Chromoplasts (Item No.: P1441301)

Curricular Relevance

Area of Expertise: Biologie
Education Level: Klasse 7-10
Topic: Biologie der Zelle, Mikroskopie
Subtopic: Pflanzliche und tierische Zellen
Experiment: Chromoplasten

Difficulty	Preparation Time	Execution Time	Recommended Group Size
Easy	10 Minutes	30 Minutes	1 Student

Additional Requirements:

- Red pepper
- Blossom of Indian Cress (Tropaeolum majus)
- Fruit from a rose plant (Rosa spec.)
- Carrot (Daucus carota)
- Water

Experiment Variations:

Keywords:

Task and equipment

Information for teachers

Information

The fruits and blossoms of many plants possess intensively bright colors. The colorful fruit attracts animals, are devoured by them and the seeds are excreted at other places. This is how the plant is dispersed. Colorful blossoms attract insects that harvest nectar from the blossoms. Pollen are concomitantly transported from plant to plant. This ensures fertilization. Yellow and red pigments are mostly located in particular cell organelles, the chromoplasts.

Information on obtaining materials

Chromoplasts are present in all yellow, red, and orange parts of plant. The specimens proposed in the students' worksheet are particularly well suited, however, the students should be encouraged to examine fruits and flowers to which they have their own easy access. Children may bring colorful vegetables from the kitchen at home, or flowers from the garden. Blue and purple colored flowers are not suitable, since the pigment they mostly contain is an anthocyanin dissolved in the vacuoles. Rose fruits can be harvested from either wild roses or garden roses.

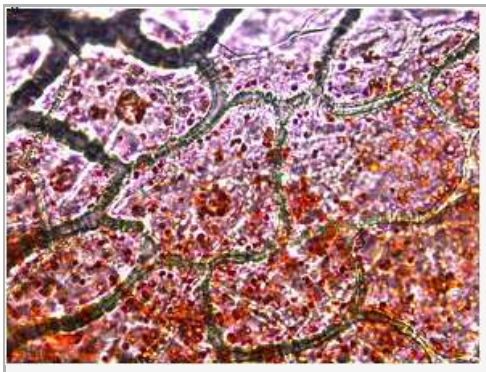
Information on chromoplasts

In the cytoplasm of plant cells, there are numerous plastids surrounded by thin membranes. These plastids are mostly oval and distinguishable according to their color. The most significant ones are naturally the chloroplasts because of photosynthesis.
The chromoplasts contain carotenes and xanthophylls. Occasionally, the color pigments are of significance to attract animals (for example, blossoms — insects, fruit — birds).

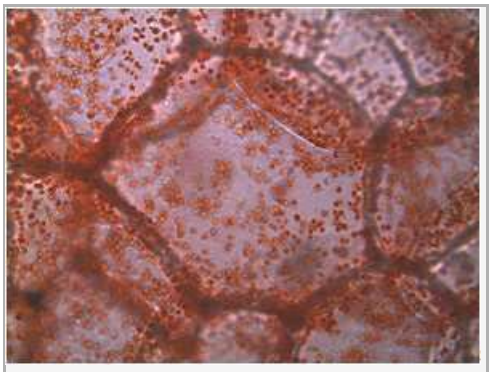
Information on practical performances

The students should understand the preparation instructions as an encouragement. The specimens may be peeled or cut to produce slides, although the carrot may also be scraped or the fruit pulp of the soft tomato squashed or crushed. It is important to observe that the slides turn out thin and hence become transparent.

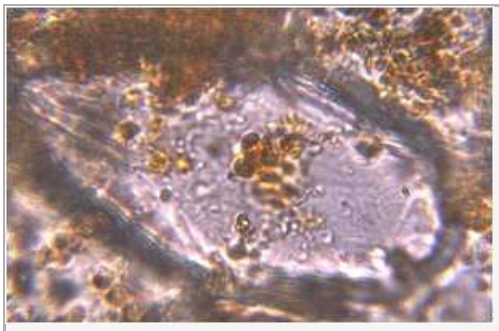
Additional information on the specimens (slides): all images are magnified 400-fold.



