Revista Electrónica de Biomedicina
Electronic Journal of Biomedicine

ISSN: 1697-090X

Rev Electron Biomed / Electron J Biomed 2009;1:3-5

Editorial:

CONTRIBUTION OF FOOD ANTIOXIDANTS TO HEALTH.

Pilar Muñiz Rodríguez PhD.

Professor of Biochemist and Molecular Biology
Faculty of Sciences. Burgos University. Burgos. España

pmuniz @ ubu.es

Version española

During the last decades, there has been a lot of research work on oxidative stress both due to its involvement in homeostasis of normal cells and its implications in the development of a large number of degenerative diseases such as cardiovascular disease, neurodegenerative disease, chronic inflammation, cancer etc. Although the role of RSON (reactive species of oxygen and nitrogen) in the pathogenesis of different diseases was originally attributed to oxidative damage exerted on the different molecules by altering their function, it is now also known to be involved as an intracellular messenger in gene regulation and in signal transduction pathways. On the other hand, in a very narrow range of concentration The RSONs can lead to the opposite effects such as proliferation or apoptosis.

As a reaction to this increase of free radicals, living organisms have endogenous defense mechanisms consisting of enzymatic antioxidants (superoxide dismutase, catalase, glutathione peroxidase) or non-enzymatic antioxidants (glutathione, thioredoxin, etc). Their function is to eliminate free radicals like superoxide, hydroxyl and peroxides before they react and interact with different biomoléculas (lipids, proteins, DNA), inducing cellular damage.

As reinforcement for this endogenous antioxidant capacity, there are foods with antioxidant compounds of nutritional interest, with a chemical structure compatible with the in vivo antioxidants /antioxidant properties. Among food compounds with antioxidant properties are polyphenols, vitamins, etc., which can modulate the cellular response to RSON through different mechanisms: stabilizing reactive oxygen species, suppressing their formation by inhibiting enzymes or acting as metal chelators. In this way, these foods can restor the endogenous antioxidant defense or regulate intracellular signals resulting from the cellular antioxidant response.

There are more than 2000 epidemiological studies showing a relationship between the protective effect against various diseases and the consumption of foods with antioxidant capacity. This protective effect has been observed against different diseases (mainly cardiovascular), and is correlated with a high intake of fruits and vegetables. According to WHO reports, if not remedied before, in the year 2020 some diseases (cardiovascular diseases, diabetes, hypertension and some cancers) will be the cause of 73% of deaths and of 60% of the global diseases (WHO, 2001). Therefore, in order to prevent the diseases associated with free radicals, the WHO recommendS an intake of 400 g of fruit and vegetables a day.

Regarding the contribution to health of the antioxidant compounds present in food, others factors should also be considered such as:

1) the presence of other non-antioxidant compounds that contribute indirectly to the reduction of these pathologies (folate, fiber, etc.),

2) the antioxidant capacity of the diet depends on the absorption or the metabolic changes that may alter the antioxidant activity of the original molecule.

3) These compounds can perform their function independently of their ability to act as antioxidant, as they can interact with enzymes, by binding to membrane or nuclear receptors, altering gene expression, etc.

4) The effect of the isolated or pure compound is not the same as when it forms part of the food matrix, which can be synergistic with other components of the food.

REFERENCES

Brownson DM, Azios NG, Fuqua BK, Dharmawardhane TJ. Flavonoid Effects Relevant to Cancer. J Nutr 2002;2132:3482S-3489S.

Cao G, Russell RM, Lischner N, Prior RL. Serum antioxidant capacity is increased by consumption of strawberries, spinach, red wine or

vitamin C in elderly women. J Nutr 1998;128:2383-90.

Davies KJA. Oxidative stress: The paradox of aerobic life. Biochem Soc Symp. 1995; 61:1-31

Fang YZ, Yang S, PHD W. Free radicals, antioxidants and nutrition. Nutr 2002;18:872-879.

Halliwell B, Gutteridge JM. Free Radicals in Biology and Medicine, second ed. Oxford University Press. New York. 1989.

Heim KE, Taglliaferro AR, Bobilya DJ. Flavonoid antioxidants: Chemistry, metabolism and structure-activity relationships. J Nutr Biochem. 2002;13: 572-584

Jiménez-Escrig A, Santos-Hidalgo AB, Saura-Calixto F. Common sources and estimated intake of plant sterols in the Spanish diet. J Agric Food Chem. 2006;3;54:3462-71

Lindsay DG, Astley SB. European research on the functional effects of dietary antioxidants- EUROFEDA. Mol Aspects Med. 2002;23:1-38.

Serafini M, Villan D, Spera G, Pellegrini N. Redox molecules and cancer prevention: the importance of understanding the role of the antioxidant network. Nutr Cancer 2006;56:232-240.

Udenigwe CC, Ramprasath VR, Aluko RE, Jones PJ. Potential of resveratrol in anticancer and anti-inflammatory therapy. Nutr Rev. 2008;66:445-54

Valko M, Leibfritz D, Moncol J, Cronin MT, Mazur M, Telser J. Free radicals and antioxidants in normal physiological functions and human disease. Int J Biochem Cell Biol. 2007;39:44-84.

Virgili F, Marino M. Regulation of cellular signals from nutritiona molecules : a specific role for phytochemicals beyond antioxidant activity. Free Radical Biology and Medicine. 2008;45:1205-1216.

Yang CS, Landau JM, Huang MT, Newmark HL. Inhibition of carcinogenesis by dietary polyphenolic compounds. Annu Rev Nutr 2001:381-406.