

Impact on the chemical composition of bark oil of *Cinnamomum zeylanicum* Blume with different peeling techniques

H. D. Weeratunga^{1*}, P. D. Weerasinghe², P. Ranasinghe¹, K. M. Mewan², I. G. N. Hewajulige¹,
C. Wijesiriwardena¹, H. P. D. Perera¹, P. Fernando¹, K. Samarasinghe¹, U. Rajawardena¹, T.

Gunawardhana¹, S. Madage¹, C. M. Lokuge¹

¹ Herbal Technology Section, Industrial Technology Institute, Thaladena, Malabe, Sri Lanka

² Department of Biotechnology, Wayamba University of Sri Lanka

*Corresponding author: hasitha108@yahoo.com

Cinnamomum zeylanicum Blume is an indigenous spice crop to Sri Lanka known as true cinnamon or Ceylon cinnamon. Cinnamon is mainly used as an aromatic condiment, flavouring agent, and traditional and modern medicines. Currently, the world cinnamon market is dominated by cassia cinnamon, which contains high coumarin content (up to 1%). Ceylon cinnamon is superior due to its low coumarin content (less than 0.004%), unique aroma, and sweet and spicy flavor profile. Sri Lankan peelers are using traditional, labour and time-intensive methods for bundling and peeling cinnamon. While Chinese cinnamon (*Cinnamomum cassia*) produces, countries never expend intensive labour and time for cinnamon processing. Hence, while maintaining the quantity and the quality, adopting a low-cost peeling method is a prerequisite to reduce the cost of production for being competitive in the world 'True cinnamon' market. A scientific study was conducted on samples peeled with three peeling methods, including traditional peeling (TP), without rubbing and scraping (WRS), and with rubbing and scraping (RS), to find out the effects on bark oil content and chemical composition. Cinnamon bark samples were peeled from approximately two-and-a-half-year-matured trees. Bark oils were obtained using hydro-distillation of bark samples by Clevenger-type apparatus. Qualitative and quantitative analyses were conducted using GC-MS and GC-FID. Data collected on oil content and chemical constituents (α -pinene 0.26 ± 0.16 , camphene 0.15 ± 0.03 , β -pinene 0.15 ± 0.03 , α -phellandrene 0.63 ± 0.30 , α -terpinene 0.75 ± 0.274 , D-limonene 0.44 ± 0.07 , β -phellandrene 1.21 ± 0.80 , p-cymene 0.43 ± 0.03 , β -linalool 1.20 ± 0.23 , β -caryophyllene 1.36 ± 0.43 , α -terpineol 0.42 ± 0.05 , 3-phenylpropanoid 0.30 ± 0.17 , cis-cinnamaldehyde 0.22 ± 0.03 , trans-cinnamaldehyde 79.88 ± 0.90 , cinnamyl

acetate 3.15 ± 0.72 , eugenol 3.87 ± 0.48 , cinnamyl alcohol 0.21 ± 0.169 , benzyl benzoate 1.45 ± 0.44) were subjected to two factors ANOVA with post-hoc LSD test. Each chemical constituent was compared with different peeling techniques, therefore, the standard deviation was calculated for each chemical constituent. The peeling method affects the bark oil content ($p < 0.05$) but not the harvested location ($p > 0.05$) RS peeling method was identified as the method that gives the highest oil content (2.28 ± 0.463 ml/g). Further, different peeling methods or areas do not significantly affect oils' chemical composition ($p > 0.05$). This study showed that we could shift from the traditional high-cost peeling method to low-cost WRS without diminishing the quality of the cinnamon bark products.

Keywords:

Cinnamon bark oil; Ceylon cinnamon; Gas chromatography-flame ionization detector (GC-FID); Traditional peeling method; Cassia cinnamon