Red pepper: Dark-red pods are particularly suited and guarantee rapid success

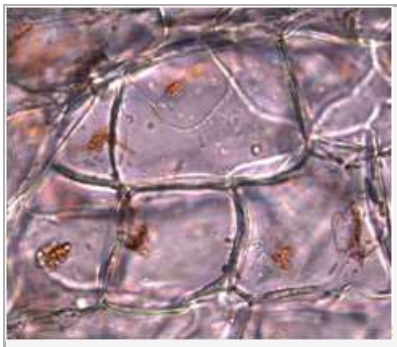


The fruit pulp of a red-pepper pod



Rose fruit: Fruits from garden roses can be used in this experiment. It is motivating for the students to collect and bring their own material.

The surface of the Indian cress blossom (Tropaeolum majus) looks velvety. The papilliform structure of the upper epidermis is clearly visible under the microscope.



Carrots can be easily cut and are therefore also suited for mounting soft plant parts (see Experiment 2.2 Manual cutting technique). The students are supposed to practice cutting with this material, in particular, in order to achieve reliance in applying the method.

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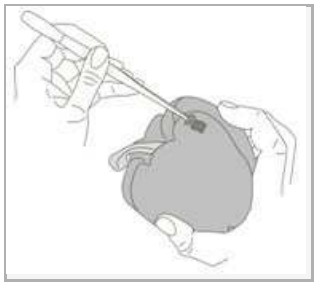
Task and equipment

Task

Describe shape and arrangement of the chromoplasts in a plant cell!



Equipment

Position No.	Material	Order No.	Quantity
1	Euromex BioBlue BB.4250 microscope	EUR-BB-4250	1
2	Microscopic slides, 50 pcs	64691-00	1
3	Cover glasses 18x18 mm, 50 pcs.	64685-00	1
4	Beaker, low form, plastic, 100 ml	36011-01	1
5	Dropping pipette with bulb, 10pcs	47131-01	1
6	Tweezers,straight,pointed,120mm	64607-00	1
7	Scalpel holder	64615-00	1
8	Scalpel blades,rounded tip,10 off	64615-02	1

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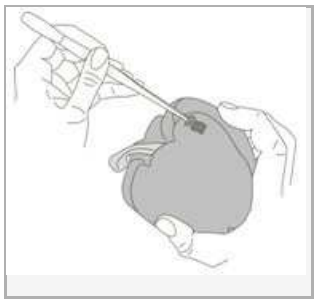
Set-up and procedure

You may examine various yellow or red fruits or blossoms. Here, some suggestions are made how you shall proceed.
1. Preparation of the slide: red pepper – fruit skin

- Pipette a drop of water onto the slide.
- Peel off a piece of skin from the red-pepper fruit using forceps.



The skin is placed directly into the drop of water, covered, and examined under the microscope.

2. Slide preparation: Indian cress – floral leaf

- Pipette a drop of water onto the slide.
- Place a yellow or red floral leaf over your finger and make a thin superficial section with the scalpel.
- The specimen is placed directly into the drop of water, covered, and examined under the microscope.

3. Slide preparation: Rose – fruit pulp

- Pipette a drop of water onto the slide.
- Cut off a thin piece of fruit from the red fruit of a rose plant (hip). The homogenous fruit pulp is to be examined, not the ovule.

- The specimen is placed directly into the drop of water, covered with a cover slip, and examined under the microscope.

Report: Chromoplasts

Result - Observations 1

Examine the specimens under the microscope with increasing powers. Draw a cell of the first object (e.g. red pepper). Use colors to demonstrate the location and the number of chromoplasts.

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Result - Observations 2

Examine the specimens under the microscope with increasing powers. Draw a cell the second object (e.g. red pepper pod). Use colors to demonstrate the location and the number of chromoplasts.

Result - Observations 3

Examine the specimens under the microscope with increasing powers. Draw a cell of the third object (e.g. rose fruit). Use colors to demonstrate the location and the number of chromoplasts.

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Result - Observations 4

Examine the specimens under the microscope with increasing powers. Draw a cell of the fourth object (e.g. Indian cress blossom). Use colors to demonstrate the location and the number of chromoplasts.

Result - Observations 5

Examine the specimens under the microscope with increasing powers. Draw a cell of the fifth object (e.g. carrots). Use colors to demonstrate the location and the number of chromoplasts.

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