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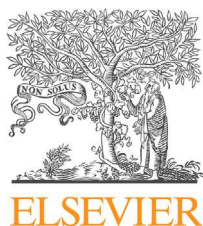


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Review Article

Potential applications of antioxidants – A review



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ABSTRACT

Various abiotic stresses lead to the overproduction of reactive oxygen species (ROS) in plants and animals which are highly reactive and toxic causing damage to proteins, lipids, carbohydrates and DNA thus leads to oxidative stress. This oxidative stress causes damage to tissues and results in large number of diseases. Antioxidants neutralize the effects of ROS and thus help in preventing diseases. Antioxidants can be natural or synthetic. Natural antioxidants can be taken up through diet as they are present in fruits, vegetables and spices. There are also certain synthetic antioxidants like BHT and BHA that also inhibit oxidation. However, these synthetic antioxidants have now been reported to be dangerous to humans so the search for non-toxic antioxidants have intensified in the recent years.

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1. Introduction

An antioxidant is any substance that at low concentration delays the oxidation of proteins, carbohydrates, lipids and DNA. They can be classified into three main categories:

1. The first line defence antioxidants which include superoxide dismutase (SOD), catalase (CAT), glutathione reductase (GR) and minerals like Se, Cu, Zn etc.
2. The second line defence antioxidants which include glutathione (GSH), vitamin C, albumin, vitamin E, carotenoids, flavonoids etc.
3. The third line defence antioxidants which include a complex group of enzymes for repair of damaged DNA, damaged proteins, oxidized lipids and peroxides. Examples: Lipase, Protease, DNA repair enzymes, Transferases, Methionine Sulphoxide Reductase etc.¹

Oxidative stress is a result of an imbalance between reactive oxygen species (ROS) and antioxidant defences. This oxidative stress deregulates a series of cellular functions and leads to various pathological conditions like AIDS, ageing, arthritis, asthma, autoimmune diseases, carcinogenesis, cardiovascular dysfunction, cataract, diabetes, neurodegenerative diseases, Alzheimer's disease, Parkinson's dementia etc.^{2–9}

2. Effects of antioxidants

Free radicals are highly reactive species having unpaired electrons in their outermost shell. Free radicals react rapidly with the membranes eventually causing cellular degeneration and finally death. To cope with these radicals the living system produces many antioxidants or takes the supplement

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