



A Primer on ORAC

Part 1 of 3



Açaí, Highest-rated ORAC Fruit!
(new 2006 research)



Blueberries, Deposed Antioxidant King...
(...reigned until 2004...)

[more background in the [Wikipedia links](#)]

Today, depending on how well you mix your diet,
you will eat between 10 and 30 distinct plant or animal foods.

Every one of those foods will contain **antioxidants** - chemicals in food usually associated with colors or **pigments** that preliminary science indicates may provide health benefits.

Recall our 3-part discussion of **The Color Code!**
(#1, #2, #3)

The amount of antioxidants in different foods varies mainly on color:
the deeper the color = more pigments = greater antioxidant strength

Even foods that are white, like the flesh of a pear or potato, contain antioxidants, although at amounts much lower than in colorful foods.

*If the public had a measure of antioxidant strength in foods,
how would we use it?*

1. we'd **inspect food labels to compare** one product's antioxidant strength against another
2. as a general rule, antioxidant strength of plant foods declines the longer the time "out of the field", so it could become **a measure of freshness**

3. some antioxidant-rich plants, like dark berries, have preliminary research evidence for anti-disease effects, so consumers could **choose according to their disease risk**
4. **children** - the next generation in current peril due partly to poor dietary choices - could be taught to **select foods with high antioxidant ratings**
5. many antioxidant-rich foods have desirable **taste qualities** (e.g., tartness of cranberries) that could more easily be discerned by a label of antioxidant strength

Science is helping by developing numerical values for antioxidant strength in foods

- **ORAC (oxygen radical absorbance capacity)** is the most commonly used, but there are others with confusing names only to be mentioned here
 - FRAP (ferric iron-reducing ability in plasma)
 - TRAP (radical trapping antioxidant parameter)
 - TEAC (Trolox equivalence antioxidant capacity)
 - total phenolic content

Wikipedia on **ORAC**

What does ORAC measure?

The glow of good food: 1) The experiment is conducted by first placing in a test tube a probe that **fluoresces (gives a colorful glow)** in the absence of oxygen radicals.

2) This fluorescence disappears when a specific radical is put in the test tube by itself, but is preserved and continues to glow when a food source containing antioxidant chemicals that neutralize that radical is present in the tube.

3) **The longer the probe fluoresces -- the greater the intensity of the glow that can be measured - the higher the antioxidant capacity of the food source.**

As there are as many as 9 major oxygen radicals (examples: hydroxyl radical, superoxide anion, singlet oxygen, hydrogen peroxide, peroxy radical - each of these is an oxygen free radical), there can be as many as 9 separate ORAC tests using each one independently to derive specific ORAC information for that one radical.

There are also individual ORAC assays for antioxidant chemicals that dissolve preferentially in either water ("water-soluble" such as vitamin C and phenolics) or in fats ("lipid-soluble" such as vitamin E). Clients requesting an ORAC assay may be particularly interested in one or several of these specific tests.

Consumers Beware....

There are important differences between ORAC data published before 2004 and those measurements available now

"Old" ORAC versus "New" ORAC

- When ORAC scores were first published for plant foods in the early 2000s, the **assay parameters were different than those used now and the resulting scores were consistently lower, sometimes by as much as 10-fold.**
- For example, **wild blueberries** had the highest score among common foods in the old

assay (2,400 ORAC units per 100 grams) whereas in the newer improved assay, the wild blueberry score is nearly 10,000.

- The old ORAC data were never organized in one report or published in a peer-reviewed journal. The **new ORAC data for more than 100 plant foods were reported in 2004** in the *Journal of Agriculture and Food Chemistry* by Wu et al. (click green link)
- ORAC data usually are not "peer-reviewed" in the typical process of scientific publishing, but rather are obtained by independent contract assays done by companies like Brunswick Laboratories
- See the [Brunswick link](#) for further background on oxygen radicals, antioxidants and ORAC

Next in Part 2 of the *Primer on ORAC*: **Mysteries and Weaknesses of ORAC**

Archives

Share this information by referring a contact to <http://berrydoctor.com> for sign-up!

Dr. Paul
The Berry Doctor

References for **The Color Code**, paperbacks available at Amazon.com Books

* Heber, D. *What Color Is Your Diet?* ReganBooks, 2001

* Joseph JA, Nadeau DA, Underwood A. *The Color Code*, Hyperion, 2002.