

ORAC

Oxygen Radical Absorbance Capacity

Exciting NEW RESEARCH

Regarding the

Antioxidant Power of Foods & Nutritional Supplements

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What is ORAC?

ORAC (*Oxygen Radical Absorbance Capacity*) is an exciting and revolutionary new test tube analysis that can be utilized to test the “*Antioxidant Power*” of foods and other chemical substances. It calculates the ability of a product or chemical to protect against potentially damaging free radicals.

This analytical procedure measures the ability of a food, vitamin, nutritional supplement or other chemical to protect against the attack by free radicals, or to act as an Antioxidant. The test is performed using Trolox (a water-soluble analog of Vitamin E) as a standard to determine the Trolox Equivalent (TE).

The ORAC value is then calculated from the Trolox Equivalent and expressed as **ORAC** units or value. The higher the **ORAC** value the greater the “Antioxidant Power”.

Why is ORAC value so Important?

We have all heard about the benefits of consuming antioxidants in our food and nutritional supplements. Virtually everyone on the planet has heard about unstable compounds called “*oxygen free radicals*”

According to Jean Carper, the bestselling Author of *Miracle Cures, Stop the Aging Now!* and *Food - Your Miracle Medicine*, “*Loads of oxygen free radical thugs can get out of control, corrupting cells’ genetic DNA, ripping their membranes, eroding their normal functioning, and sometimes destroying them.*”¹ She further states, “*In general, they (oxygen free radicals) are the dark forces that attack fatty cell membranes, creating permanent cellular damage that accumulates over time, leading to accelerated aging and virtually every chronic disease imaginable, including heart disease, cancer, diabetes, arthritis and degenerative brain problems.*”²

What do these oxygen free radicals attack?

Every cell in the body is subject to attack. Oxygen free radicals cannot be avoided altogether. “*Every instance of your existence is an elegant dance of life and death between free radicals and antioxidants.*”³ They are generated when you breathe, or burn calories and glucose during normal metabolism.⁴ They get into your body through cigarette smoke, air pollution and toxic chemicals in the air and water. They are carried into your cells in food, notably fatty foods. “*Our brain generates more free radicals than other bodily tissue, because it uses so much oxygen and is the fattest organ in the body.*”⁵

Oxygen reacts with fat molecules in ways that generate free radicals, a process called **oxidation** which leaves fat oxidized or rancid. Even worse, oxidized fat cripples the functions of the mitochondria (energy factors of cells), prompting a cascade of events that can cause cell death.⁶

Why must we be concerned?

When oxygen free radicals get the upper hand over antioxidant activity, the result is an imbalance known in scientific jargon as “*Oxidative Stress*”.⁷ This simply means that the free radical thugs can overpower our antioxidant potential and beat up in the cells of our body. ***Unfortunately, as we age, our body tends to produce more free radicals and fewer antioxidants, potentially leading toward mental and physical decline.*** According to some experts, this antioxidant production slowdown begins around the age of twenty five.⁸ This has lead many to believe that it is especially imperative to take in more antioxidants as you get older in order to maintain a more youthful balance.

Are all antioxidants the same?

Absolutely not! Antioxidants vary in their ability to combat free radicals. The stronger and more effi-

cient they are, the greater their so called “**Antioxidant Capacity of Power**”. However, it was not until researchers at Tufts University in Boston developed a method of analyzing each food for its antioxidant capacity that anyone knew the real benefit of taking antioxidants. Then another USDA scientist, Dr. Guohau (Howard) Cao, blended some samples of specified foods and used the pulp and extract to reveal the food’s “total antioxidant capacity or power”. The procedure is now referred to **ORAC** (Oxygen Radical Absorbance Capacity).

After testing each food, an ORAC source or value is assigned which signifies how well nature endowed that food with overall power to neutralize cell-damaging free radicals.

Not surprising, this testing procedure has revealed that the highest antioxidant sources are fruits, followed by vegetables. Yet most people are not consuming the recommended five daily servings.

No longer do we just consider the individual components a food has, such as how much beta-carotene or lycopene or anthocyanins they contain. What really counts is the “**total antioxidant capacity**”.

What are the top “antioxidant powerhouses” inspired by nature?

One Group of these **powerhouses** are the so called carotenoids, such as beta-carotene, alpha carotene, lycopenes, lutein and zeaxanthin. There is another family of antioxidants known as **flavonoids**. Both of these families seem to be concentrated in deeply colored fruits and vegetables. Teas and red wine contain a group of phyto-chemicals called **proanthocyanidins** and **polyphenols** like **Resveratrol**.

