**Phenolic Compounds**

Plant-based foods contain significant amounts of bioactive compounds, which provide desirable

health benefits beyond basic nutrition. Epidemiological evidence suggests that consumption of a diet rich in vegetables and fruits has positive implications for human health. In the last decades, special attention has been paid towards edible plants, especially those that are rich in secondary metabolites (frequently called phytochemicals).

Most of the antioxidative effect related to plant food intake is mainly due to the presence of phenolic compounds and these have been related to the reduction of the risk of chronic diseases including cardiovascular diseases and cancer.

Phenolic compounds are a large group of phytochemicals widespread in the plant kingdom. Depending on their structure they can be classified into simple phenols, phenolic acids, hydroxycinnamic acid derivatives and flavonoids. Phenolic compounds have received considerable attention for being potentially protective factors against cancer and heart diseases, in part because of their potent antioxidative properties and their ubiquity in a wide range of commonly consumed foods of plant origin.

In recent years, considerable attention has been directed towards the identification of natural antioxidants, namely those plant derived that may be used for human consumption regarding health promotion and disease prevention.

Phenolic compounds is a generic term that refers to a large number of compounds (more than 8,000) widely dispersed throughout the plant kingdom and characterized by having at least one aromatic ring with one or more hydroxyl groups attached. Phenolics are produced in plants as secondary metabolites via the shikimic acid pathway. Phenylalanine ammonialyase (PAL)

is the key enzyme catalyzing the biosynthesis of phenolics from the aromatic amino acid phenylalanine.

Classification of Phenolic compounds

Phenolic compounds can be classified based on the number and arrangement of their carbon atoms in flavonoids (flavonols, flavones, flavan-3-ols, anthocyanidins, flavanones, isoflavones and others) and non-flavonoids (phenolic acids, hydroxycinnamates, stilbenes and others) and they are commonly found conjugated to sugars and organic acids. The most widespread and diverse group of polyphenols are the flavonoids (mainly flavonols but also anthocyanins) and the hydroxycinnamic acids.

Flavonoids

Flavonoids are polyphenolic compounds comprising fifteen carbons with two aromatic rings connected by a three-carbon bridge, hence C6-C3-C6. They are the most numerous of phenolics and are found throughout the plant kingdom. They are present in high concentrations in the epidermis of leaves and fruits and have important and varied roles as secondary metabolites, being involved in processes like UV protection, pigmentation, stimulation of nitrogen-fixing nodules and disease resistance. Flavonols are the most widespread of the flavonoids.