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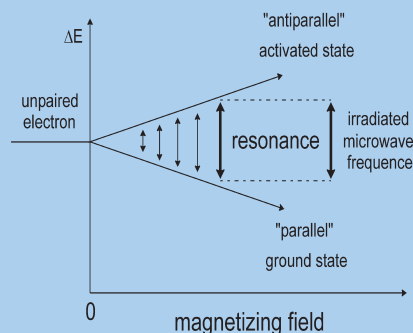
Molecular Nutrition Food Research

MNF Education:

Electron spin resonance – A spectroscopic method for determining the antioxidative activity

Sascha Rohn and Lothar W. Kroh

This educational article highlights a fast developing method for the determination of the antioxidative activity – the electron spin resonance (ESR) spectroscopy. Compared to other methods such as colorimetric assays, ESR measurements allow more detailed information about the antioxidative activity of natural compounds like vitamins and secondary plant metabolites. Their ability to scavenge radicals is preferentially tested with stabilized synthetic radicals (*e.g.*, Fremy's salt, galvinoxyl, DPPH). Investigations in biological samples are also possible. Samples such as blood, tissues and even organs may be used for such investigations. Various degenerative diseases (*e.g.*, Alzheimer's disease, cancer) and ageing are related to higher concentrations of reactive oxygen and nitrogen species (ROS/NOS). Due to the high reactivity of these compounds, the spin trapping technique has to be used for monitoring the oxidative situation in the organism. Synthetic nitron or nitroso compounds are capable of "trapping" radicals in order to form determinable adducts. Currently, available spin traps cannot be administered to humans because of the unknown toxicity. Three-dimensional ESR spectrometers allow non-invasive *in vivo* measurements of the formation and localization of radicals resulting from oxidative stress in whole bodies. 898



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