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# Antioxidant effects of sulfur-containing amino acids.

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## Abstract

Sulfur is an essential element for the entire biological kingdom because of its incorporation into amino acids, proteins and other biomolecules. Sulfur atoms are also important in the iron-containing flavoenzymes. Unlike humans, plants can use inorganic sulfur to synthesize sulfur-containing amino acids. Therefore, plants are an important source of sulfur for humans. Sulfur-containing compounds are found in all body cells and are indispensable for life. Some of sulfur-containing antioxidant compounds are, cysteine, methionine, taurine, glutathione, lipoic acid, mercaptopropionylglycine, N-acetylcysteine, and the three major organosulfur compounds of garlic oil, diallylsulfide, diallyldisulfide and diallyltrisulfide. In a comparison of the structure-function relationship among these sulfur-containing antioxidant compounds, dihydrolipoic acid (the reduced form of LA) is the most effective antioxidant. Dihydrolipoic acid contains two sulfhydryl groups and can undergo further oxidation reaction to form lipoic acid. The antioxidative activities of sulfur-containing compounds follow a general trend, the more highly reduced forms are stronger antioxidants and the number of sulfur atoms determine, at least in part, their modulatory activites on the glutathione related antioxidant enzymes. In this article, the antioxidant effects and the antioxidative activities, of sulfur-containing amino acids, are reviewed. In addition, the general antioxidant effects and the structure-function relationship of some sulfur-containing compounds are also reviewed.

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