

# Phytochemicals

- ▶ Obtained from herbal materials such as fruit, vegetables, legumes, cereals, nuts
- ▶ Non-nutritious chemicals which form the basis of a healthy diet
- ▶ Specific phytochemicals have important roles in prevention and treatment of diseases but phytochemicals are not essential nutrients.

# Sources of Phytochemicals

- ▶ Vegetables and fruit
- ▶ Plants belonging to Cruciferae family
- ▶ Garlic
- ▶ Legumes
- ▶ Nuts
- ▶ Cereals

# Some Important Phytochemicals

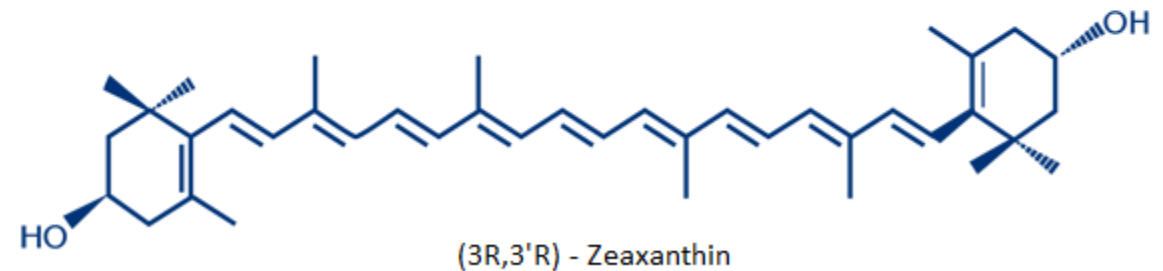
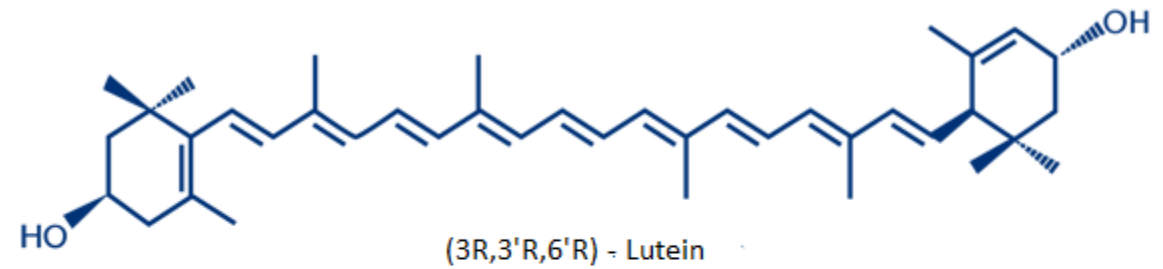
- ▶ Carotenoids
- ▶ Chlorophyll
- ▶ Fiber
- ▶ Flavonoids
- ▶ Indol-3-carbinol
- ▶ Isoflavones
- ▶ Isocyanates
- ▶ Lignans
- ▶ Phytosterols

# Phytochemicals - examples

- ▶ Lycopene – tomato – antioxidant
- ▶ Soy isoflavones – phytoestrogenic
- ▶ Carotenoids – carrot – antioxidant
- ▶ Polyphenols – tea, grape – antioxidant
- ▶ Allyl sulfur – garlic, onion, leek – antibacterial
- ▶ Capsaicin – chili pepper- anticarcinogenic
- ▶ Saponins – anticarcinogenic
- ▶ Indols – cabbage – enzyme stimulation
- ▶ Resveratrol – grape - antioxidant

# Lutein and Zeaxanthin

- ▶ Carotenoid structure
- ▶ Stereoisomers
- ▶ Found in plants, algae and photosynthetic bacteria.
- ▶ Lutein is one of the most common carotenoids in serum and is found abundantly in ocular tissue such as lens and yellow zone.



# Lutein and Zeaxanthin

- ▶ Lutein and zeaxanthin are responsible for the formation of yellow pigment in the retina. Yellow pigments play an active role in protecting the eye from light and may prevent retinal damage
- ▶ They have a protective role against macular degeneration and cataract development induced by aging.
- ▶ Provide filtration of phototoxic blue light and near-ultraviolet radiation
- ▶ More resistant against decomposition by prooxidants than other antioxidants

# Foods Containing Lutein and Zeaxanthin

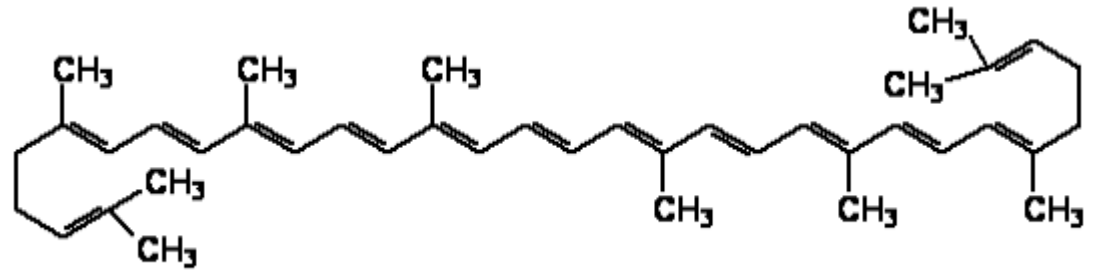
- ▶ Corn
- ▶ Egg yolk
- ▶ Green vegetables and fruits (peas, zucchini, cabbage, spinach, lettuce, kiwi, nettle etc.)
- ▶ Seaweeds
- ▶ Petals of yellow flowering plants

# Lutein and Zeaxanthin

- ▶ Each egg yolk contains 290  $\mu\text{g}$  lutein, 210  $\mu\text{g}$  zeaxanthin.
- ▶ Reduce the risk of macular degeneration at 6.9-11.7 mg daily dose



# Lycopene



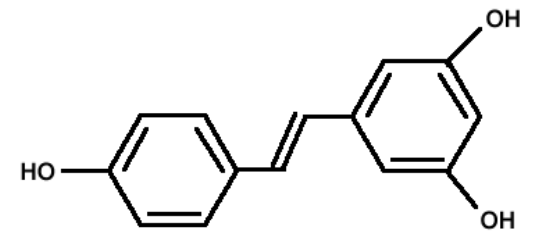
- ▶ Lycopene is the most common carotenoid in tomato and forms 80-90% of the pigments found in tomato.
- ▶ *Lycopersicum esculentum*
- ▶ Lycopene content varies according to the variety and maturity of tomato.
- ▶ Watermelon, rosehip, pink guava, papaya, pink grapefruit, carrot and pumpkin are other sources of lycopene.

# Lycopene

- ▶ Protects the organisms from the toxic effects of light and oxygen
- ▶ Protective against cancer, especially prostate cancer and coronary heart disease
- ▶ Antioxidant
- ▶ Decreases LDL level of blood
- ▶ The highest antioxidant effect among all carotenoids.

# Resveratrol

- ▶ It is a phytochemical that is included in the group of «phytoalexins» which some plants produce in order to protect themselves from pathogen infections such as fungal or bacterial infections.
- ▶ Grape – *Vitis vinifera*



Resveratrol

# Resveratrol

- ▶ Cardioprotective
- ▶ Protective against cancer
- ▶ Antioxidant
- ▶ Phytoestrogenic