

NS.SCI.8

METABOLOMICS OF SRI LANKAN TEA GERmplasm: A QUANTITATIVE ANALYSIS OF CATECHINS, GALLIC ACID AND CAFFEINE

**B. Jeganathan¹, P. A. N. Punyasiri^{1,4}, J. D. Kottawa-Arachchi¹,
M. A. B. Ranatunga¹, I. S. B. Abeysinghe¹, M. T. K. Gunasekare²,
B. M. R. Bandara³**

¹*Tea Research Institute of Sri Lanka, Talawakelle*

²*Council for Agriculture Research Policy, Colombo*

³*Department of Chemistry, Faculty of Science, University of Peradeniya*

⁴*Institute of Biochemistry Molecular Biology and Biotechnology,
University of Colombo*

Tea (*Camellia sinensis* L.) contains a myriad of metabolites of varying chemical structures. Early efforts to correlate metabolites with the quality of tea have been focused on single metabolite variation in tea cultivars. The literature available on the analysis of a broad range of metabolites in tea accessions is minimal. We have begun a systematic study on metabolic profiling of the Sri Lankan tea germplasm through the analysis of principal metabolites of tea leaves. The results of this study will enable, the commercial exploitation of germplasm accessions for making diverse products of tea of desired quality, the definition of biochemical diversity of the Sri Lankan tea germplasm, the stratification of germplasm accessions into diverse clusters, and the identification of parent candidates for breeding programmes. We report our preliminary results on the quantitative analysis of tea flush from 40 germplasm accessions for total polyphenol content (TPP) and six metabolites.

Green leaf samples of 40 germplasm accessions collected from the *ex situ* field genebank of the Tea Research Institute of Sri Lanka were analysed for total polyphenols using the Folin Ciocalteu's colorimetric method (ISO 14502-1), and for six metabolites to include 4 catechins, caffeine and gallic acid, using high performance liquid chromatography (ISO/CD 14502-2). The measurements were made for two extracts prepared from each accession.

The TPP was found to be 165.16 - 275.78 mg/g (w/w, dry weight). The contents of the six metabolites varied in the following ranges: epigallocatechin gallate (EGCg, 37.18±2.70 - 109.44±8.35 mg/g), epigallocatechin (EGC, 6.11±0.43 - 47.60±0.20 mg/g), epicatechin gallate (ECg, 13.73±3.66 - 43.52±4.00 mg/g), epicatechin (EC, 4.44±0.42 - 21.88±1.27 mg/g), caffeine (13.72±0.53 - 43.48±1.48 mg/g) and gallic acid (0.10±0.03 - 1.56±0.12 mg/g). The highest contents of EGCg, ECg, EGC and EC were observed for the accessions TRI62/9, TRI62/9, TRI4076 and TRI777 while the lowest amounts were shown by the accessions KEN16/3, PBGT41, PLLG2 and PLLG2, respectively. High levels of EC and ECg were observed in high-quality black tea producing cultivars whereas low-quality tea producing cultivars had low levels of EC and ECg.

Funding: National Research Council Grant 11-023.