Colored fabrics (1. LF UK, NT)

Compounds that affect the color of food are called coloring substances. (Color is a visual sensation, dye is a colored substance).

Origin

Primary substances:

- Natural component of food;
- natural component of other materials (microorganisms, algae, higher plants), use as additives.

Secondary substances:

- Enzyme reactions (enzyme browning reactions);
- chemical reactions (reactive dyes).

Synthetic substances:

- Use as additives.

When evaluating the organoleptic properties of food, we can notice color defects.

Natural dyes

Notable groups:

- **Tetrapyrrole dyes** - vegetable, animal
  - Heme dyes, chlorophyll dyes
- **Betalain dyes'** - vegetable
  - Betacyanins
  - Betaxanthins
- **Flavonoid dyes'** - vegetable
  - Anthocyanins
  - Anthoxanthins
- **Phenolic and quinoid dyes'** - vegetable, animal
  - Phenols
  - Quinones
- **Carotenoid dyes** - vegetable, animal
  - Carotenes
  - Xanthophylls

Tetrapyrrole dyes

Tetrapyrrole dyes

Chlorophyll pigments

Chlorophyll pigments

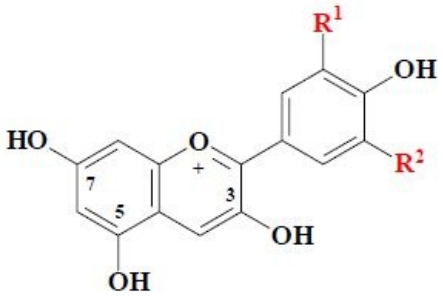
Betalain dyes

Betalain dyes

Flavonoid dyes

Flavonoid dyes

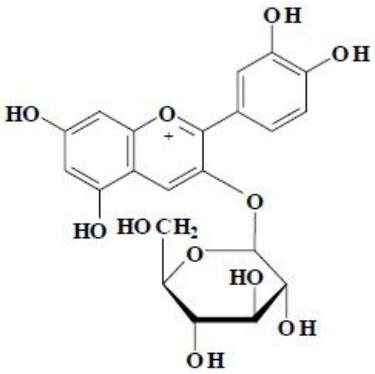
Anthocyanins

- **Basic structure** 

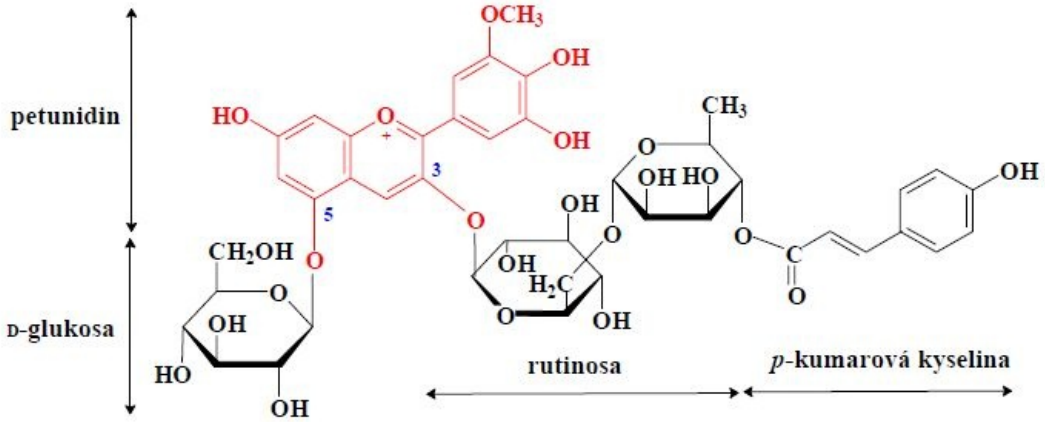
- Pelargonidin Pg... R1 = H, R2 = H violet-red
- Cyanidin Cy... R1 = H, R2 = OH purple
- Delfinidin Dp... R1 = OH, R2 = OH blue-violet
- Peonidin Pn... R1 = H, R2 = OCH3 violet
- Petunidin Pt... R1 = OH, R2 = OCH3 dark red
- Malvidin Mv... R1 = OCH3, R2 = OCH3 blue-violet

- **Carbohydrates**: Glu, Gal, Xyl, Ara, Rha, always C-3, often C-3 and C-5, rarely C-7
- **Acids:** p-coumaric, caffeic, ferulic

Examples:

- Cyanidin-3-O-β-D-glucoside (generally known) 

- (E)-petunidin-3-O-[6-O-(4-O-p-kumaroyl-α-L-rhamnopyranosyl)-β-D-glukopyranosid]-5-O-β-D-glukopyranosid

