

Antioxidants and their Bio-Availability

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Antioxidants (AO) perform an important role in the removal of free radicals (FR) from the body. AO compounds combine with FR and neutralize it. After they are neutralized, they no longer damage living organisms. AO are not completely absorbed or assimilated by the body. For nutrition principles absorbed through a process of passive diffusion, the share of AO absorbed decreases with the increase of the amount of matrix containing it. AO molecular forms for which there are isomers or molecular bonds under the form of esters are important determinants of bioavailability. Bioavailability is the ratio between the amount of active substance and the rate at which it is released and absorbed in the body, where it reaches the action site for biological action.

Bioavailability of AO substances can be explained through multilinear regression using descriptors of transport and reactivity. The transport speed depends on: hydrophobicity, polarity, degree of ionization, form and size of molecules, removal speed i.e. metabolism rate, types of interactions (electronic, steric, orbital controlled-frontier-orbitals). The factors responsible for it are a series of factors related to diet like chemical formula, presence of inhibitors or enhancers, possibility of interacting with other components and to body (enzymatic secretions, duration of digestion, activity of intestinal flora, type of nutrition, health state, etc.). AO bioavailability depends on factors such as individual and nutrition type. To determine it, measure the absolute bioavailability that corresponds to the fraction of active substance that reaches blood circuit, relative bioavailability,

i.e., the amount of active substance reaching the circulation and the speed of this process, relative-optimal bioavailability, which assesses comparatively two forms, of which one is the reference form with maximum availability. The availability of an AO is influenced by the transport of molecules through biological membranes, by the degree of bonding between plasmatic proteins and tissues, by the blood flow at the level of action site, and by the metabolising and elimination of AO. To produce the desired effect, an AO needs to cross cell membranes, i.e. two phospholipid layers. Glycoproteins, lipoproteins, as well as different ion or polar groups on the surface of membranes make up membranes. As a result of the interaction of different endogenous or exogenous substances with the receptors on the biological membranes, they can undergo alterations through alterations of the spatial orientation of the resulting compounds and, consequently, channels/pores measuring up to 8 Å at the level of cell membrane and up to 60–80 Å at the level of capillaries, open up. Besides the opening of ion channels, the effect of the interaction mediator-receptor can consist in the mobilisation of enzymes mobilising secondary messengers.

Bioavailability is a very interesting study I wish young scientists and researchers should take it up and explore some new facts and technologies helpful to the mankind. We should all make an effort to bring forth a positive attitude for life and beautify the nature, the wonderful creation of the God and stay from negative and destructive ideas.

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