

New Spectrophotometric Determination of Antioxidant Capacity using Conjugated Triene Triacylglycerols Naturally present in Tung Oil

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Reactive oxygen species (ROS) and their roles in human pathologies have recently been of great interest in the area of disease prevention. The oxidative stress, resulting namely from an imbalance between ROS and antioxidant systems, seems to be linked to numerous degenerative diseases, such as carcinogenesis and cardiovascular diseases. Growing evidence suggests that, in addition to organism antioxidant defences, intake of dietary or medicinal antioxidants may protect important biological molecules from oxidative damage. Among these antioxidants, phenolic compounds appear to be particularly promising, owing to their ubiquity in vegetal kingdom and their strong antioxidant properties. However, the development of tools for the evaluation of their real efficiency remains a great challenge in terms of reliability, rapidity and relevancy. In this way, we measured and compared the antioxidant capacity of various phenolic compounds (flavonoids, phenolic acids and esters) by using new ultraviolet spectrophotometric method, called "Conjugated Triene Assay". This *in vitro* test is based on spectral properties of triacylglycerols naturally present in commercially available Tung oil. This cheap oil contains around 80% α -eleostearic acid, an octadecatrienoic fatty acid with conjugated triene (Δ^9 *cis*, Δ^{11} *trans*, Δ^{13} *trans*) exhibiting a strong ultraviolet absorption at 271 nm. Under oxidizing conditions induced by azo-initiator, the degradation of conjugated triene is accompanied by an absorbance decrease at 271 nm. Addition of phenolic compounds results in a delay of oxidative process and enables to quantify the antioxidant capacity in comparison with a reference standard. Herein, we describe the development and application of this high-throughput assay by using classical cuvette-spectrophotometer or microplate reader. Finally, this study show the interesting potential of some dietary phenolic compounds to counteract lipid oxidation.