

**Scientific Name:** *Melilotus indicus* (L.) All.  
**Synonym :** *M. parviflora* Desf.  
**Local Name:** Zerareca  
**Arabic Name(s):** Ekleil almalik, handagog, Gard, Nafлах, handagog bostani, Ghosn alban  
**Common Name(s):** Indian sweet-clover, sour clover, small melilot, small flowered sweet clover  
**Family:** Fabaceae ( Leguminosae)  
**Sub Family:** Papilionoideae



**Flowers**



**Whole plant**



**Leaves**

**Description :**

Annual or biennial, erect or prostrate herb, branching from base, 10-50cm high sometimes to 80-100cm in favorable conditions. Leaves compound ,aromatic, trifoliate, petioles up to 40mm long, stipulate; leaflets 8-22mm, 3-12mm wide, obovate, obtuse with denticulate margin. Inflorescence terminal or axillary racemes with long axis up to 45 mm long, to 50-60mm wide in fruit; flowers small 3.5-5mm., yellow in color. Fruit legume, pod round or oval wrinkled, 3mm long, with one or rarely two seeds; seed smooth, ovoid-elliptical, 1.5-3mm long, yellow or greenish yellow, sometimes with purple spots.

**Habitat & Distribution:**

The plant found in Asia, Europe and throughout Arabia as a weed of cultivation ; and has been introduced to many regions of the world.

**Part(s) used:**

Whole plant, seeds

### Traditional & Medicinal Uses:

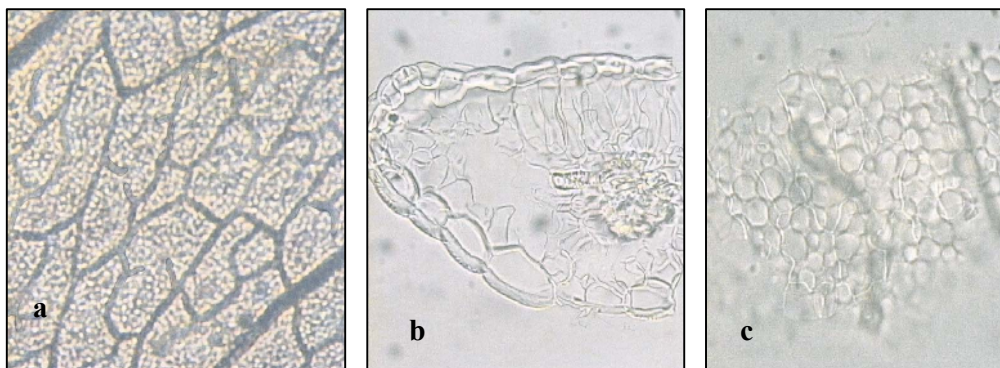
The plant is antispasmodic, emollient, analgesic, insect repellent, tonic, astringent, it is used for swellings, tumors, skin rash, wounds, gastrointestinal problems and colds. Seeds taken to treat genital organ diseases.

### Pharmacognosy and Phytochemistry

Parts studied : Aerial Parts

### Microscopic Description

In surface view, the upper epidermis is shown to consist of polygonal cells that have thick and more or less sinuous beady cell walls. A transverse section of the leaf lamina shows the leaf to be dorsiventral with the palisade tissues exclusively underlying the upper epidermis. The oval stomata are numerous and they are of the anomocytic type but the anisocytic type of stomata is also observed. The upper epidermis is covered with a thin unstriated cuticle. The palisade tissue of the mesophyll is composed of two layers of elongated compactly arranged parenchyma cells with straight cell walls. These cells contain brownish and yellowish colouring materials. The spongy mesophyll consists of several layers of compact polygonal or more or less spherical thick-walled parenchyma cells. Part of these cells are embracing the vascular strands of phloem and xylem tissues. The venation is reticulate and the xylem vessels are either spirally or annularly thickened. The lower epidermal cells are larger in size compared with those of the upper epidermis and they have thinner but markedly wavy walls. They are somewhat longitudinal above the vein areas. The lower epidermal cells are rich in crystalline structures and minute particles with various colours. The oval stomata are also numerous and both anisocytic and anomocytic types of stomata are observed though the latter is the most dominant (DPS ZCHRTM Unpublished Results).



