

Tea polyphenols and alkaloids content using Soxhlet and direct extraction methods

ABSTRACT

Extraction efficiency of extraction methods on the content of polyphenols (catechins and gallic acid) and alkaloids (caffeine, theobromine and theophylline) from tea leaves is studied. Level of polyphenols and alkaloids in samples (leaf buds, young leaves, old leaves and Sabah black Tea) from Sabah Tea Plantation were evaluated by HPLC. Leaf buds were found to have a higher polyphenol and alkaloid contents compared to young and old leaves. Fermentation process during manufacturing of Sabah Tea significantly reduced the levels of catechins, gallic acid and alkaloids by approximately 2-fold in comparison to fresh tea leaves. Degradation of catechins was also observed at high extraction temperatures. By increasing the heating temperature from 40°C in direct extraction to 70°C in soxhlet extraction, concentrations of total polyphenols and total alkaloids decreased. However, no significant change was observed in the Sabah Black Tea, with the only exception for epigallocatechin that was 3-fold lower in soxhlet extraction. It is recommended that for preparation of oxidation-sensitive plant samples like tea, extraction should be carried out at 40°C or lower using direct extraction method couple with a multi-step extraction procedure, rather than percolating with high boiling point (> 40°C) organic solvents that are routinely used in plant extraction.