



جامعة الإمارات العربية المتحدة  
United Arab Emirates University

**The College of Graduate Studies and the College of sciences Cordially  
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**Master Thesis Defense**

**Entitled**

**AN ASSESSMENT OF DNA EXTRACTION PROTOCOLS FOR HERBARIUM  
SPECIMEN: THE CASE OF UAEU HERBARIUM**

**by**

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**Abstract: Background:** The herbarium collections have become vastly used due to the recent developments in molecular techniques. Molecular techniques such as DNA extraction and DNA sequencing are playing an important role in studying genetic makeup of plant and identifying the evolutionary relationship using DNA bar-coding. Herbarium collection is considered as one of the potential source to access the genetic material of the extinct plant species. **Methods:** Our study focused

on the DNA isolation process using five isolation techniques: Maxwell, synergy, Qiagen, I-genomic, and CTAB on herbarium desert/medicine plant: *Inula Helenium*, *Chenopodium album*, *Salsola Kali*, *Haloxylon Persicum*, *Atriplex Halimus* and compared them with fresh samples in term of DNA purity and DNA yield. Two universal genes, *matK* and *Rbcl*, were used for the phylogenetic investigation for all samples. In addition, the homemade extraction (CTAB) was compared with other DNA extraction kits for both herbarium and fresh samples in order to find the significant difference between them.

**Results:** Fresh specimens yielded better quality of DNA and 100% amplified and sequenced of plant barcode genes *Rbcl* and *matK* in five techniques. while, herbarium samples *Salsola Kali*, *Haloxylon Persicum* were yielded good DNA purity and concentration via CTAB, Maxwell, Synergy, Qiagen techniques, resulting good amplification in both genes (*matK*, *Rbcl*). Regarding to the significance effect between fresh and herbarium, there are noticeable differences values in both DNA purity and DNA concentration. In case of comparing fresh samples only, the concentration effect showed significant differences between CTAB and four other methods, while three out of five species show significant differences method in term of purity. In term of comparing herbarium samples only, *Inula helenium* and *Chenopodium album* from CTAB method showed no significance effect in term of purity, also *Chenopodium album* from CTAB method showed no significance effect in term of concentration.

**Keywords:** CTAB, Maxwell, Synergy, I-genomic, Qiagen, herbarium, DNA extraction, DNA concentration, as *Inula Helenium*, *Chenopodium album*, *Salsola Kali*, *Haloxylon Persicum*, *Atriplex Halimus*, *matK*, *Rbcl*.