



**In Vitro Cryopreservation and Cytogenetics and
molecular Characterization of Some Medicinal
Plants**

By

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A Thesis

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Abstract

The objectives of this study were to characterize three genera germplasm of Apiaceae family, namely cumin, caraway and coriander, to make chromosome characterization and molecular fingerprinting for the mentioned genera. Karyomorphological results confirmed that; *Cuminum cyminum* L. (cumin: $2n=14$), *Carum carvi* (caraway: $2n=20$) and *Coriandrum sativum* (coriander: $2n=22$). The total Chromatin Relative Length percentage (RL%) shown cumin $\pm 10.69\mu\text{m} \pm 19.70\mu\text{m}$, caraway $\pm 7.30\mu\text{m} \pm 13.40\mu\text{m}$ and coriander $\pm 5.58\mu\text{m} \pm 12.07\mu\text{m}$. Satellites in all the cases were associated to short arms. The molecular characterization for the three genera (caraway, cumin, and coriander) was conducted using 5 AFLP combinations and 15 ISSR primers. The total amplified bands were 330 (162 ISSR+168 AFLP), with an average of 83.75% (89.5% ISSR+78% AFLP) per primer. The combined dendrogram based on both AFLP and ISSR markers for the three genera was divided into 2 main clusters; the first cluster has 2 accessions (cumin and caraway) with 60% similarity, while coriander falls in a distinct cluster.

Key words: Karyotype; Cytogenetic; Cytology; C-banding; Chromosome; Cumin; Caraway; Coriander; AFLP; ISSR; molecular marker; Cryopreservation.