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PHYTOCHEMISTRY OF *ARTEMISIA ANNUA* L. GROWING IN NORTH OF
IRAN AND ESSENTIAL OIL CHEMICAL COMPOSITION,
ANTIMICROBIAL AND ANTIOXIDANT EFFECTS

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Artemisia annua L. (Asteraceae) commonly known as sweet wormwood or Qinghao is an annual herb/shrub native of Asia. The plant grows wild in Europe and America and on a large scale in China, Iran, Turkey, Afghanistan, and Australia [1, 2]. *A. annua* is well-known medicinal plant for being as a source of antimalarial compound artemisinin [3]. *A. annua* essential oil has potential to be used in perfumery, cosmetics and aromatherapy [4]. Since the phytochemical compounds and oil composition and effects vary in different climate, our objective was to investigate the *A. annua* oil from Rasht region in Iran. The aerial parts *A. annua* was gathered, dried and powdered and extracted by Soxhlet apparatus with methanol. This extract was fractionated in to petroleum ether, chloroform and ethyl acetate fractions. Isolation and purification of chloroform and ethyl acetate fractions compounds were performed using CC, PTLC, MPLC and HPLC. As results of phytochemistry tests, 5 compounds as scopoletin (coumarin), scopolin (comarin glycoside), domesticoside (phloroacetophenone), chrysosplenol-D (flavonoid) and norannuic acid (bisor-cadinane) were isolated. Artemisinin wasn't found as a major compound. Structural elucidation of compounds carried out using different methods of UV, FTIR, EIMS, 1D, 2D-¹H, ¹³CNMR. The essential oil of *A. annua* prepared by hydro-distillation and was analyzed by GC/MS. 48 out of 52 compounds were identified. Major constituents were β -selinene (16.16%), camphor (12.12%) and β -caryophyllene (7.43%). In DPPH antioxidant test, the oil was able to reduce purple color of the stable free radical DPPH to the yellow colore with $IC_{50} = 22.6 \pm 2.93 \mu\text{l}$ which was more potent than vitamin E and BHA. Antimicrobial and antifungal tests carried out by Agar dilution method, showed inhibition against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Pseudomonas aeruginosa*, *Bacillus cereus*, *Bacillus subtilis*, *Candida albicans* and *Aspergillus niger* with MIC = 2.5, 2.5, 2.5, 1.25, 0.156, 2.5, 2.5 μml^{-1} respectively and did not show significant activity on *E. coli*.

References

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