

Antioxidant Activity, Phytochemical Screening and GC-MS Profiling of Some Tea Varieties of Sri Lanka

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Tea is a widely consumed beverage made from the *Camellia sinensis* plant. The antioxidant properties of tea leaf extract have been extensively studied. The study aimed to analyse 19 commercially available tea varieties belonging to four groups, i.e., black, green, organic, and herbal tea, to identify key bioactive compounds. Methanol and dichloromethane were used as the solvents for extraction and the antioxidant activity was assessed using the DPPH (1,1-diphenyl-2-picrylhydrazyl) free radical scavenging assay using a UV-visible spectrophotometer measuring at a 517 nm wavelength to determine their efficacy in neutralizing free radicals. The phytochemical profile of the methanolic extract of the tea varieties was obtained by Gas Chromatography – Mass Spectrometry (GC-MS) analysis. Six samples of the 19 tea varieties analysed demonstrated superior antioxidant activity in the DPPH free radical scavenging assay. The tea variety with the best antioxidant activity was 26-KRT at 85.39%, followed by 21-BGT at 63.54%, 9-GTGPP at 61.15%, 3-LGTC at 59.71%, 7-OGT at 57.73%, and 6-PGT at 56.24%, with ascorbic acid serving as the

positive control (62.26%). The GC-MS analysis of the tea varieties identified several bioactive compounds, including 1,2,3-benzenetriol, 1-pentadecene, hexanoic acid, n-hexadecenoic acid, 9,12,15-octadecatrienoic acid methyl ester (Z,Z,Z)-, phytol, 9,12,15-octadecatrienoic acid (Z,Z,Z)-, 9,12-octadecadienoic acid (Z,Z)-, and theobromine. Caffeine was the main constituent among the compounds identified by GC-MS in all tea varieties except in herbal tea types such as Weniwelgata tea, Slim Apple tea, Mature tea, Pure Camomile tea, and DETOX. Phytochemical screening tests revealed the tea samples' abundance of alkaloids, flavonoids, polyphenols, saponins, and terpenes. These findings highlight tea extracts' effectiveness in preventing lipid oxidation during storage and their high antioxidant capacity, which provides additional health benefits and improves quality of life.

Keywords:

Camellia sinensis; GC-MS; antioxidants; Caffeine.