Vitamin C

Background.

We need vitamin C to stay healthy: it is a vital nutrient. Without enough vitamin C, humans can develop a disease known as scurvy. Humans along with some other animals have to eat foods containing vitamin C as our bodies can’t synthesise it.

Scurvy used to be deadly for sailors and soldiers, who often had to go for long periods without fresh fruit and vegetables. One symptom of scurvy is spongy and bleeding gums. This happens because vitamin C is required for the body to make collagen which is an important component of connective tissue. The navy found that lime juice added to rum and water (grog) kept sailors healthy and is why the English are sometimes referred to as “Limeys”.

Many fresh fruits and vegetables contain vitamin C. Citrus fruits, such as oranges and lemons, are especially good sources. Vitamin C may also be added to processed food as a supplement. Vitamin C is L-ascorbic acid - (5R)\-[\(\text{1S}\)-1,2-dihydroxyethyl]-3,4-dihydroxyfuran-2(5H)-one - or one of its oxidised forms. Any of these have the biological effect of vitamin C (Figure 1).

Ascorbic acid itself does not just have activity as a vitamin, it is also an anti-oxidant. The term oxidation originally referred specifically to a reaction which combined something with oxygen. Now, however, it has a much wider meaning. If one reactant is being oxidised another must be being reduced to balance things out. These types of reactions are known as redox (REDuction-OXidation) reactions. An anti-oxidant (or reducing agent) is used to reduce another reactant while being oxidised itself (a bit like a see-saw; if one end goes up the other must come down). We can use this property of ascorbic acid to measure how much we have in a solution (see global experiment 2013). Figure 2 shows the redox equation for ascorbic acid and iodine.

Ascorbic acid $\rightarrow$ Dehydroascorbic acid

Figure 2
Further Research on Vitamin C

1) http://www.rsc.org/search/?q=vitamin+C&ie=&site=Default&output=xml_no_dtd&client=default#gsc.tab=0&gsc.q=vitamin%20C&gsc.page=1

2) http://www.rsc.org/learn-chemistry/resource/listing?searchtext=vitamin%20C&eMediaType=MED00000009

3) http://my.rsc.org/search?search_filters%5B%5D=all&query=vitamin+C&tk=SnNsNUeP6qkHG

4) http://www.youtube.com/user/wwwRSCorg/search?query=vitamin

5) http://www.livestrong.com/article/482374-how-does-vitamin-c-work/

6) http://www.ageless.co.za/vitamin-C-ascorbic-acid.htm

7) http://members.upnaway.com/~poliowa/How%20Vitamin%20C%20works.html

8) http://www.clinicalcorrelations.org/?p=3670


10) Methods and reagents for quantitatively determining ascorbic acid
A method for determining ascorbic acid by quantitatively determining ascorbic acid in a ... A reagent for quantitatively determining ascorbic acid and a kit for ...