

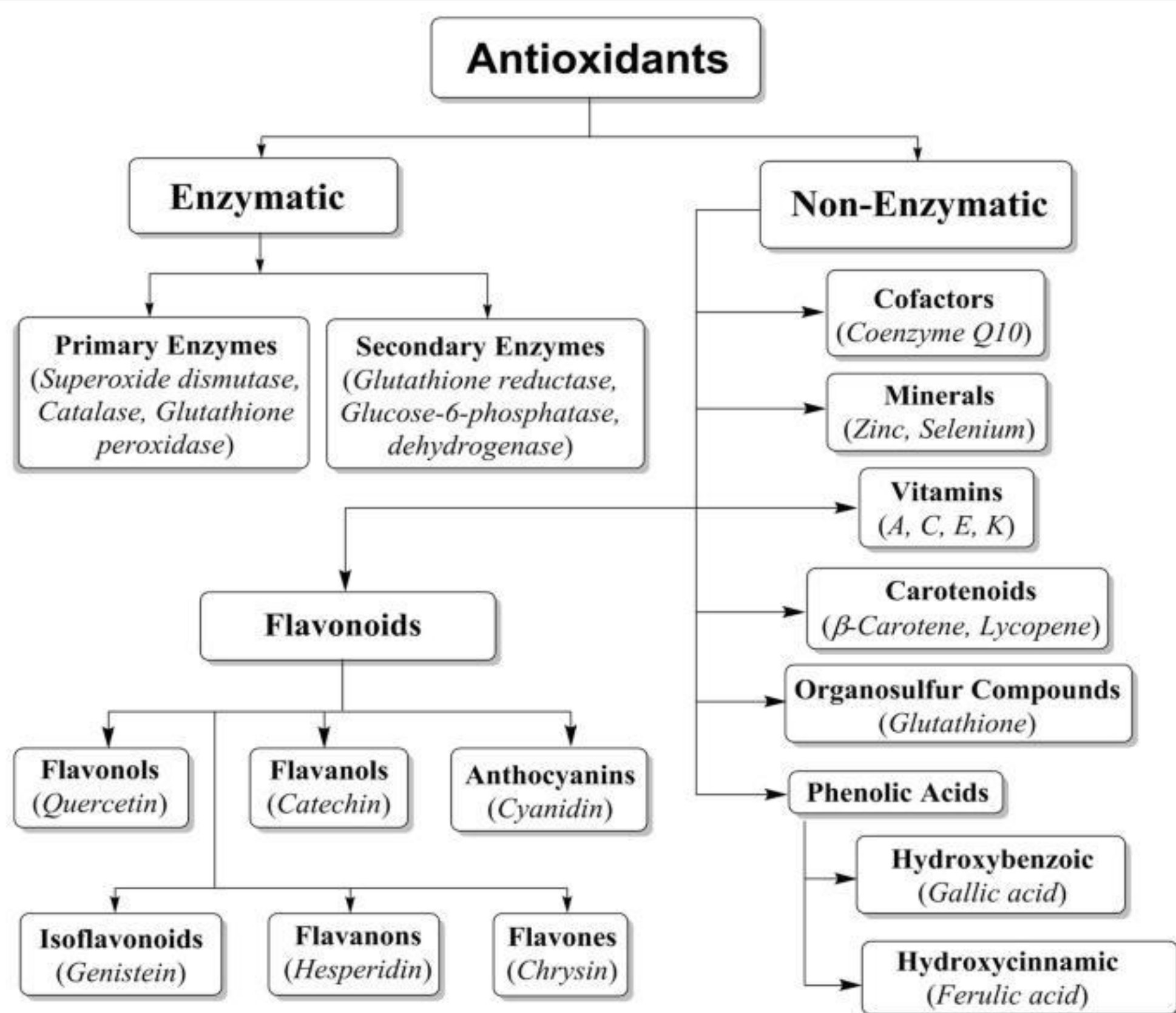
Natural antioxidant: A review of their source, properties and health benefits

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INTRODUCTION

- Antioxidants help promote good health and prevent diseases like cancer and heart disease.
- They are also used as food preservatives to prevent spoilage.
- In the mid-20th century, scientists discovered that adding antioxidants to foods with high unsaturated fats could stop rancidity, preventing bad smell and taste.
- Antioxidants can be defined as substances that trap harmful forms of oxygen and prevent them from damaging cells

TYPES OF NATURAL ANTIOXIDANT



Mechanisms of action

The two possible pathways are chain-breaking and preventive.

- **Chain-breaking:** When a free radical releases or abstracts an electron, a second radical is formed. This molecule then turns around and does the same thing to a third molecule, continuing to generate more unstable products. The process continues until termination occurs, either the radical is stabilized by a chain-breaking antioxidant such as β -carotene and vitamins C and E, or it simply decays into a harmless product.
- **Preventive:** Antioxidant prevents oxidation by reducing the rate of chain initiation. That is, by scavenging initiating radicals, such antioxidants can thwart an oxidation chain from ever setting in motion. They can also prevent oxidation by stabilizing transition metal radicals such as copper and iron.

Application of antioxidants

- ✓ Food Industry – Prevents spoilage and extends shelf life.
- ✓ Medicine – Used in anti-aging products, heart disease prevention.
- ✓ Cosmetics – Helps in skincare, reduces oxidative stress.
- ✓ Industrial Use – Preserves plastics, rubbers, and fuels.

SOURCE OF NATURAL ANTIOXIDANT

Antioxidants are obtained from both vegetarian and non-vegetarian diets.

- Common dietary antioxidants include **Vitamin C, Vitamin E, β -carotene, and Coenzyme Q.**

Vitamin E

- Found in **vegetable oils** and **wheat germ**.
- A **fat-soluble vitamin**, absorbed in the gut and transported via lipoproteins.
- Exists in **8 natural isomeric forms**, with **α -tocopherol** being the most potent.
- Helps prevent **lipid peroxidation** of plasma membranes.

Plant-Based Antioxidants

Plants (fruits, vegetables, medicinal herbs) contain various free radical scavenging compounds:

- **Phenolic compounds** – Phenolic acids, flavonoids, quinones, coumarins, lignans, stilbenes, tannins.
- **Nitrogen compounds** – Alkaloids, amines, betalains.
- **Vitamins and terpenoids** – Including **carotenoids**.
- Other **endogenous metabolites** with strong antioxidant activity.

Uses of antioxidants in technology

- ✓ Antioxidants play a vital role in protecting against oxidative stress, which contributes to diabetes, cancer, cardiovascular diseases, and aging-related conditions.
- ✓ They help neutralize harmful free radicals, support immune function, and regulate genes to prevent disease. While they can modulate inflammation and reduce oxidative damage, their effectiveness remains debated. Nonetheless, a diet rich in antioxidants is essential for overall health.

Health benefits and risks:

Due to the power of natural antioxidants to prevent the generation of free radicals, it has been found that they are particularly useful in preventing certain diseases.

However, though it is apparent that natural antioxidants have many positive effects on health, it should also be taken into consideration that they could also have harmful effects if taken in excess.

CONCLUSION

Antioxidants help prevent food oxidation, but both synthetic and natural types require careful use. Synthetic antioxidants work at low doses but can be harmful in excess, while natural ones aren't always risk-free. To maximize antioxidant benefits, eat a variety of colorful fruits and vegetables.

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