

**OPTIMIZATION OF ESSENTIAL OIL EXTRACTION FROM *Eucalyptus grandis* LEAVES BY CLEVANGER DISTILLATION**

\*Patrick K. Tum<sup>1</sup>, Gift M. Kasha<sup>1</sup>, Joyce G.N. Kithure<sup>1</sup>, Fredrick M. Mwazighe<sup>1</sup>

<sup>1</sup>University of Nairobi, School of Physical Sciences, Department of Chemistry,  
P.O Box 30197-00100 Nairobi, Kenya,

\* Corresponding Author: patricktum@uonbi.ac.ke , Tel: 0726977559

**Abstract**

Recent statistics show a rise in the margin of consumption and utilization of essential oils. People have turned their attention to traditional medicines, and so the demand for essential oils in the international market has increased drastically. However, essential oil extraction processes have been observed to suffer from minimum output levels. The purpose of this study was to investigate the effects of changing the process parameters (time of extraction, leaf sizes and leaves to water ratio) and their contribution to maximizing the process of extraction and also the composition of *Eucalyptus grandis* oil to establish utility of the oil. The extracted oil's refractive index was determined and GC-MS analysis of the oil was also done to determine the composition of the oil. There was an increase of %yield with increase in time up to 150 minutes. Quality of the oil extract was desirable from appearance and smell. Variation in oil yield was also noted from varying the leaves to water ratio, with 1:12.5 (w/v) being optimal. The adjustment of leaf sizes was found to be most effective with a very high increase in yield margin. The whole leaves produced the highest amounts of oil. More than 20 compounds were identified with many of them appearing in eucalyptus oil from other species seen in literature.

**Key Words:** Essential Oils, *Eucalyptus grandis*, Clevenger Distillation, Optimization, GC-MS

**INTRODUCTION**

At present, the intersection of cutting edge technology and folklore wisdom has enabled scientists to procure most of their raw materials from more available and naturally

occurring resources especially forests. This is certainly substantiated by the current upsurge in the demand of essential oils in the international market. [1]