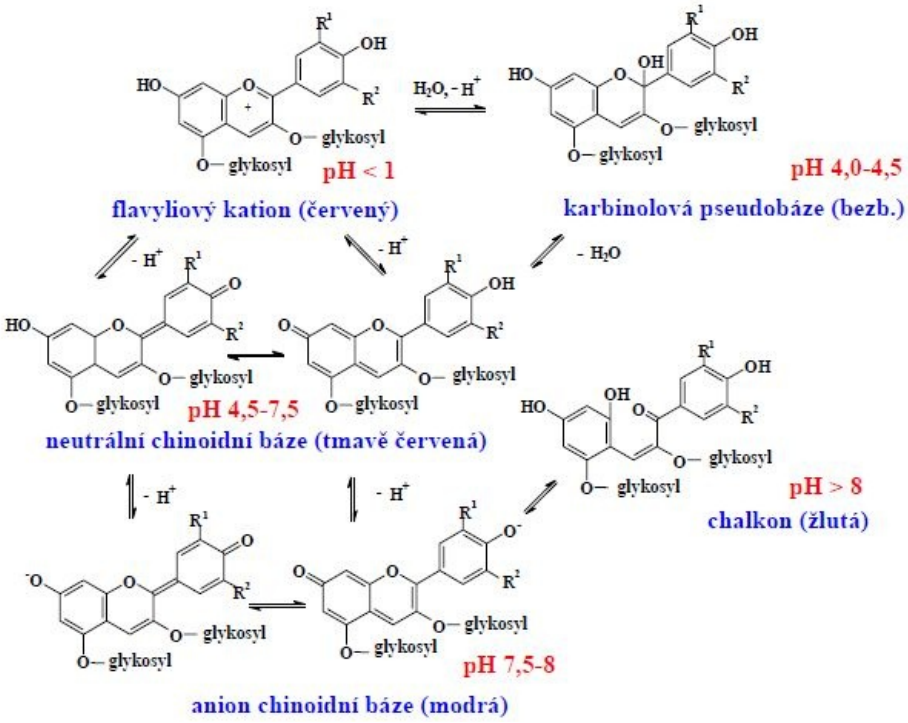


  - Trivially: petanin (red potato variety)

Anthocyanins of fruits and vegetables

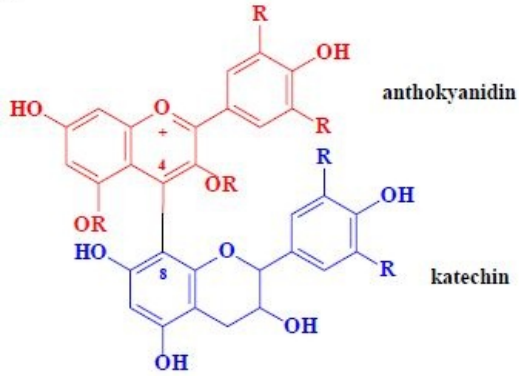
- Dependence of coloration on various factors:
  - pH of the environment;
  - Copigmentation, or transformation to other dyes;
  - sulphur dioxide;
  - hydrogen peroxide

pH of the medium

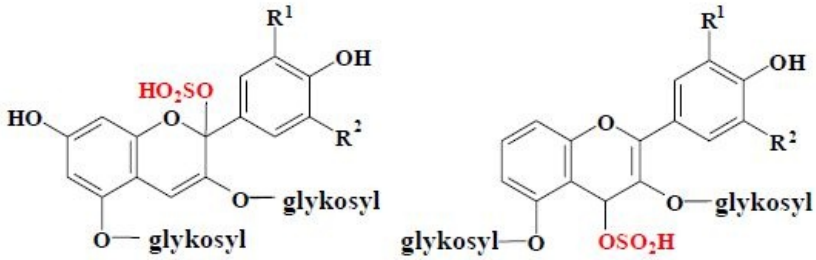


- Copigmentation
  - Interaction with procyanidins (e.g. catechins, so-called copigments) → colour complex.
- Transformation to other dyes, colour complex → dimer (oligomer), insoluble condensation products, sediments

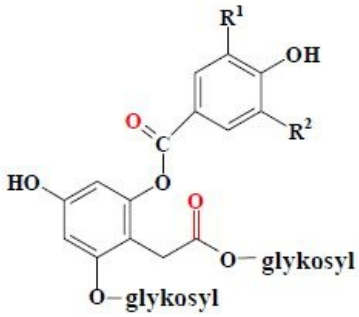
phlobaphenes.



- Sulphur dioxide → colourless sulphonic acids.



- Hydrogen peroxide → colourless products.



Anthoxanthins

Anthoxanthins

Chinoid dyes

Chinoid dyes

Carotene dyes

Carotene dyes

Enzyme browning reaction

Enzymatic browning reaction

Links

- Tetrapyrrole dyes
- Chlorophyll pigments
- Betalain dyes
- Flavonoid dyes
- Anthoxanthins
- Chinoid dyes]
- Carotene dyes

Source

- ws: Látky barevné (1. LF UK, NT)
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