



## Phytochemical constituents, antioxidant activity and toxicity potential of the essential oil from *Ferula gummosa* Boiss. roots

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**Background and objectives:** *Ferula gummosa* Boiss. (Umbelliferae) is a popular medicinal plant, which is known mostly for therapeutic uses of its oleo-gum-resin (*Barijeh* in Persian). In the present study, the essential oil of *F. gummosa* roots was investigated for its phytochemical constituents, antioxidant activity and toxicity potential. **Methods:** Phytochemical constituents of the essential oil (extracted by hydrodistillation method) were analyzed using GC-MS. Antioxidant and toxicity properties of the oil were also evaluated in DPPH free radical-scavenging assay and brine shrimp lethality test, respectively. **Results:** Forty-two compounds, representing 87.7% of total oil, were identified by GC-MS analysis of the plant roots oil. The essential oil was characterized by a high concentration of monoterpene hydrocarbons (55.9%), mainly  $\beta$ -pinene (33.2%),  $\beta$ -phellandrene (8.0%) and  $\alpha$ -pinene (6.9%). In DPPH free radical-scavenging assay, the oil sample did not demonstrate any activity at the highest tested concentration (1.0 mg/mL). However, it was found very toxic in brine shrimp lethality test with LD<sub>50</sub> value of 2.4  $\mu$ g/mL. **Conclusion:** The results of this study introduced the *F. gummosa* roots oil as a source of monoterpene hydrocarbons, especially  $\beta$ -pinene. Considering the high yield of essential oil extraction (12.1% v/w), these compounds may be involved in anticonvulsant, antinociceptive and anti-inflammatory properties of *F. gummosa* root. Moreover, considerable toxicity of the root oil highlights it as an appropriate candidate for further mechanistic toxicological studies.

**Keywords:** DPPH, essential oil, *Ferula gummosa* Boiss., GC-MS, general toxicity,  $\beta$ -pinene