



Faculty of Science
Botany Department

Taxonomic Studies on Family Lauraceae and Its Antibacterial Effect

A Thesis

Submitted for the Degree of Doctor of Philosophy of
Science in Botany

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Declaration

This thesis has not been previously submitted for a degree of this or any other University.

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Dedication

In the name of Allah, who has given me strength and to achieve this work.

- ♥ I dedicate this humble work to my homeland Libya and my beloved Benghazi University, and despite their suffering they supported me materialistically and morally. I also thank my second country Egypt and the people of Egypt, for hosting me and my family.
- ♥ To my Parents, without them I would not reach my goals in life
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Abstract

Lauraceae (the laurel or avocado family) is an economically important family. Eight taxa (representing three tribes, four genera and seven species) of Lauraceae grown in Egypt were studied. This study was carried out to study the taxonomic relationships of this family and to explore the contribution of morphology, molecular and chemical screening in systematics of Lauraceae. The macro-micromorphological patterns, inter-simple sequence repeat (ISSR) analysis, as well as chemical composition of essential oils and their antibacterial activity were used. The macro-micromorphological patterns were investigated by light microscope. The genetic differentiation among the studied taxa was analyzed by a genotyping method using 13 ISSR primers. The essential oils were extracted by Clevenger apparatus and analyzed by Gas-chromatography–mass spectrometry (GC-MS). The antibacterial activity was determined by Minimum Inhibitory Concentration (MIC). The recorded data were analyzed using the Dice coefficient to compute the similarity matrix. This similarity matrix was used to produce dendrograms using the Unweighted Pair Group Mean Arithmetic average (UPGMA) clustering method. Three dendrograms were constructed based on macro-micromorphological, molecular criteria, and the combination of

the characters obtained from the previous data (both morphological and molecular criteria). The results obtained from the micro-macromorphological and molecular analysis, were sufficient to resolve relationships within Lauraceae. Moreover, the antibacterial effect is in agreement with that of the combined analysis and also in accordance with the dendrogram based on macro-micromorphological characters. The two dendrograms suggested that the species of genus *Cinnamomum* are clustered together and antibacterial effect showed activity against the five tested bacteria. Moreover, the close relationship between the two varieties of *Persea americana* and their ability to inhibit the only two bacteria namely *K. pneumoniae* and *E. coli* was noticed. furthermore the two species of *Laurus* showed mild antibacterial activity against the five tested bacteria. The obtained data from morphological, molecular and chemical point of view could be considered as a possible diagnostic methods at interspecific level.

Key words: Lauraceae, Anatomy, lamina architecture, ISSR, Essential oils, Antibacterial activity.

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