

## Understanding ORAC Testing and Results

Ever since scientists first suggested that disease and aging might be related to the build of oxidative stress they have been looking for a way to measure the potency of antioxidants. It was hoped that by quantifying antioxidant activity they would know which compounds could slow aging or prevent disease. During the last several decades several assays have been developed to measure antioxidant activity. The most common assays include TEAC (Trolox equivalent antioxidant capacity), FRAP (ferric reducing/antioxidant power), TRAP (total radical trapping antioxidant parameter), and ORAC (oxygen radical absorbance capacity), among others. Each of these tests measures a slightly different aspect of antioxidant activity. However, none of these tests measure the antioxidative actions of a compound in a living organism. They are all done in a laboratory using artificial environments. This is not necessarily a bad thing. For instance, if you take a number of berry juices and measure them with the same method or all 3 methods you get a good idea of which juices are better than others and some idea as to how much one may be better than another.

In the past few years a number of studies have been published extolling the virtues of the ORAC assay method. While ORAC has been around for more than a decade, in 2001 the folks at Brunswick Labs came across a way to enhance the assay and make it more economically viable. Since then the use of ORAC testing has skyrocketed. Nowadays you can't look at an antioxidant drink or dietary supplement without being bombarded by its ORAC score. Because ORAC scores are so prevalent it becomes ever more important that people understand exactly what the score means.

As its name suggests the ORAC assay measures how well a substance absorbs oxygen radicals. Oxygen radicals are some of the more damaging oxidants in nature. However, they are not the only radicals. As with almost all chemical assays ORAC testing measures the performance of a compound against a standard. In the case of the ORAC test this standard is Trolox. Trolox (6-Hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid) is a water soluble derivative of vitamin E. Being the standard, all ORAC results are reported in Trolox Equivalents (TE). This seemingly makes comparisons between assays a simple task. Unfortunately, ORAC results are often reported using a number different mass or volume measures (e.g. TE/g, TE/L, or TE/mL). Obviously, you cannot directly compare two results using different reporting. Many companies use this to create an artificial advantage.

Like vitamin E, Trolox is a potent antioxidant. Unlike vitamin E, Trolox does not occur naturally in the body. Likewise, a high ORAC score does not necessarily mean a higher antioxidant activity in the body. All of the current antioxidant measures are merely approximations of how an antioxidant might behave in the body. A true measure of antioxidant activity would require that the person's blood be tested after consuming the food or compound in question. However, such testing would actually include multiple tests as there are multiple oxidants to test against and multiple antioxidant systems involved. Science does not currently have the technology to do any testing this comprehensive.

### ORAC and RioVida

As you can see no current antioxidant measure provides a full picture of the antioxidant potential of foods or phytochemicals. Life purposefully selected juices that are known to have high antioxidant activity as determined by the ORAC assay. In fact, we had Brunswick Labs perform an ORAC assay of the RioVida juice. The result reported to us was just under 20,000 TE/L. In comparison, this value falls in the middle to upper-middle range of those values reported for the individual berries in RioVida. Some of the native activity is lost during the juicing process and during the actual mixing and bottling of RioVida.

However, this ORAC value only represents a small portion of the health benefits that RioVida provides. The ORAC assay does not measure the benefits of transfer factors. As we saw with our

research in Russia, the consumption of 4Life Transfer Factor can help spare native antioxidants. Transfer factors do not have innate antioxidant activity, but as they interact with the body's immune cells there is an apparent sparing effect on the body's own antioxidant defenses. Furthermore, as mentioned above, ORAC only measures the activity of a compound against oxygen radicals in comparison to a synthetic standard. There are multiple active compounds in these potent fruit juices that work against a number of different radicals and help support the body's own antioxidant defenses. Much of this is not accounted for in the ORAC score.

While ORAC is a good general indicator of antioxidant status it does not measure the immune potential of 4Life Transfer Factor RioVida, nor does it fully quantify the total antioxidant potential of the RioVida juice blend. In addition, the ORAC score completely fails to account for the antioxidant contributions of transfer factors. Comparing only the ORAC score of 4Life Transfer Factor RioVida to the competition is like comparing a brick to an entire building. ORAC is one small part of 4Life Transfer Factor RioVida, but it may be all that the competition has.

**Further Reading:**

<http://brunswicklabs.com/artman/uploads/jafc-2005-1841-1856.pdf>