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Brief Characteristics of Flavonoids

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Annotation: Flavonoids are the most numerous class of natural phenolic compounds, which are characterized by structural diversity, high and versatile activity and low toxicity. Due to their remarkable antioxidant properties, flavonoids are used in the food, cosmetic and pharmaceutical industries. Medicinal plants containing phenylpropanoids and flavonoids are a promising source of adaptogenic, tonic, nootropic, antidepressant, anxiolytic, immunomodulatory, hepatoprotective, antioxidant drugs.

Keywords: Flavonoids, (C6-C3-C6), secondary metabolites, flavonols.

Introduction. Nutrition is one of the most important aspects needed to lead a healthy life. A balanced diet includes foods of plant origin and contains non-starch polysaccharides, biologically active compounds, poly/monounsaturated fatty acids and polyphenols.

Polyphenols are a class of compounds that are produced by plants as secondary metabolites and play an important role in reproduction and pigmentation, and also help plants fight pathogens. [1,2]. Flavonoids are hydroxylated polyphenols with two or more aromatic rings connected by a heterocyclic pyran and at least one aromatic hydroxyl group attached (Figure 1) [3].

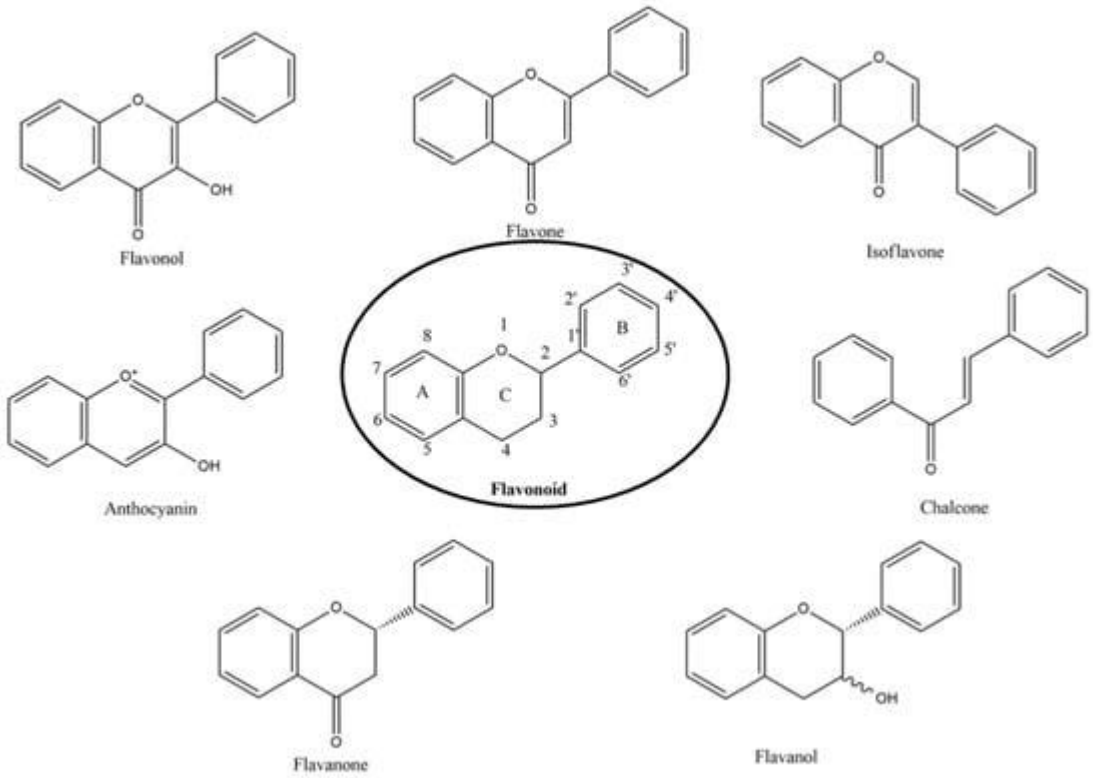

Fig. 1: Structure of various groups of flavonoids [3].

Flavonoids (from Latin flavus - yellow, Latin suf. -on-, Greek eidos - type) are phenolic compounds containing in their structure a fragment of diphenylpropane (C6-C3-C6) and are most often derivatives of 2-phenylchroman (flavan) or 2-phenylchromone (flavone). The term “flavonoid” was proposed in

1949 by the English scientist Geissman, more than a century after the isolation of the first flavonoid quercetin (Quercus), not only for flavones - yellow substances, but also for other compounds of flavonoid nature that have a different color - white or colorless (flavanones), orange (aurons, chalcones), red, crimson, blue (anthocyanins) [4].

Flavonols, which include, for example, quercetin, kaempferol, fisetin, isorhamnetin and myricetin, are found in abundance in green leaves, fruits and grains. For example, lettuce, cranberries, apples, peaches and red peppers are rich in quercetin and kaempferol. Spinach leaves contain high amounts of rutin, spinacetin glycosides and patuletin glycosides, while broccoli, cabbage, endive, potatoes, onions, grapes and tomatoes contain more kaempferol 3-O-glycosides. Myricetin can be found in nuts, berries, tea, and red wine [5].

Flavonoids are the most numerous class of natural phenolic compounds, which are characterized by structural diversity, high and versatile activity and low toxicity. The wide range of biological activity of flavonoids is associated with the diversity of their chemical structures and the resulting various physicochemical properties. This interest is associated with the fact that flavonoids, being evolutionarily adequate to the human body, provide antioxidant, angioprotective, hepatoprotective, choleretic, diuretic, neurotropic and other important pharmacological properties [6].

Although the exact mechanism of action of flavonoids remains to be studied, they are known to exhibit anti-inflammatory properties by acting on multiple mechanisms. Various flavonoids have unique ways of reducing inflammation; many studies have focused on the different types of flavonoids and their mode of action. They are also known to be potent inhibitors of several enzymes such as xanthine oxidase (XO), cyclooxygenase (COX), lipoxygenase and phosphoinositide 3-kinase [7].

Based on the study of the physicochemical, chemical, spectral and pharmacological properties of phenylpropanoids and flavonoids, the feasibility of creating a whole range of import-substituting medicines has been substantiated.

Conclusion: Thus, medicinal plants containing phenylpropanoids and flavonoids are a promising source of adaptogenic, tonic, nootropic, antidepressant, anxiolytic, immunomodulatory, hepatoprotective, and antioxidant drugs.

Due to their remarkable antioxidant properties, flavonoids are used in the food, cosmetic and pharmaceutical industries

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