

Use of Conventional and Omics-based Methods to Determine Oxidative Stress – A Critical Overview

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Research on lipid oxidation (LO) and substances to delay LO has increased considerably during the past decades. One important issue in this respect is the determination of the real potential of a substance to reduce the susceptibility to oxidative stress. The number of methods and end points to measure antioxidants increased in the same way.

A number of currently used biochemical measurements aimed at determining the total antioxidant capacity, oxidised lipids or proteins must be chosen carefully since some of them are carried out under non-physiological conditions and are sometimes prone to artefact formation. Probably the most reliable approaches at the moment are measurements of isoprostanes as a parameter of lipid peroxidation and determination of oxidative DNA damage. Also the design of the experimental models has a strong impact on the reliability of LO studies: Recent findings indicate that activation of transcription factors which regulate genes involved in antioxidant defence plays a key role in the mode of action of antioxidants.

The lecture describes the principles and limitations of methods used to describe LO. It will also reflect some new -omics based approaches such as gene transcription or protein expression which are now used to describe some parameters of oxidative stress.