Study of anatomy, palynology, micromorphology and antioxidant activity of *Salviasharifii* from East of Iran

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Introduction

Salvia L. is one of the most important genus of the Lamiaceae family with ۹۰۰ species in the world and so far ۷۰ species in Iran. *Salvia sharifii* Rech. f. & Esfand is one of the important genus of this species which has many therapeutic properties including anti-microbial, anti- flatulence and anti-rheumatism, due to its economic importance and its pharmaceutical, components, so its accurate separation and identification is necessary. The goal of this study was to identify the plant for the correct botanical identification and identify the active ingredients, antibacterial and antioxidant of aerial parts of *Salvia sharifii* collected from East of Iran.

Methods: In this study, fresh plant material was collected from Band Zareh region in South Khorasan province, considering the importance of taxonomy of trichomes, the morphology of glandular trichomes Capitate, peltate and non-glandular, the decorations of trichome level, Stomata, palynological and Nutlet Micromorphology, the SEM was used and the anatomy of the leaves, petioles and stems of the species were studied in South Khorasan province Iran. The active component of the methanolic extract were separated and identified by gas chromatography (GC) and gas chromatography- mass spectrometry (GC-MS) methods. The total phenolic contents of the extracts were determined by Folin-Ciocalteu method and the antioxidant activity was evaluated using DPPH (۲, ۲ -diphenyl ۱-۱ picrylhydrazyl) assay. The essence of the aerial parts was extracted by Clevenger apparatus. The effect of essence against S*taphylococcus aureus* and *Escherichia coli* was tested by the micro dilution method.

Result: The results showed that trichomes in the surface of leaves and petioles have more similarities compared to different stem. The biggest Capitate glandular trichomes in the stem was found. Diacytic Stomata, the main vein shape rectangular - oval with a flat top surface, sclerid as a whole bunch around the vascular bundles surrounding and dorsi - ventral mesophilic leaves with ۲-۳ layers of palisade parenchyma and layer ٤-٥ Spongy parenchyma was observed. Irregular semicircle petiole with the two accessory layer, ٦ vascular bundle in the center and two small handles at the top and stem were totally square. The type and shape of pollen hexacolpate, oblate spheroidal and spherical-oval shape mericarps was wide, length to width ratio of ۱,۳٥ mm decorations spherical bulge irregular

skeletal mericarps surface was observed. The result of this study revealed that Bornyl acetate (۲۰,۸۵٪),*β*- Caryophyllene (۱۵,۷۹٪) and Camphene (۱۵,۶۳٪) were the most prevalent components of the methanolic extract. The minimum inhibitory concentration of the essential oils against S*taphylococcus aureus* and *Escherichia coli* were ۳/۷۵mg/ml and ۷/۵mg/ml respectively. Also, the amount of phenolic component of the methanolic extract was۲۹µg/mgand the antioxidant activity of methanolic extract and essence were ۳۲/۱ and ۵۸/۲µg/m, respectively.

Conclusions

In conclusion, taxonomical characters such as the midrib form, the shape and number of sclerid above the vascular bundle, the petiole form and the number of large vascular bundle in the center and small subsidiary bundle on the sides of the petiole, the shape of glandular and non-glandular trichoms and decorations of mericarps was helpful character to identify *Salvia* species. The results indicated methanolic extract of *Salvia sharifii* has strong antioxidant activity. Present Bornyl acetate in *Salvia sharifii*, the major compound in plant extract plays an important role in antimicrobial activity