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Proanthocyanidins and selected phenolic and non phenolic compounds in bark and leaf of Ceylon cinnamon (*Cinnamomumzeylanicum*Blume)

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Ceylon cinnamon (CC) (*Cinnamomum zeylanicum* Blume) is the 'true cinnamon' among different species of cinnamon worldwide. Bark of *Cinnamomum* species is reported as one of the richest sources of phenolics especially proanthocyanidins. Further, a wide array of non phenolic compounds (NPC) are also present in the cinnamon bark. Moreover, cinnamon proanthocyanidins and NPC such as cinnamaldehyde are reported to have many health benefits. However, to date proanthocyanidins, phenolic and NPC in bark of CC are not well investigated. Further, there are no such previous reports on leaf of CC. Present study investigated total proanthocyanidins (TPs) and selected phenolic and NPC in bark and leaf of CC.

Freeze dried 95% ethanol and 1:1dichloromethane:methanol (DCM:M) bark extracts (BEs) and leaf extracts (LEs) of authenticated CC were used in this study. The HCl-butanol assay was used in quantification of TPs (n=6 each). Quantification of selected phenolic (euginol, kaempferol, phorizidin, epicatechin, catechin, 4-hydroxy benzoic acid and gallic; n=3 each) and NPC (cinnamylacetate, cinnamaldehyde and trans cinnamic acid; n=3 each) were performed using HPLC-DAD method.

Varying quantities of TPs, phenolic and NPC were observed in ethanolic and DCM:M both BEs and LEs. TPs were significantly high ($p<0.05$) in bark [1098±73-1381±46 mg cyanidin equivalents (CE)/g of extract (GE)] compared to leaf (309±3-434±14 mg CE/GE) for both extracts studied. Phenolic and NPC tested were significantly ($p<0.05$) high in ethanolic extracts of both bark and leaf compared to DCM:M bark and leaf extracts (except euginol in ethanolic BE and epicatechin in ethanolic LE). Among phenolics tested catechin (17.28±1.65 mg/GE)and euginol (104.38 ± 1.79 mg/GE) were the highest containing phenolic compounds in ethanolic extracts of bark and leaf, respectively, while gallic was the lowest (bark:2.14 ± 0.28 mg/GE; leaf: 0.81 ± 0.06 mg/GE). Similarly, among NPC tested cinnamaldehyde (101.91 ± 3.61 mg/GE) and cinnamyl acetate (44.53 ± 3.22 mg/GE) were the highest containing phenolic compounds in ethanolic extracts of bark and leaf respectively whereas lowest was trans cinnamic acid (bark:3.33 ± 0.65 mg/GE;leaf: 7.68 ± 0.55 mg/GE).It is concluded that CC bark had high TPs compared to leaf. The phenolic and NPC tested had varying quantities in both bark and leaf.

Keywords: Ceylon cinnamon, total proanthocyanidins, phenolic and NPC, bark and leaf.

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