

Evaluation of Food Antioxidants and Their Applications

Junji Terao

Institute of Health Biosciences, The University of Tokushima Graduate School

3-18-15 Kuramoto, Tokushima 770-8503, Japan

Summary

Food antioxidants have attracted much attention in relation to their potential physiological functions. Living organisms survive in an environment featuring a balance between the generation and scavenging/quenching of reactive oxygen species (ROS). Any imbalance may cause oxidative stress, resulting in the oxidative damage which leads to a wide variety of degenerative diseases. Antioxidant defense against oxidative damage involves low-molecular weight antioxidants in addition to antioxidative enzymes, nutrient vitamins and non-nutrient components such as plant polyphenols being included. However, large scale intervention studies failed to demonstrate beneficial effects of supplementary intake of β -carotene against carcinogenesis, pointing to a complex situation *in vivo*. Although atherosclerosis and related coronary heart diseases (CHD) are also tightly related to oxidative stress, the data similarly do not indicate that supplementary intake of vitamin E will consistently be effective for their prevention. Epidemiological studies such as the so-called French paradox indicate a positive relationship between the intake of polyphenols and CHD prevention. However, the mechanism of ROS scavenging/quenching and bioavailability of each polyphenol derived from foods need to be evaluated for estimating biological activity. Specificity regarding target organs and cellular target sites should also be clarified. Recently, standardization of assessment of antioxidant activity and its utilization for health claims has promoted to provide a firm basis for beneficial effects of food antioxidants on human health.