**Scientific Name:** *Ammi visnaga* (L.) Lam.Fl. Fl. Franc.

**Synonym:** *Daucus visnaga* L.

**Local Name:** Khilla

**Common Name:** Toothpick Plant, Bishop’s Weed

**Arabic name:** Khilla Baladi; Bizr Alkhilla, Kulla, Khilal, Sowak Alnabi, Saq Alaroos

**Family:** Apiaceae (Umbelliferae)

**Description:**
Annual herb, 30-150 cm high, slightly aromatic stems erect, robust, much branching, cylindrical, furrowed, densely leafy. Leaves alternate, with special odor, with broad leaf sheath, lower leaves pinnate, with narrowly-liner lobes; middle and upper leaves 2-3 pinnate, with filiform lobes. Inflorescence dense umbel with numerous rays (to 120 or more) slender in flower, thickened and stiff in fruit, hence used as toothpick. Bracts pinnatisect, as long as or longer than the rays; bracteoles small, flowers white, pedicels erect, rigid in fruit, fruit cremocarp about 2 mm long, glabrous with thick ribs, separated into two mericarps, mericarp 1mm c.x 2mm l., greenish brown.

**Habitat & Distribution:**
Widespread in the Mediterranean and western Asia, found also in North & South America and Europe. In U.A.E it is cultivated in private farms.

**Part(s) Used:**
Seeds, rays of umbel

**Traditional & Medicinal Uses:**
Seeds are diuretic, carminative, stimulant, antispasmodic, vasodialator. Seeds used to treat congestion of prostrate gland, urinary diseases and renal stones, asthma remedy,
respiratory problems, circulatory herb used to relax the coronary arteries, and helps to improve blood supply to the heart muscle and thereby eases angina, and also for dental care. The dry umbel rays used as toothpicks.

Pharmacognosy and Phytochemistry

Parts studied: Fruits

Microscopical Description:
A transverse section of the mericarp is an almost regular pentagon with one of its sides slightly longer which is the commissural surface at which the two mericarps are attached. The epicarp is composed of a layer of indistinct colourless, polygonal, papillose, thin-walled parenchyma covered with faintly striated cuticle. The mesocarp encloses vascular strands on the outer side of which is found a large space (lacuna) just below the epidermis of each primary ridge. Below the epidermal part of the secondary ridges are a group of radiating club-shaped parenchyma cells that are associated with the secretory canals known as vittae which are filled with dense brown contents. The endocarp is composed of elongated thin-walled cells which are surrounding the seed testa. The testa is composed of one or two layers of thin-walled cells that contain brown pigments. The endosperm of the seed consists of almost rounded parenchyma cells having intercellar spaces. The cells contain aleurone grains and microrosette crystals of calcium oxalate (DPS,ZCHRTM Unpub.Results).

(a). TS of the one-seeded khella fruit (mericarp) showing its characteristic features including the pentagon shape brownish seed coat, large endosperm, vascular tissues, vittae, lacunae, and here is showing a cotyledon. (b). Section of the one-seed fruit showing the cyledons surrounded by the endospermic parenchyma cells. (c). Longitudinal section of the fruit (mericarp) near its tip showing the vascular tissues (dark grey) and the vittae (oil canals, violet brown). (Magnifications: x 100, x 400 and x 100, respectively).
Organoleptic characteristics

Appearance: Solid powder
Colour: Brown
Odour: Aromatic
Taste: Bitter

Physico-chemical constants:

Loss in weight on drying at 105°C(%): 4.60

Solubilities (%)
- Alcohol solubility: 16.8-18.40
- Water solubility: 34.4-35.04
- 10% ethanolic extractive: 32 – 34

Ash values (%)
- Total ash: 9.4
- Acid insoluble ash: 0.6
- Water soluble ash: 2.9

Successive extractives (%)
- Petroleum ether: 3.40
- Chloroform (60-80°C): 6.10
- Absolute ethanol: 11.10
- 10% ethanolic water extract: 19.50

pH values
- pH value of 1% solution: 5.92
- pH value of 10% solution: 5.64

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

Chemical Constituents:
The major constituents are γ-pyrones (furanochromone) derivates, 2-4%) with the principle compounds being khellin (0.3-1.2%) and visnagin (0.05-0.3%) other γ-pyrones of significance are khellinol, amiol, khellol and its glucoside khellenin (0.3-1.0%). A second group of major constituents are the coumarins (0.2-0.5%), the principle of which is the pyranocoumarin, visudin. Essential oil contains camphor, α-terpinol, linatool. (DPS, ZCHRTM Unpub. results; Dic. Nat. Prod., Buckingham 1994).

