophyll a, carotene.



Conclusion:

- A deep study of photosynthesis has been performed.
- Glucose and oxygen have been proven to be the products of the photosynthesis.
- The main effect of temperature, light intensity and light spectrum have been shown.