We now know that the total antioxidant capacity of food is far greater than the sum of these individual components. Certain fruits and vegetables contain a complex assortment of countless antioxidants that interact and potentate each other, pushing their “**Antioxidant Powers**” far above their mere additive value.

How do we know the ORAC value of these “Powerhouse” fruits and vegetables?

If you ask people in general, “*What do you think is the most powerful food in “free radical absorbency capacity,”*” you will get all kinds of answers. Some will say broccoli, carrots, cauliflower and possibly spinach. That is because we have heard they are good for us, and while this is true in many respects, it is not necessarily true in terms of “*total antioxidant capacity or power*”.

Also surprising, it is not always fresh foods that have the greatest “*antioxidant power*”. For example, the new **ORAC** test shows that a fresh plum has an *ORAC value* of 9.49 (per gram), compared to a dried plum (prune) with an *ORAC value* of 57.7 (per gram).⁹ Another surprising example is the antioxidant power of grapes. Fresh grapes have an *ORAC value* of 4.46 (per gram) versus dried grapes (raisins) which have an *ORAC value* of 28.3 (per gram).¹⁰ **Why?** Drying removes the water and concentrates their antioxidants.

Does this mean we are only to eat dried foods?

Of course this is not true. We consume foods not only for their antioxidant value, but for their nutritive value as well, which makes our bodies function properly. At the same time, we must not ignore the other values of food such as its “*free radical absorbency capacity*” or “*antioxidant power*”. Most of us do not want to just feel good for the moment, we want the moment to last. We are all interested in anti-aging, like extension and quality of life. By learning of a foods *ORAC value* we may be one step closer to the “fountain of youth”.

How Much ORAC Value Do We Need?

According to research conducted by Drs. Ronald Prior and Guahau Cao, we need about **3,000 to 5,000 ORAC units per day** to have a significant impact on plasma and tissue antioxidant capacity.¹¹ What is shocking is that most Americans are taking in about **1200 ORAC units daily**. According to the USDA estimate, these units come primarily from an average consumption of three fruit and vegetables per day.¹² This means the average person is short between 1800 and 3800 ORAC units each day.¹³

What about those people who are not eating their fruits and vegetables daily?

Of course the ORAC value also depends on which fruits and vegetables you choose. Maybe you are eating five servings, but they could be fruits and vegetables with a low ORAC value.

How can you be sure you are getting 3,000 to 5,000 ORAC units every day in your food?

The following chart shows the ORAC value of over fifty foods and the ORAC value of some of New Spirit Naturals' nutritional products and supplements.

New Spirit Naturals is leading the way in advancing the ORAC science.

SUPER ANTIOXIDANT FRUITS AND VEGETABLES			
Fruit or Vegetable	ORAC VALUE Per 5 grams	Serving Size	ORAC VALUE Per Serving
Prunes	288.50	1 pitted prune	462
Raisins	141.50	¼ cup	1019
Blueberries	111.70	½ cup	1620
Blackberries	101.80	½ cup	1466
Garlic	96.95	1 clove	58
Kale	88.50	½ cup cooked	1150
Cranberries	87.50	½ cup	831
Strawberries	76.80	½ cup	831
Spinach (Raw)	60.50	1 cup	678
Raspberry	61.35	½ cup	755
Brussels Sprouts	<1.0	1 Sprout	206
Plum	47.45	1 Plum	626
Alfalfa Sprouts	46.55	1 cup	307
Spinach (Steamed)	45.45	½ cup cooked	1089
Broccoli Florets	44.40	½ cup cooked	817
Beets	42.05	½ cup cooked	715
Avocado	39.10	½ Florida	149
Orange	37.50	1 Orange	982
Grape (Red)	36.95	10 Grapes	177
Pepper (Red)	36.55	1 Med. Pepper	540
Cherry	33.50	10 Cherries	455
Kiwifruit	30.25	1 Fruit	458
Beans (Baked)	25.15	½ cup	640

