

Title Understanding total antioxidant and bioavailable antioxidant assay protocols for fruits and vegetables: what they tell us and their limitations

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Abstract

There are numerous reports in the literature regarding the antioxidant contents of fruits and vegetables and documenting changes in response to handling, storage and processing. This information is useful for many purposes but, if the data are to be useful to health researchers, there should be consideration given to at least three issues that have not been widely incorporated into the existing work. The first consideration is the chemistry of the antioxidant methods. Most total antioxidant measures fall into two categories in regards to the chemistry of the assay; 1) peroxy radical scavenging capacity, and 2) reducing capacity. The second consideration is whether the assay is measuring the discrete, intended target groups of antioxidants. If the goal of the work is to understand the antioxidant activity of phenolic constituents, then extract clean-up procedures must be incorporated into the protocol to remove ascorbic acid and other interfering constituents. The last consideration is that of bioavailability. The most commonly used extraction procedures are indiscriminate and relatively harsh and as a consequence more constituents are extracted from the fruit or vegetable matrix than would be by the human digestive system. Prior work shows that only a fraction of the antioxidant potential measured using conventional extraction is extractable when using simulated digestive fluids. The incorporation of these three considerations into analyses of apple and apple slice antioxidant profiles is presented to show their importance to assessing functional quality in a format useful to nutritionists.