

ANTIOXIDANT ACTIVITY OF SOME GREEN TEA CONSTITUENTS

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Tea is unique in having a high concentration of flavanoids (catechins) that have been associated with the health benefits of tea. Catechins are polyphenolic compounds, and are known to be strong anti-oxidants that may help to protect the body from free radical damage. The results of recent scientific and medical studies suggest that tea drinking helps to reduce the risk of certain types of cancer and cardiovascular diseases.

In the present study, the antioxidant activity of crude catechin extracts and green tea constituents obtained after fractionation by High Speed Countercurrent Chromatography (HSCCC) was determined using the β -carotene bleaching method and the DPPH (α, α -diphenyl- β -picrylhydrazyl) radical scavenging method using α -tocopherol (Vitamin E) and BHA (butylated hydroxyanisole) respectively, as reference compounds.

Antioxidant activity of tea constituents was determined by a modified version of the β -carotene bleaching method, and was observed to decrease in the order, FLA2 (469.0) > FLA1 (431.0) > epigallocatechin gallate EGCG (329.3) > epicatechin gallate ECG (280.0) > epigallocatechin EGC (201.0) > epicatechin gallate EC (151.0) > theobromine TB (74). Both BHA (680.0) and α -tocopherol (551.5) were stronger anti-oxidants than the tea constituents. In this method, the anti-oxidant coefficient of a sample is calculated. The difference in the anti-oxidant coefficients of the catechin samples with respect to a control sample is an indication of the inhibition of the coupled oxidation of linoleic acid and β -carotene by oxygen, and is measured by the absorption due to β -carotene at 470 nm.

Antioxidant activity of tea constituents determined using the DPPH radical scavenging method decreased in the order ECG (90.8) > EGCG (90.0) > FLA2 (87.0) > FLA1 (76.3) > EGC (58.9) > EC (36.8) > TB (35.3). In this method, the decrease in absorbance of the DPPH radical (DPPH[•]) due to its reduction by different antioxidants was measured. According to this method, BHA showed less antioxidant activity than ECG, EGCG and α -tocopherol. Additionally, EGCG and ECG were found to be equally potent in hydrogen donating ability than BHA.

Both methods confirm the strong anti-oxidant activity of green tea catechins. The unidentified catechins, FLA1 and FLA2, are also potent anti-oxidants. Studies to establish the structures of these two compounds are in progress.

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