# Process Optimization to Extract Oleoresin and Essential Oil from the Leaves of Allspice [Pimenta dioica (L.) Merill.] and Screening of Its Essential Oil Composition, Antioxidant Capacity and Potential to Develop New Products

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*Pimenta dioica* (L.) Merill., the allspice plant having the combination of flavours of clove, cinnamon, cardamon and nutmeg has not been explored in Sri Lanka for its potential uses. In this study, a process optimization was carried out to extract oleoresin and essential oil from the first 8 leaf positions of shoots of allspice. Several solvent mixtures were tested for the extraction of allspice oleoresin. Total antioxidant capacity, total phenolics and total flavonoids in allspice oleoresin were determined using ferric reducing antioxidant power assay, modified Folin-Ciocalteu method and a calorimetric method, respectively. Characterization of essential oil was done using gas chromatography. Acetone: Hexane (90:10) was identified as the optimum solvent mixture to extract oleoresin and the highest yield (8.92 ± 0.03%) was obtained from the 7$^{th}$ leaf position. There was no significant ($p>0.05$) difference in the yield of oleoresin from the 6$^{th}$ leaf position upwards, the highest yield (4.45 ± 0.10%) of leaf essential oil was observed in the 3$^{rd}$ leaf position. The highest amount of total antioxidant capacity (1,555.69 ± 7.04 mg TE/g of oleoresin) and total phenolic content (143.19 ± 2.24 mg GAE/g of oleoresin) were observed in oleoresin extracted from 2$^{nd}$ leaf position whereas highest total flavonoids (718.78 ± 25.24 mg RE/g of oleoresin) were recorded in the 5$^{th}$ leaf position. Eugenol was the most abundant (89.43 ± 0.03% in 7$^{th}$ leaf) chemical in the leaf essential oil followed by β-caryophyllene (10.92 ± 0.07% in 1$^{st}$ leaf) and Myrcene (2.21 ± 0.02% in 1$^{st}$ leaf) respectively. The residual solvent level was maintained below 25 mg/kg levels in the final allspice oleoresin product. Two products, allspice herbal black tea and green tea, from allspice leaves, were developed. The findings of this study encourage the commercial-scale cultivation of allspice in Sri Lanka.

**Keywords**: Antioxidant capacity, Essential oil, Oleoresins, Phenolics, *Pimenta dioica*

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