Pharmacological and Toxicological studies:

Visnagin, an active principle extracted from the fruits of Ammi visnaga, exhibits peripheral and coronary vasodilator activities and has been used for the treatment of angina pectoris (Durate et al., 1995). Khellin and visnagin, both inhibited the spasms, indicating an involvement of a calcium channel-blocking mode of action for visnagin (Rauwald and Odenthal, 1994). Khellin was found to increase HDL-cholesterol in normolipaemic subjects (Harvengt et al., 1983). Visnagin caused non-specific inhibition of vascular smooth muscle contractility (Durate at al., 1995).
Ammi visnaga seeds were studied on experimentally induced kidney stones in male Wistar albino rats. Uremia and hyperbilirubinaemia observed in glycolic acid control group were found to be ameliorated by Ammi visnaga seed extract treatment (Khan et. al., 2001). Ammi visnaga extract was reported to be good for expulsion of urinary crystals (Westendorf, et. al., 1981) The plant was found to possess hypoglycemic activity (Yaniv et. al., 1987).

The pharmacological and toxicological studies carried out in our laboratory and the results in brief, on Ammi visnaga (10% ethanolic extract) have been given below. The results presented without references showed unpublished data (ZCHRTM, DBMS Unpub.Results).

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antinociceptive activity-Writhing</td>
<td>Not found effective.</td>
</tr>
<tr>
<td>Anti-hypertension activity-Anaesthetic rats</td>
<td>Not effective at the dose studied.</td>
</tr>
<tr>
<td>Vasorelaxant activity-Isolated aortic strip</td>
<td>Produced relaxation.</td>
</tr>
<tr>
<td>Vasorelaxant activity-Isolated rat mesenteric bed</td>
<td>Vosorelaxant.</td>
</tr>
<tr>
<td>Cardiovascular studies</td>
<td>Produced hypotension (Zakaria et. Al., 2000c)</td>
</tr>
<tr>
<td>Effect on uterine muscle-Isolated rat uterus</td>
<td>Shifted DRC (Dose response curve).</td>
</tr>
<tr>
<td>Anti-coagulant activity</td>
<td>Increased prothrombin time.</td>
</tr>
<tr>
<td>Effect on GIT smooth muscle-Isolated rabbit jejunum</td>
<td>Reduced amplitude.</td>
</tr>
<tr>
<td>Effect on GIT smooth muscle-Isolated rat fundus</td>
<td>Reduced resting tension.</td>
</tr>
<tr>
<td>Gross behavioral studies-Tremor/Twitches</td>
<td>Produced tremors.</td>
</tr>
<tr>
<td>Gross behavioral studies-Respiration rate</td>
<td>Respiration increased initially.</td>
</tr>
<tr>
<td>Gross behavioral studies-Diarrhea, Urination</td>
<td>Not effective.</td>
</tr>
<tr>
<td>Mortality</td>
<td>Mortality at higher dose recorded.</td>
</tr>
</tbody>
</table>
Motor co-ordination (String & Platform test) Not effective.

Anti-asthmatic activity-Guinea pig tracheal chain Bronchorelaxant.

Anti-asthmatic activity-In vivo studies in Guinea pig Increased onset time.

Anti-tussive activity-SO$_2$ induced Reduced recovery time.

Acute toxicity studies Produced symptoms.

LD$_{50}$ evaluation oral >6.4 g/kg.

LD$_{50}$ evaluation i.p. Between 1.6-3.2 g/kg.

Summary of the results:
*Ammi spp.* is strong vasorelaxant. The extract is found brochio-relaxant.

References:
- Department of Biomedical Sciences, Zyed Complex for Herbal Research and Traditional Medicine, Unpublished results.
- Department of Pharmacognostic Sciences, Zyed Complex for Herbal Research and Traditional Medicine (ZCHRTM ),unpublished results.
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• محمد العودات، جورج لحام النباتات الطبية واستعمالاتها (1988) الجزء الأول الطبعة الثانية. الأهلية، سوريا.