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The Role of Oxidative Stress and Antioxidants in Diabetic Complications

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Objectives: Oxidative stress plays a major role in the pathogenesis and development of complications of both types of Diabetes Mellitus. This study describes the importance of natural antioxidants to be included in the diet to reduce the hyperglycemic effect.

Methods: Worldwide, several animal studies on antioxidants as protective agents have been conducted. The most important studies have been performed utilising antioxidants in experimental diabetic models. The effects of antioxidants on oxidative stress are measured through certain observable biomarkers. These markers include the enzymatic activities of CAT, SOD, GSH-Px, and glutathione reductase (GSH-Rx), as well as thiobarbituric acid reacting substances (TBARS) levels, an indirect measurement of free radical production that has been shown to be consistently elevated in diabetes.

Results: Antioxidant defense mechanisms involve both enzymatic and nonenzymatic strategies. Common non-enzymatic antioxidants include the vitamins A, C, and E, glutathione, α -lipoic acid, mixed carotenoids, coenzyme Q10 (CoQ10), several bioflavonoids, antioxidant minerals (copper, zinc, manganese and selenium), and cofactors like folic acid, uric acid, albumin, and vitamins B1, B2, B6, and B12. Enzymatic antioxidants include superoxide dismutase, catalase, glutathione peroxidase, and glutathione reductase.⁸⁰ Through normal physiological processes, antioxidants affect signal transduction and regulation of proliferation and the immune response.

Conclusions: In recent studies, it is stated that if a traditional system of medicines like Siddha and Ayurveda is used with modern science medicines will be very effective. Diabetic complications associated with oxidative stress can be minimized to some extent by natural antioxidants. But there is no perfect mechanism developed till to date in which the diabetic complications are known exactly. In various there are various clinical, epidemiological and experimental antioxidants are developed to cure of diabetes and other diseases.