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Investigation of the Potential for *Eucalyptus* Leaf Oil Extraction Industry in Sri Lanka

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Abstract

Eucalyptus oil is a product of secondary metabolism of trees which is extracted mostly by its leaves. It holds a long history of use against respiratory infections due to its antibacterial, antifungal and antiviral properties and also acts as a fragrance in perfumes and as a flavouring agent in certain food items.

A survey was conducted in the first phase of this study with the Customs Department to identify the existing market potential for *Eucalyptus* oil in Sri Lanka. Results revealed that the export is far below in compared with the imports. Although a few local oil extractors are present, their production is highly insufficient to meet even the local market demand, hence most of the *Eucalyptus* oil demand is fulfilled by importing large quantities from Australia, China, India and United Kingdom. Therefore if the optimum conditions are identified, commercial level extraction of *Eucalyptus* oil will be an ideal opportunity of earning a significant income for both government and private sectors because they manage nearly 32,000 ha of *Eucalyptus* plantations in Sri Lanka. This will create much benefit, especially for the owners of *Eucalyptus* plantations grown above 1,500 m from mean sea level, because harvesting of those plantations have been banned.

Hydro and steam distillation are the only two methods used in *Eucalyptus* leaf oil extraction in commercial scale. Therefore the second phase of the study was designed to identify the best distillation method and required optimum physical conditions in *Eucalyptus* leaf oil extraction. Fresh leaves were collected from the middle of the canopy of a young *E. microcorys* plantation at Demodara and those were air dried under shade. Both steam and hydro distillation methods were conducted parallely for 250 g of leaves, using a small-scale distillation apparatus for 3 hours. The effect of the particle size of the leaves (full leaf and 4.0, 2.0, 0.2 cm) and leaf to water ratio (1:4, 1:6 and 1:8 (w/v)) were examined. Altogether 24 different treatments were used with three replicates. According to one-way ANOVA, 16 different combinations of the tested variables had significantly higher oil yields. Among them there were 11 steam distillation methods and five hydro-distillation methods. However, the best average oil content was yielded by the hydro distillation, used with leaves cut into 4.0 cm and with 1:4 leaf water ratio.

Keywords: *Eucalyptus* leaf oil, Distillation, *Eucalyptus microcorys*, Oil yield