

# **Phytochemical screening and antiproliferative activity of *Varthemia montana* Grown in Jordan**

By

**Hala Ismail Mohammed Abulawi**

Supervision

**Dr. Nour Aboalhaija**

Co-supervisor

**Prof. Rania Hamed**

**Al-Zaytoonah University of Jordan, 2024**

## **Abstract**

*Varthemia montana* (Vahl) Boiss. (Family Asteraceae), it is mainly grown in Jordan has been evaluated for the first time both phytochemically and biologically. Hydro-distillation of the plants' aerial parts yielded traces of oil. Six extracts were prepared (petroleum ether, chloroform, ethyl acetate, methanol, ethanol and aqueous) and their phenolic and flavonoids contents were evaluated in addition to their antioxidant activities. In-vitro antiproliferative activity was evaluated against H1299 and A549 pulmonary cancer cell lines. The highest levels of total phenol and flavonoid contents were found in the ethyl acetate extract. Ethanol extract exhibited the highest antioxidant activity with  $IC_{50}$  of  $322.1 \pm 39 \mu\text{g/mL}$  and strongest cytotoxic effect against H1299 cells with  $641.17 \pm 2.0 \mu\text{g/mL}$ . Nevadensin, sorbifolin, spiraeoside, chlorogenic acid and caffeic acid were identified in ethanol and ethyl acetate extracts using liquid chromatography mass spectrometry (LC-MS). Nanoemulsion (NE) prepared from the ethanol extract was evaluated for a suitable delivery system. Four NE formulations with varying concentration component degrees were prepared, S4 and S6 showed to be the most stable formulations based on NE characterizations, including MDS, ZP, thermodynamic, and physical stability over two months.

**Keywords:** Anti-proliferative, GC-MS, Nanoemulsion, SPME, *Varthemia montana* authentication.