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Study of two Commonly used Measures of Overall Antioxidant Capacity

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DESCRIPTION

A test solution's Total Antioxidant Capacity (TAC) is the quantity of free radicals it scavenges, which is used to determine a sample's antioxidant capacity. One indicator of a food's capacity to function as an *in vivo* antioxidant is the blood's antioxidant capacity. The ORAC assay (oxygen radical absorbance capacity) and the FRAP assay (ferric reducing ability of plasma) are two commonly used measures of overall antioxidant capacity. Dietary interventions do alter blood's capacity for antioxidants. For instance, serum ORAC levels were higher in people who followed a diet high in chocolate and cocoa for two weeks than in those who followed a control diet. However, not all of these outcomes are consistent. For instance, plasma ORAC does not change in people who consume procyanidins in the same quantities as chocolate and cocoa powder after 6 or 12 weeks. TAC assays can also be divided into two groups based on the chemical reactions involved methods based on Single Electron Transfer (SET) or Hydrogen Atom Transfer (HAT). The ability of an antioxidant to neutralize free radicals through hydrogen donation is measured using HAT-based methods. These techniques are pH-independent and typically take only a few seconds to minutes to complete. The ORAC test is one example. A potential antioxidant's ability to reduce any compound, including metals, carbonyls, and radicals, by transferring one electron are determined by SET-based methods. They are usually slower than HAT-based methods because they are pH-dependent and based on per cent product decrease rather than kinetics. The SET reaction is the foundation for the ferric reducing ability of plasma (FRAP), CUPRAC, and TEAC assays. Numerous tests have been developed as a result of the complexity and variety of the investigated research topics, but sadly none have received widespread acceptance. As a result, choosing the appropriate method for a given application is one of the most difficult aspects of antioxidant testing. It is important to determine which function of antioxidants is being measured, and the antioxidant assay method should be chosen in accordance with the function to be evaluated because antioxidants may exert their effect through a variety of mechanisms, including scavenging radicals, sequestering transition metal ions, decomposing hydrogen peroxide or hydro peroxides, quenching active prooxidants, and repairing biological damage. To bring some order and agreement to this important field, more valid and rigorous guidelines and assay protocols are required due to the wide range of results for natural antioxidants in food systems. A more specific methodology that is capable of defining what products are formed and inhibited by antioxidants based on conditions, systems, and targets of protection can only improve our understanding of the effects of antioxidant compounds. Naturally, it is important to keep in mind that TAC and AOA are not like elemental analysis parameters for which the analyst must obtain essentially the same result from multiple techniques (for instance, measuring calcium in a milk sample using multiple techniques should produce the same results within tolerable limits). Instead, it is possible to obtain quite distinct TAC or AOA results by employing the same probe in various experimental conditions.

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CONFLICT OF INTEREST

The author's declared that they have no conflict of interest.

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