Title: Antioxidant assays in urine for disease detection

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Abstract

Background: Assays for antioxidants in biological fluids, such as blood, urine, and saliva, are becoming increasingly useful in the detection and surveillance of diseases caused by oxidative stress resulting from free radical damage. These investigations determine the level of oxidative stress in an individual by measuring their total antioxidant capacity or a particular type of antioxidant activity. One easy, non-invasive biological fluid to measure such is urine. This review investigates the use of various antioxidant assays in urine to diagnose diseases and quantitatively counteract free radicals.

Objectives: The primary goal of this research is to use oxidative stress assessment to identify and track illnesses. Knowing the processes by which oxidative stress causes disease development and assessing the efficacy of antioxidant treatments such as dietary adjustments, supplementation, and lifestyle adjustments.

Methods: TAC Assays: According to Miller and colleagues with revisions by Re and their colleagues, TAC Assays evaluate the antioxidant level in biological fluids and quantify the antioxidants' capacity to quench free radicals. These assays include the ABTS test and Trolox Equivalent Antioxidant Capacity (TEAC). FRAP (Ferric Reducing/Antioxidant Power) Assay: According to Benzie and Strain, the reduction of ferric ion to ferrous ion is evaluated in an acidic environment using hydrophilic antioxidants. CUPRAC (Cupric Reducing Antioxidant Capacity): Evaluates the urine sample's capacity to reduce cupric ions to cuprous ions using Da Cruz's commercial AOP method (U.S. patent 6,613,577).

Conclusion: By evaluating antioxidant activity in this manner, disorders such as cancer, metabolic syndrome, and neurodegenerative diseases might be better understood. Sensitive, instantaneous, new techniques are being developed. Antioxidants function as indicators for illnesses linked to oxidative stress. Monitoring and early illness identification are improved by real-time in-situ measurements of free radicals. Rapid and reliable techniques make them more effective and enhance illness control plans.