

# A REVIEW ON TEUCRIUM OLIVERANUM, A PLANT FOUND ABUNDANTLY IN SAUDI ARABIA

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**ABSTRACT:** Saudi Arabia is one of the oldest inhabited region of world by mankind. It has a vast variety of plants from North to South. The Northern region is rich in plants suitable for Mediterranean climate. *Teucriumoliverianum* is known as *Qassapa* in local language, vernacular name reported as *Aihan* common habitat is silty soils of inland basins or rocky runnels bearing sand layers. The flowers are velvety purple, therefore preferred as ornamental plant. The plant is traditionally used for diabetes. Initial screening for phyto-constituents was carried out by several researchers which show the presence of alkaloids, flavonoids, sterols, tannins, saponins, coumarins, volatile oil and cardiac glycosides. Much work has been carried out on aerial parts of *Teucriumoliveranum* which resulted in isolation of Neo-clerodane diterpenoids *teucrolivins A, B, C, D, E* and *F*. Literature search shows analgesic, anti-inflammatory, insecticidal, cytotoxic, and anticholesterol and anti-diabetic activities in *Teucriumoliverianum*.

**Keywords:** *Teucriumoliveranum*, Saudi Arabia, *Teucrolivins*, Pharmacological activities

## INTRODUCTION

Saudi Arabia is one of the oldest inhabited region of world by mankind. It has a vast variety of plants from the North to South. The Northern region is rich in plants suitable for Mediterranean climate. *Teucrium* is a common wild growing genus of perennial plants including hundreds of species. This genus is named after King Teucer of Troy, described as son of river in Greek mythology. Common name for this genus is *Germanders*. This genus belongs to *Lamiaceae* family and all species are rich in essential oils. Their major use is as ornamental plants, but some possess culinary and medicinal value [1].

Genus *Teucrium* contains almost 340 species. Literature search shows anti-oxidant, analgesic, anti-inflammatory, anti-ulcer, insecticidal, anthelmintic, cytotoxic, antispasmodic, antibacterial and antifungal activities in various in *T. polium*, *T. orientale*, *T. royleanum*, *T. buxifolium* and *T. stocksianum* [2,3,4, 5 and 6]. *T. polium* is reported for its antioxidant and xanthine oxidase inhibition activities [7, 8]. Anti-inflammatory and analgesic activities of hydro-alcoholic extract of this plant which exhibited mild analgesic effect. The author suggested mode of action through opioid receptors, stimulation of GABAergic system, promotion of endogenous opipeptides release or decrease of free radicals [9]. *T. monatum* and *T. divaricatum* also possess diterpenoids as reported by some authors [10, 11].

*Teucriumoliverianum* is known as *Qassapa* in local language, vernacular name reported as *Aihan* common habitat is silty soils of inland basins or rocky runnels bearing sand layers. The flowers are velvety purple therefore preferred as ornamental plant. The plant is traditionally used for diabetes [12, 13].

## IMAGES OF TEUCRIUM OLIVERANUM



## CHEMICAL CONSTITUENTS

Initial screening for phyto-constituents was carried out by several researchers which shows the presence of alkaloids,

flavonoids, sterols, tannins, saponins, coumarins, volatile oil and cardiac glycosides [14]. Much work has been carried out on aerial parts of *Teucrium oliveranum*. Isolation of Neo-clerodane diterpenoids *teucrolivins A, B, C, D, E* and *F* was made using spectrometric and chemical methods to establish their structures mentioned in Table I [15, 16].

Few years later, structure of *Teucrilivin E* was revised that it contains a tetrahydrofuran ring instead of an oxetane ring conducted by NMR experiments including homonuclear and heteronuclear correlations [17], while *Teucrilivin F* and *G* were also isolated. Again in continuation to similar studies two new neoclerodane diterpenoids, 6-deacetyl-*teucrolivin A* and 8β-hydroxy-*teucrolivin B* were isolated from the aerial parts of *Teucrium oliveranum* [18].

