

## THE ANTI-OXIDANT CAPACITY EVALUATION BY THE ORAC METHOD

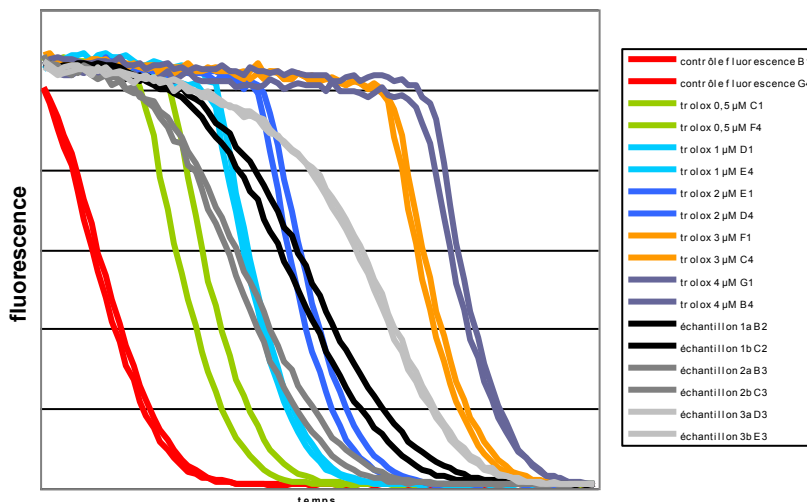
One of the most important ageing factors is a progressive decrease of the cells capacity to defend oneself against oxidation phenomena. Some natural physiological defences against free-radicals aggressions exist and a significant part of these defences results from diet. Nutritional constituents holding an antioxidant capacity mostly come from vegetals, particularly from fruits and vegetables. This is for example polyphenols and vitamins E and C. But other nutrients whose antioxidizing capacities are recognized exist like tocotrienols, the coenzyme Q10, the lipoïc acid or the flavonoïds which act by getting the free-radicals. Some molecules showing an enzymatic activity (such as SOD) also act like antioxidant. Finally, some molecules having chelating properties can exercise an antioxidant protection by stopping metals reactions that induce oxidation reactions.

The ORAC method (Oxygen Radical Absorbance Capacity) is used by the USDA (United States Department of Agriculture) to select foods having a high antioxidant ability, called ORAC Value. These foods are recommended to bring an antioxidant protection to the consumers by the feeding or the supply way. The contribution advised by some American nutritionists is estimated between 3000 and 5000 units ORAC per day. This leads to the publication of numerous tables classifying foods by increasing ORAC values . Here are some examples extracted of this "top ten" of antioxidant food (website <http://www.ars.usda.gov/is/pr/1999/990208.htm>).

Food	ORAC Value per gram of fresh weight
Goji berries (Wolfberry Ningxia)	146
Prune	58
Grape	28
Blackberries	24
Strawberry	15
Kale	18
Spinach	13
Broccoli	9

The ORAC method allows a global measure of the antioxidant capacity of pure substances or in mixture as in finished products. The first step consists in an extraction of the active compounds in a mixture of water in acetone for the hydrosoluble molecules and in acetone for lipophilic molecules.

Fluorescence decreasing curve with AAPH and with different concentrations of TROLOX



The test is realized by spectrofluorimetry and consists in a measurement of the protection exercised by a given molecule against the fluorescein oxidation by a stable free-radical, the AAPH.

The results are expressed according to Trolox®, standard curve, the hydrosoluble vitamin E analogue. The Trolox® is considered as a standard antioxidant. The main advantage of the ORAC test is to propose a standardized measurement, widely accepted as the global measure antioxidant capacity, unlike the other numerous existing methods.