**(a).** A general surface view of the lower epidermis of the leaf showing the intricate type of venation. **(b).** TS of the leaf near the margin showing the oblong upper epidermal cells and the relatively large lower epidermal cells, the palisade tissues and the spongy mesophyll cells embedding vascular tissues. **(c).** A portion of the leaf showing the comparatively smaller upper epidermal cells (including oval stomata)

with the underlying palisade cells in a surface view. ( magnifications: x 100, x 100 and x 400).

### Organoleptic characteristics:

Appearance :	Solid powder
Colour:	Brownish gray
Odour :	Aromatic
Taste :	Bitter

### Physicochemical constants:

**Loss in weight on drying at 105<sup>0</sup>C (%):** 11.00-11.20

#### Solubilities (%)

Alcohol solubility :	3.20
Water solubility:	29.60
10% ethanolic extractive:	45.60

#### Ash values (%)

Total ash:	10.80-12.20
Water soluble ash:	4.80-5.20
Acid-insoluble ash :	0.60-0.80

#### Successive extractive (%)

Petroleum ether (60-80 <sup>0</sup> C) :	1.70
Chloroform:	2.00
Absolute alcohol:	7.90-8.15
Distilled water :	Not done

#### pH values

pH of 1% solution:	5.992
pH of 10% solution:	5.640

The above results are under process of publication( DPS ZCHRTM UnPub. Results).

### Chemical constituents:

Coumarin, herniarin, umbelliferene and scopoletin have been identified in the plant. The presence of  $\beta$ -sitosterol, a sterol or triterpene alcohol, choline and an aromatic compound have also been reported. ( Rizk 1986,DPS , ZCHRTM Unpub, results; )

### Pharmacological and Toxicological studies:

Melilotus indica has been reported to be emollient, astringent, strongly laxative and narcotic (Cooper & Johnson 1984, Chopra. et. al. 1986). The plant contains coumarin, which is reported to be anticoagulant (Duke & Ayensu 1985).

The dried leaves are reported to be toxic, whereas the fresh leaves are quite safe. This is due to the presence of coumarin, the substance that gives some dried plants the smell of hay. If taken internally it can prevent the blood from clotting (Cooper & Johnson 1984, Duke & Ayensu 1985) the leaves and the aerial parts of the plant are known to as insect repellent (Moerman, 1998).

**The pharmacological and toxicological studies carried out in ZCHRTM laboratory and the results of Aqueous extract have been given below:**

The results presented without references showed unpublished data (UPD, ZCHRTM, DBMS):

<b>ACTIVITY</b>	<b>RESULTS</b>
<b>Anti-inflammatory activity-Rat paw oedema</b>	No anti-inflammatory activity was observed. Increased in paw volume at both the doses were recorded.
<b>Antinociceptive activity-Writhing</b>	Showed significant analgesic activity.
<b>Locomotor activity</b>	Did not show any change in locomotor activity.
<b>Effect on GIT smooth Muscle- Isolated rabbit jejunum</b>	Produced mild reduction in amplitude.
<b>Effect on GIT smooth Muscle- Isolated rat fundus</b>	Produced slight contraction.
<b>activity Anti-epileptic (Anticonvulsant activity)</b>	Increase in onset of clonic convulsion, onset of tonic convulsion. % mortality reduced.
<b>Gross behavioral studies - Tremor/Twitches</b>	No toxic effect observed.
<b>Gross behavioral studies-Writhing</b>	No writhing observed.
<b>Gross behavioral studies -Diarrhea, Urination</b>	No diarrhea observed.
<b>Mortality</b>	No death was recorded.
<b>&amp;Motor co-ordination (String Platform test)</b>	Motor co-ordination not affected.
<b>Acute toxicity studies-</b>	No toxic signs and symptoms observed.
<b>LD<sub>50</sub> evaluation</b>	<6.4 g/kg.

**Summary of the results:**

The plant extract showed a significant analgesic activity, produced mild reduction in GIT smooth muscle amplitude. No death and no toxic signs were observed on acute toxicity administration. Increased in the onset of colonic convulsion and percentage mortality reduced.

### References:

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