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Free radicals, antioxidant activities in fruit crops and their importance as phytomedicines

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Abstract : Free radicals are well documented for playing a dual role in our body both deleterious and beneficial species. In low/moderate concentrations free radicals are involved in normal physiological functions but excess production of free radicals or decrease in antioxidant level leads to oxidative stress. It is a harmful process that can mediates damage to cell structure including lipids, proteins, RNA and DNA, which leads to number of disease conditions. Fruits are good source of natural antioxidants, containing much different antioxidant composition and provide protection against free radicals and causing lower incident and mortality rate of various diseases like cancer and heart diseases in addition to a number of other health benefits. The antioxidant properties of carotenoids are well known and important dietary fruits like orange, tangerine, peach, blueberries and raspberry have good carotenoids content. Citrus fruits and juices contain a unique substance of flavanoids particularly limonene, hesperetin, naringin and narirutin. Cherry contains a high content of total phenols. Pomegranate is considered as super antioxidant because of its antioxidant content and antioxidant activity is higher than other fruits. Interest in the role of fruit antioxidants in human health has promoted research in the field of horticulture. Therefore, it is a demand of modern era to evaluate each fruit in terms of what phytocontituents are present and to use phytocontituents or phytomedicine. In the present article, an attempt has been made to explain the free radicals toxicity, antioxidant properties of fruits and medicinal value of fruits.

Key words : Free radicals, Antioxidants, Oxidative stress, Diseases, Phytoconstituents, Fruits

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The chief toxicity of reactive oxygen species (ROS) resides in their ability to initiate cascade reactions that results in the production of the hydroxyl radicals (.OH) and other destructive species, such as lipid peroxides (LOO.). These cascades are prevented by efficient operations of antioxidant defense systems. The term antioxidant can be considered to describe any compound capable of quenching ROS without itself undergoing conversion to a destructive radical. Organisms have evolved complex enzymatic and non-enzymatic defenses to minimize oxidative damage to macromolecules and cellular structures. They also possess repair system for renewing some oxidative modifications and disposal systems for removing modified macromolecules that are not repaired.

Free radicals are responsible for causing a wide number of health problems such as cancer, aging, heart diseases and gastric problems etc (Bagchi and Puri, 1998; Nagendrappa, 2005). Antioxidant causes protective effect by neutralizing free radicals, which are toxic byproducts of natural cell metabolism. The human body naturally produces antioxidants but the process is not 100 per cent effective in case of overwhelming production of free radicals and that effectiveness also declines with age. Increasing antioxidant intake can prevent diseases and lower the health problems. (Sies, 1991; Goldfarb, 1993). Fruits are loaded with key antioxidants such as vitamin A, C, E, beta-carotene and important minerals, including, selenium and zinc. Fruit research in the last decade has been the most spectacular and intriguing one. Discovery of antioxidant phytochemicals and their promising health promoting effects have paved the way of new revolution what is termed as a fruit revolution. A revolution promising a good health (Chaovanalikit and Wrolstad, 2004). Natural products, mainly obtained from fruits provide a large number of antioxidants. Phytoconstituents are also