# Flavonoids and the Structure-Antioxidant Activity Relationship

**Daniela Russo**

Department of Science, University of Basilicata, Potenza, Italy

## Editorial

**For thousands of years, plants have been well documented for their medicinal uses and nowadays, about 80% of world population is dependent on traditional medicines [1]. He knowledge associated with traditional medicine has promoted further investigations of medicinal plants as potential medicines and has led to the isolation of many natural products. Herbal medicine materials consist in juices, gums, essential oils and any other natural substances containing as bioactive components, underground and aerial plant parts or other plant materials, in the crude state or as plant preparations. Among all natural bioactive products, flaYonoLds represent a group of phenolic compounds widely distributed in the plant kingdom and they have a positive eِect on human health. In plants, flaYonoLds are synthetized via phenylpropanoid biosynthetic pathway and their structural feature is a 2-phenyl-benzo-γ-pyrane nucleus including two aromatic rings (A and B rings) and a pyran heterocyclic ring (C ring). He A-ring originates from the cyclization of 3 molecules of malonyl CoA and it is linked to B-ring, derived from phenylalanine, by a three-carbon bridge (C-ring). He great variability of the flaYonoLds is due to the dLِerences in the ring structure of the aglycone and in its state of oxidation/reduction, in the hydroxylation state of the aglycone and in the positions of the hydroxyl groups and in the derivatisation of the hydroxyl groups with methyl groups, carbohydrates, or isoprenoids. He main substituents are hydroxyl, methoxyl, or glycosyl, which can be further, substituted forming chemical structures very complex. &lassLficatLon of flaYonoLds into subclasses is based on the functional groups in the C ring and they include anthocyanidins, flaYanols, flaYones, flaYonols, flaYanones, and LsoflaYonoLds. He antioxidant properties of flaYonoLds are important in determining their role as protective agents against free radicals. He\ are able to scavenge a wide range of reactive species, including hydroxyl radicals and superoxide radical and they can also inhibit biomolecular damage by peroxynitrite. He\ are also known to exhibit antibacterial eِects, enzyme inhibition, antimicrobial activity, antimutagenic and antL-Lnflammator\ activities in bacteria and mammalian, respectively [2]. Proanthocyanidin-rich extracts from grape seeds also display anticataract activity in rats [3]. Due to their antioxidant activity, flaYonoLds have been reported to have positive eِects on cancer, cardiovascular disease, immune disorders, microbial infections, neurogenerative disease and viral infections [4-7]. He\ can participate in protection against the harmful action of ROS (Radical Oxygen Species); further they have multiple applications in food, cosmetic and pharmaceutical industries.**