Fruit or Vegetable	ORAC VALUE Per 5 grams	Serving Size	ORAC VALUE Per Serving
Grapefruit (Pink)	24.15	½ Fruit	580
Beans (Kidney)	23	½ cup cooked	400
Onion	22.45	½ cup chopped	360
Grapes (White)	22.30	10 Grapes	107
Corn	20.10	½ cup cooked	330
Eggplant	19.3	½ cup cooked	185
Cauliflower	18.85	½ cup cooked	234
Cauliflower	18.85	½ cup raw	188
Peas (Frozen)	18.20	½ cup cooked	291
Potatoes	15.65	½ cup cooked	244
Potatoes (Sweet)	15.05	½ cup cooked	301
Cabbage	14.90	½ cup raw	105
Leaf Lettuce	13.10	10 Leaves	200
Cantaloupe	12.60	½ Melon	670
Banana	11.05	1 Banana	252
Apple	10.9	1 Med. Apple	300
Tofu	10.65	½ cup	195
Carrots	10.35	½ cup raw	115
Carrots	10.35	½ cup cooked	160
Beans (String)	10.05	½ cup cooked	125
Tomato	9.45	1 Medium	233
'Zucchini	8.80	½ cup raw	115
Apricots	8.20	3 Raw	175
Peach	7.9	1 Medium	137
Squash (Yellow)	7.5	½ cup cooked	183
Beans (Lima)	6.80	½ cup	115
Lettuce (Iceberg)	5.80	5 Large Leaves	116
Pear	6.70	1 Medium	222
Watermelon	5.20	1/16 th 10" diam.	501
Melon (Honeydew)	4.85	1/10 Melon	125
Celery	3.05	½ cup diced	60
Cucumber	2.70	½ cup slices	28

Source: Your Miracle Brain, Jean Carper, Harper Collens Publisher 2000 p. 152 -153.

New Spirit Naturals' ORAC Tested Nutritional Supplements

ORAC Plus † Fruit Powder	5 grams	3730
Green Magic Powder	3 Grams	1040
Vita Balance 2000	3 Tablets	2445
Magnum C	1 Tablet	1105
Ultra Clear 20	1 Capsule	325
Mega Pro	1 Capsule	313
Golden Ginkgo Biloba	1 Capsule	363
Vitamin E+	1 Softgel	125.36

What other people are saying, ORAC and antioxidants.

Doctors Prior and Cao say, "How much it takes to elevate antioxidant activity and how high you can drive it up depends on individual makeup".¹⁴ Dr. Cao explains, "each person has a distinctive internal antioxidant defense system, and how much you can improve it by eating more fruits and vegetables depends on your unique biology. He further explains that if your antioxidant defenses are low, you may get a bigger burst than someone with an existing high antioxidant capacity. Each body regulates antioxidant defense, depending on a multitude of factors including genes."¹⁵

Since we may not be sure of our exact internal mechanisms it behooves one to consume at least 3,000 to 5,000 **ORAC** units per day just to be certain that you reduce as much a free radical damage as possible to your body's cellular structure.

"Dried fruits are an efficient way to get antioxidants into your body."

Jean Carper

*"Most Americans should eat more than 3,500 **ORAC** units a day to significantly lift the human antioxidant activity."*

D. Ronald Prior, Tufts University

"Eight ounces of strawberries boosted blood antioxidants as much as drinking two five ounce glasses of red wine"¹¹

"Nutritional intervention with fruits and vegetables may play an important role in preventing the long term effects of oxidative (free radicals) stress on brain function."

Dr. James A Joseph, Tufts University.

"Among fourteen hundred older men and women, those with the highest blood levels of fruits and vegetable antioxidants, called carotenoids (beta-carotene, alpha-carotenes, lutein, zeaxanthin, cryptoxanthin and lycopene) were smarter individuals, with the highest blood carotenoids indicative, they eat the most fruits and vegetables, scored thirty five to forty percent higher on tests of logical reasoning and visual attention than those with the lowest blood levels of carotenoids."¹⁷

ISERM (French Governments Medical Research Institute)

"High blood levels of antioxidants Vitamin C and beta-carotene actually predicted a superior memory in old age"

Dr. Walter J. Perrig Ph.D.

Swiss Researchers University of Berne

"In young people, antioxidant capacity rises dramatically in five or six days. People over age sixty needed ten to eleven days to reach the same heights of antioxidant capacity"

Tufts University.

"If these studies are borne out in further research, young and middle-aged people may be able to reduce risk of diseases of aging, including senility, simply by adding high antioxidant foods to their diets."

Floyd Horn

Administrator of the USDA's

Agricultural Research Service

Beltsville, MD.

References

¹ Jean Carper, Your Miracle Brain, p.141

² Ibid., p.142.

³ Ibid., p.145.

⁴ Ibid., p.142.

⁵ Ibid.

⁶ Ibid., p. 142-143.

⁷ Ibid., p. 145-146.

⁸ Ibid., p. 146.

⁹ BioSynergy Technical Bulletin,
Vol 14:9, p. 1.

¹⁰ Ibid.

¹¹ Ibid.

¹² Jean Carper, Your Miracle Brain, p. 155.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid., p. 161-162.

Bibliography

Carper, Jean, Your Miracle Brain, New York, Harper Collins, 2000.

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