

Editorial

Phenolic Compounds: Natural Antioxidants, Other Benefices and Future Perspectives

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From the history of humanity, man had used the nature for their basic needs: food-stuffs, clothing, fertilizers, flavour and fragrances, etc. In ancient cultures plants have formed the basis of traditional medicines systems and have been used their extracts as fragrances, cosmetic and/or therapeutic products. Over time the interest in nature as a source of potential therapeutic agents for the treatments of different diseases and affection continued [1]. The last century with the technology advances, the use of plants as natural products decreased due to the implementation of combinatorial synthesis techniques that could generate synthetic analogs of biomolecules produced for different plants. It has been estimated that one quarter of today medical prescriptions are formulations based on substances derived from plants or synthetic analogs, but since we have better understanding of the body functions and plant physiology we are in better position to understand the healing powers of plants and their potential used as multi-functional chemical entities for the treat of different health conditions [2]. Nowadays, lot of researchers have focused their investigation in the identification, isolation and/or extraction of biomolecules from plants with potential used in cosmetic and pharmaceutical industry. This change in approach could be attributed to different causes; despite the fact that combinatorial synthesis techniques could produce large number of molecules, is limited in the reaction types that could be used to generate the molecules. Other reason could be the increasingly regulatory and safety rules due to the potential damage given by the use and consume of chemical synthesis products over the human health. Even, the increasing globalization had made that the knowledge of ancient and modern cultures mix in a complementary way for the treatment of serious conditions, for chronic illnesses or to reduce symptoms and improve the quality of life [3].

An amount of investigation had focused their researches in biomolecules and their uses. One type of biomolecules that is on the upswing in the field of science are the polyphenols. These compounds are produced by a large amount of plant species as secondary metabolites. One of the main roles of these metabolites is to reduce the level of Reactive Oxygen Species (ROS) produce in the plant due to some environmental signal or stress [4]. Polyphenols are monomer or polymers of chemical compounds formed by a

phenolic ring bonded with reactive groups such as hydroxyl which react with the free radical of the ROS [5]. Animals and plants cells produce ROS. These molecules have an important role in the cells as signaling and/or homeostasis, but when the level of ROS increases, caused toxicity damage to cellular structure and a rapid cell aging. That is why plants cells produce these secondary metabolites as antioxidant mechanism, and the use of plant derived foods with Polyphenols could help to avoid the oxidation process animal cells caused by some diseases or affections. Also, some Polyphenols that had been extracted and identified from different plant species had shown to have antimicrobial, antifungal and/or antiviral functions [6]. All of these benefits attributed to this type of biomolecules had enhanced the interest in the study of the Polyphenols, especially in plants-derived foods or species that growth in adverse environment producing these compounds to survive [7,8].

Actually, there are a variety of techniques to isolate and identify Polyphenols. This breath of methodologies is attributed to the variety of plant species and type of extracts that contain different classes of phenolic compounds with different chemical properties and in some cases, are found at low concentration levels [9]. The advances in chromatography separation techniques have enabled researchers to elucidate Polyphenols structures. The most successful techniques are with the uses of High Performance Liquid Chromatography (HPLC), generally with tandem mass (MS/MS). Another step to take into account is the pre-treatment of the samples used for determination due to could help to a better isolation of the compound of interest. There are a variety of extraction techniques, most of them based in the polarity of the solvents and the test compounds. The most used extraction techniques in plant tissues or food samples are the Liquid-Liquid Extraction (LLE). This type of pre-treatment is the most chosen by researchers due to their simplicity and low-cost compared with separation techniques based in Solid Phase- Extraction (SPE) The LLE used a wide range of solvents and combinations depending on the complexity and composition of the sample. The most selected solvents are methanol, water, acetone, acetonitrile amount others, in different concentration and combinations [10,11]. Before or after the phenolic compounds are identified the antioxidant capacity of the extract could be determined. Most of the techniques used are reactions based on the use of solution with free radicals. These techniques are known as free radical scavenging assay. These techniques used solution of superoxide, hydrogen peroxide, hypochlorous acid, hydroxyl radical, peroxy radical or sometimes a technique known as Total Radical Trapping Antioxidant Parameter (TRAP) or Oxygen Radical Absorbance Capacity (ORAC). Others compounds used which produced radical cation are 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) or, 2,2-diphenyl-1-picrylhydrazyl (DPPH) [12].

Beside the already known antioxidant role of these compounds, several researches had demonstrated that some Polyphenols

have another properties and benefits such anticarcinogenicity, antimutagenicity, anti-allergenicity, anti-aging, antibacterial, antifungal and antiviral activity that make that the study of these compounds been really important for pharmaceutical industries. All of the favourable properties that phenolic compounds promise had focus their interest in different areas of research. One of them is the identification and quantification from foods, their benefits when they are includes in the regular diet and the advantages over the metabolism or to affront some diseases. Another is the extraction and isolation from plant tissues (includes or not in the human diet) or even from residual sources, and their large-scale production from bioreactors to be used in cosmetic products or medicines [13]. In the actual industries natural products and their derivates represent more than 50% of drugs in clinical use in the word and foods and cosmetic publicity used their name and properties to enhance their benefits.

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