

HEALTH INGREDIENTS

The Case for Resveratrol Enhancement

Resveratrol is the new “scientific superstar” on the horizon, promising great things from anti-aging to reducing vascular disease and cancer.

by Dr. Philip Norrie

Resveratrol was first mentioned in a Japanese scientific article in 1939 written by Michio Takaoka, who had isolated it from a medicinal plant - *Veratrum album* variety *grandiflorum*. In 2000, the late Prof. Geoff Skurray, Head of Food Science at the University of Western Sydney, Australia was experimenting with different pectolytic enzymes at fermentation time to increase the

amount of resveratrol in wine. He was able to increase the resveratrol content by as much as 50%, thus taking the resveratrol content of a normal white wine from 1-2mg/l to 3mg/l and a normal red wine from 3-6mg/l to about 10mg/l. In 2003, another Australian, Prof. David Sinclair from the Anti-Aging Laboratory at Harvard Medical School in Boston, showed that resveratrol activated the cellular

proteins called Sirtuins. They in turn stimulate the mitochondria, the energy source within the cell cytoplasm, to produce more energy for the cell, hence the cell lives longer. Sinclair and other researchers have shown that this increase in the lifespan of the cell applies to all species whether they be yeasts, worms or humans. In 2005, I experimented with my own way of increasing the amount of resveratrol in wine. I was able to increase it by up to 100mg/l, which was much more than had been achieved previously. I called it Resveratrol Enhanced Wine or REW and trademarked the expression and patented the process. The first REW, both red and white wines, were sold commercially in Australia in 2008. The other important thing to note here is that for the first time white wines are just as healthy as red wines, because they have the same amount of resveratrol in them, if they are REW.

Resveratrol Composition

Resveratrol or trans-3,5,4'-Trihydroxystilbene has the molecular formula of C₁₄H₁₂O₃ and its appearance is that of an off white powder. It is part of the polyphenol group of compounds called Stilbenes and is found mainly in the skin of grapes, where its main function is to protect the grape from fungal infection at vintage time. It is also found in other fruits such as berries and in peanuts. The other main source of resveratrol is the root of the Japanese Knotweed or *Polygonum cuspidatum*, which is the source of most resveratrol sold commercially to date. But another source of resveratrol is becoming popular and that is synthetic resveratrol, made either by chemical synthesis or by biotechnical synthesis using metabolic engineering of microorganisms.

Mechanisms and Safety

As a medical clinician, I know that the best way to treat a disease is to not get it in the first place - so preventative medicine is the way ahead, instead of paying the huge cost of treating heart attacks and strokes for example. Thus the new definition of health should be, not the usual limited one of being disease free, but to a broader one of the ability to enjoy life physically, mentally and environmentally. So the doctor's role is to help their patients to die young, as late as possible. Resveratrol has the potential to be a major preventative medicine and that is why it is essential that we get enough of it in our daily diet, as it cannot be stored by our bodies; the same as vitamins cannot be stored. The recommended daily dose is from 50 to 100mg and recent studies on humans have shown that we can consume up to 5,000mg in one day without any detrimental effects.

Resveratrol works in three main ways on the human body. Firstly, it stimulates Sirtuin production to make cells live longer.

Table 1: Reseveratrol Content of Selected Foods

Resveratrol content in wines and grape juice in mg/l

Red Grape Juice [Spanish]	1.14-8.69
Red Wine [Spanish]	1.92-12.59
Rose Wine [Spanish]	0.43-3.52
Pinot Noir	0.40-2.0
Red Wine [Global]	1.98-7.13
White Wine [Spanish]	0.05-1.80
Dr Norrie's REW Red Wine	100
Dr Norrie's REW White Wine (pictured)	100

Resveratrol content in selected foods in mg per cup serving

Peanuts [raw]	0.01-0.26
Peanuts [boiled]	0.32-1.28
Peanut butter	0.04-0.13
Cocoa powder	0.28-0.46
Berries have less than 10% of the resveratrol present in grapes.	

[modified from Linus Pauling Institute at Oregon State University]



Secondly it acts as an antioxidant, and Dr. Frankel at Davis University in California has shown that its antioxidant effect will plateau at 100% compared to the usual antioxidants such as vitamin C and E which can only reduce oxidation by up to 20%. This antioxidant effect, for example, helps to lower the amount of atheromatous plaque in our bodies because LDL or "bad" cholesterol has to be oxidized before it can be incorporated into the vessel wall as atheroma.

Thirdly, resveratrol acts as an anti-inflammatory agent. This is a very important role because the atheromatous plaque in the vessel wall endothelial cells has to become inflamed before it will rupture, thus triggering the clotting mechanism which is the final event to block off the vessel causing a heart attack, stroke, renal failure or peripheral vascular disease, depending upon which vessel is involved. The vascular endothelial cell proliferation and nitrous oxide production [both important in the progression of atheroma] are also favorably influenced by resveratrol. Resveratrol reduces vessel wall endothelial cell proliferation and increases nitrous oxide production which in turn causes vessels to dilate, hence reduce the risk of obstruction. Resveratrol has also been shown to have the potential to, not only reduce vascular disease [which kills half of us in the first world], but to reduce cancer, dementia and diabetes as well.

Approval for Use

In 2010, the Food Standard of Australia and New Zealand [FSANZ] ruled that resveratrol was to be classed as a novel food. I made an application to have this ruling reversed for *Vitis vinifera* grape derived resveratrol added to wine at concentrations up to 100mg/l and succeeded with their ruling being dated from 16/12/13. The ruling is still in place for all other food and beverage applications unfortunately. So anyone contemplating adding resveratrol to a food or beverage in Australia and New Zealand has to go through the expensive business of proving to FSANZ that it is

safe. Currently, the EU will not allow my REW to be manufactured in the EU or imported into the EU. I am in the middle of a lengthy application to have my REW process approved by the EU, who is using the OIV as their assessment authority. I strongly suggest that anyone contemplating adding resveratrol to a food or beverage in their country, to check with their local food authority to make sure it has their approval first. The US authorities in 2011 gave resveratrol GRAS [Generally Regarded as Safe] status, while in 2012 the EU authorities gave the synthetic resveratrol from Fluxome Novel Food approval. Japan is now in the process of allowing its use there as well. The addition of resveratrol to our everyday food and beverages is necessary to help consumers get a decent daily dose of this important supplement.

Technical Challenges

There are three main issues to consider when trying to make a resveratrol enhanced food or beverage. Firstly, does it have local Food Authority approval for this addition? Secondly, resveratrol is hard to dissolve, other than in alcohol and thirdly it is an antioxidant, hence it must be kept away from oxygen. Resveratrol's solubility in water is a very poor 0.03g/l while its solubility in ethanol a good 50g/l.

Obviously you cannot dissolve resveratrol in ethanol and then add it to a food and beverage, along with the ethanol, and then give it to children or adults who do not want to consume alcohol. So dissolving it can be a problem, unless you use my patented technique. Alternatively, resveratrol could just be added in as a powder to a food mix. Because it is an antioxidant, resveratrol has to have minimal oxygen exposure during the manufacturing process and has to be packaged in airtight containers or the final product has to have an airtight coating around it, such as a sugar coating. ▼

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