## PHARMACOLOGICAL ACTIVITIES

### Antinociceptive Activity

Antinociceptive and anti-inflammatory activities were investigated in albino Wistar rats by formalin induced test in doses of 300 and 600 mg/kg body weight of Hydro-alcoholic extract of *Teucrium oliveranum*. Both doses exerted positive results but those of higher dose were better. Possible mode of action was suggested that the plant extract might act through opioid receptors, stimulation of GABAergic system, promotion of endogenous opipeptides release or decrease of free radicals [9].

### Anti-diabetic Activity

Aqueous and ethanol extract of *Teucrium oliveranum* were tested for antidiabetic activity in alloxan induced diabetic mice. Both extracts significantly reduced blood sugar levels [14].

### Anti-feedant Activity

Phytoconstituents *Teucrilivin A, B* and *C* were tested for anti-feedant activity against some strains of insects including *S. podopteralittoralis*, *S. frugiperda* and *Helicoverpa armigera*. Among this *Teucrolivin A* exhibited significant anti-feedant activity [17].

### Anti cholesterol Activity

The aqueous extract of *Teucrium oliverianum* was tested in rats at a dose of 400 mg/kg body weight for one month

**Table1:**

No	Compound	Structure established
1	Teucrolivin A	6 $\alpha$ ,19-diacetoxy-4 $\alpha$ ,18;15,16-diepoxy-3-oxo- <i>neo</i> -cleroda-13(16),14-diene-12 <i>R</i> ,10 $\beta$ -hemiacetal
2	Teucrolivin B	3 $\beta$ ,19-diacetoxy-4 $\alpha$ ,18;15,16-diepoxy-6 $\alpha$ ,10 $\beta$ -dihydroxy- <i>neo</i> -cleroda-13(16),14-dien-7-one
3	Teucrolivin C	19-acetoxy-4 $\alpha$ ,18;15,16-diepoxy-3 $\beta$ ,6 $\alpha$ ,10 $\beta$ -trihydroxy- <i>neo</i> -cleroda-13(16),14-dien-7-one
4	Teucrolivin D	3 $\beta$ ,7 $\beta$ ,19-triacetoxy-4 $\alpha$ ,18;15,16-diepoxy-6 $\alpha$ -hydroxy- <i>neo</i> -cleroda-13(16),14-diene
5	Teucrolivin E	3 $\beta$ ,19-diacetoxy-4 $\alpha$ ,18;15,16-diepoxy-6 $\alpha$ -hydroxy- <i>neo</i> -cleroda-13(16),14-dien-7-one
6	Teucrolivin F	6 $\alpha$ ,19-diacetoxy-4 $\alpha$ ,18-epoxy-3-oxo-13,14,15,16-tetranor- <i>neo</i> -clerodan-12,10 $\beta$ -olide

which significantly decreased cholesterol levels in treated groups [19].

#### Hematological studies

The aqueous extract of *Teucrium oliverianum* decreased the serum levels of ALT, total lipids, bilirubin, total proteins, albumin,  $\alpha$ -globulins, A/G ratio and uric acid. Haematological studies exhibited a significant increase in leukocyte count and PCV% after four week oral feeding [19].

#### Anti-cancer Activity

Cyto-toxic Activity was investigated *in vitro* for *Teucrium oliverianum* plant extract on human breast adenocarcinoma cells along with some other extracts. The method used was MCF-7 cell proliferation using MTT assay after one day exposure to extracts. Mild significant anti cancer activity was found i.e. 66% survival of cancer cells was reported [20].

In another study plant extract was tested against hepatocellular carcinoma in rats which exhibited significant improvement in biochemical parameters like and structural organization of liver thus proving anti tumor efficacy of the *Teucrium oliverianum* [21].

#### CONCLUSION

The plant *Teucrium oliverianum* is a wild growing abundantly found plant possessing important phyto-constituents and medicinal properties. It can be used for formulation of anti-cancer herbal medicine.

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