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## Characterization and quantification of polyphenolic compounds in refuse tea

K N Kodagoda[1], N S Jayasekara[2*], P H N D Karunatilaka[3] and G H C M Hettiarachchi[1]

[1] *Department of Chemistry, University of Colombo, Colombo 03.*
[2] *Sri Lanka Council for Agricultural Research Policy,* [3] *HVA Foods Pvt Limited, Kandana.*

The polyphenols of the tea plant (*Camellia sinensis*) have been more thoroughly investigated than any other compound in tea. Polyphenols are well known antioxidants that have a variety of biological activities. Based on the current tea production the predicted annual generation of refuse tea would be $9.5 \times 10^6$ Kg and only about 6 % of the refuse tea is being utilized for instant tea production while the rest is discarded. Hence this study was designed with the objective of characterizing and quantifying polyphenolic compounds in refuse tea to provide scientific evidence for adding value to refuse tea. Caffeine content was also quantified in order to compare it with the polyphenol content of refuse tea.

Refuse tea samples were collected from a tea factory in Sri Lanka and the extraction of polyphenolic compounds and caffeine was carried out using two methods. Extraction method 1 extracts polyphenols only, whereas extraction method 2 extracts polyphenols and caffeine. High Performance Liquid Chromatography (HPLC) was used to analyse and quantify the extracted polyphenolic compounds and caffeine. Chromatographic separation was performed on a guard and analytical column system (Phenomenex, Luna 3u C18 (2), column dimension 150 x 4.6 mm 3u micron). Preparation of standards and samples, and the chromatographic analysis were carried out according to the International Standard. Identification of individual polyphenols was done by comparing the retention time of samples and standards, and quantification was done by the external standardization method.

The quantities of polyphenols and caffeine in mg/g, from method 1 were: gallic acid (2.40); (+)-catechin hydrate (0.0334); (-)-epicatechin (0.232); (-)-epigallocatechin gallate (0.0806); and (-)-gallocatechin gallate (0.407). From method 2: gallic acid (2.45); (+)-catechin hydrate (0.157); (-)-epicatechin (0.254); (-)-epigallocatechin gallate (0.0710); (-)-gallocatechin gallate (0.0953); and caffeine (14.7). The presence of polyphenols and caffeine was evident in refuse tea. Hence it is evident that refuse tea could be used as a source of natural antioxidants, for the preparation of pharmaceuticals, food supplements and animal feed.

nsjnsj2002@yahoo.com Tel: 071 8565259