(281)

Studying of Underutilized Parts Produced in Processing of *Cinnamomum zeylanicum* Cultivated in Sri Lanka by Analyzing their Chemical Composition

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Abstract

Cinnamon, (*Cinnamomum zeylanicum*) is widely recognized as a major spice, flavoring agent, and herb consumed globally. This study aimed to identify and quantify the primary chemical constituents of essential oils, the oleoresin content, and the DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging activity of oleoresins obtained from different underutilized parts of Ceylon cinnamon. The underutilized parts used in this study included cinnamon scrapes (obtained from cleaning the outer corky tissue layer of the sticks), 'kathurupodi' (broken pieces and splits of all grades of cinnamon quills), heavy bark (over-matured bark), and 'katta' (scraped from the greenish-brown, mature bark, primarily from upper branches). Essential oil was extracted by hydro distillation using a Clevenger apparatus. The essential oil percentage of each part was calculated, and the dried essential oil samples were qualitatively and quantitatively analyzed through GC-MS analysis. Oleoresins were extracted from each part using Soxhlet extraction, and their antioxidant activity was determined by DPPH radical scavenging activity. The highest essential oil percentage (1.5±0.10 %) was recorded from the 'kathurupodi' sample and a neglectable amount of essential oil was recorded from the cinnamon scrapes sample. Cinnamaldehyde, D-limonene, linalool, α-Phellandrene, Cinnamyl alcohol and eugenol were the main components of the essential oil as identified. The highest cinnamaldehyde content (82.10%) was found in essential oil extracted from the 'Kathurupodi' sample. The highest eugenol content (9%) was detected in essential oil extracted from the "katta" sample while there is a lower cinnamaldehyde content (66.78%) when comparing with others. The highest oleoresin percentage (11.19±0.02 %) and DPPH radical scavenging activity, 71.980±2.080 (IC_{50} value-mg/ml) also have been recorded from "Kathurupodi" sample and the lowest oleoresin percentage (2.22±0.01%) and DPPH radical scavenging activity, 10.910±0.830 (IC_{50} value-mg/ml) has been recorded from scrapes sample. It can be concluded that 'Kathurupodi' has the highest value for those quality parameters among other underutilized parts and mostly those values are close to cinnamon quills. There are significant oleoresins percentages and antioxidant activities for heavy bark and "Katta" samples also with significant profiles of bio active compounds in essential oil including cinnamaldehyde, eugenol, and linalool, which contribute to the characteristic flavor and other significant properties of cinnamon.

Keywords*: Cinnamon, Essential oil, Oleoresins, Underutilized parts*