Morphological Description:
A malodorous shrublet with much branched leafy stems. Leaves bi- or tripinnatisect, glaucous leaflets narrowly oblong-lanceolate to obovate, to 6 mm wide, inflorescence glabrous, corolla with oblong, ciliate petals. Color yellow. Fruit a globose capsule 6-9 mm.

Geographical Distribution:
Local: In Morocco, there are four varieties of Ruta chalepensis with some differences in geographical distribution.
- Var. angustifolia (Pers) Wilk.: Rif, Oranian sector, western part of the central Morocco, occidental Morocco, Macaronesian sector, Sous, High Atlas,
- Var. bracteosa (DC) Bois.: Rif, North part of central Morocco, Macaronesian sector, Tingitane peninsula.
- Var. intermedia Rouy.: Central Morocco.
- Var. Jacobae Maire: mentioned in Talat n’Yacoub (High Atlas), it is endemic to Morocco.
Regional: Morocco to Libya.
Global: Europe, Mediterranean region, Asia Minor

Ecology:
This plant grows in rocky limestone areas and on cliffs from sea level to 2 300 m.
Cultivation: sunny, dry, rock crevices, protection against winter wet.
Propagation: seed in spring; division in spring; cuttings in late summer.

Status:
IUCN not threatened.

Parts Used:
Leaves, Flowering stems, Roots,

Constituents:
Phytochemical studies of root and aerial parts of the plant showed that Ruta chalepensis is rich in active alkaloids and furocoumarins and contain other coumarin classes, flavonoids, tannins, volatile oil, sterols and/or triterpenes. Several alkaloids were isolated from the aerial part and/or root of Ruta chalepensis: arborinine, graveolene, graveolinine, dictamnine, pteleine, skimmianine, isogravacridonechlorine, maculosidine, and 4-methoxy-1-methyl-2 (1H)-quinolinone, kokusaginine, ribalinidine, rutacridone, isotaifine, 8-methyl-taifine, taifine, Chaloridone, 1-hydroxy-N-methyl-lacridone, 5-methoxy-dictammine and others. Among these, some were also found in other Ruta species like Rata graveolens, the cultivated species.
Coumarins and coumarin glucoides: xanthotoxin, bergapten, chalepensin, clausindine (= rutolide), isopimpinelline psoralen, chalepine (= heliettine), chalepine acetete, rutarin, byakangelicine, chalepensol, acethyl chalepensol rutalpine, xantilerine, angustifolin 7-methy ether. rutaresine, daphnorine, and other coumarins : ombelliferone. This species contain also rutin and 8-methoxypsoralen. Shikimic derivatives: moskachan A, B, C, D, dehydro-moskachan C.

Dry seeds contain 26.4 % protein and 33.2 % fat.

**Pharmacological Action and Toxicity:**

The alkaloid, arborinine, has abortive, anti-inflammatory, antihistaminic, and spasmolytic properties. The furanocoumarins, bergapten and xanthotoxin, have spasmolytic effects on smooth muscles and have phototoxic properties useful in treating psoriasis. Rutin is best known for its ability to decrease capillary permeability and fragility. It is also said to be cancer preventive. Rutin is also useful to counteract edema, atherogenesis, thrombogenesis, inflammation, spasms, and hypertension. It was once official in U.S. for arteriosclerosis, hypertension diabetes, and allergic manifestations. It is suggested that it may be useful for stroke prevention.

*Ruta chalepensis* is among other herbs used in the traditional medicine of Arab countries for the treatment of rheumatism, arthritis, gout and other forms of inflammation were tested against carrageenan-induced acute inflammation in rats. The ethanol extract of this plant produced significant inhibition of carrageenan-induced inflammation in rats and also inhibited cotton pellet-induced exudation. An ethanolic extract of the aerial parts of *Ruta chalepensis* tested in laboratory animals produced anti-inflammatory, antipyretic and CNS depressant activities but was not analgesic and did not produce any significant changes in prothrombin time and fibrinogen level. However, the alcoholic extract of *Ruta chalepensis* was demonstrated to have a significant inhibitory effect on collagen-induced platelet aggregation of human blood in vitro. In traditional medicine, plants are used in fertility regulation. Extracts from Rutaceae are known to posses such activity. Among these *Ruta chalepensis* has been used as an antifertility in Turkish and Chinese cultures. Antifertility activity of *Ruta chalepensis* extracts and some coumarins (bergaptol, chalepensin, xanthotoxin, chalepin) was established. Bergaptol beeing the most active compound. In *Ruta graveolens*, chalepensin was the most active principle. Chalepensin was shown, on the other hand, to have an effect on the sleeptime of hexobarbital in mice. Chalepensol had no effect whereas chalepin have only relatively weak activity. The traditional use of *Ruta chalepensis* in Morocco to treat jaundice may be related to the enzyme induction of its components and increased conjugation of bilirubine by liver.

Chalepensin was also found to have molluscicidal activity. On the other hand, ether extract, capric acid, xanthotoxin, and isopimpinellin were demonstrated to be active against insects of stored grains and confirm the traditional use of this plant as stored grain protector.

In the Rutaceae Family, the species of toxicological importance are *Ruta graveolens* and *Ruta chalepensis*.

Oral acute and chronic toxicity studies of the ethanolic extracts of *Ruta chalepensis* aerial parts were carried out in mice. The results showed a significant fall in RBC level in treated animals, but failed to show spermatotoxic effects. Male mice gained significant weight during chronic treatment while a loss or no significant change in weight was noticed in the female mice treated with the same extracts.

Perinatal toxicology of *Ruta chalepensis* studied in mice tends to confirm the embryotoxic effect of the plant and its harmful use. All furanocoumarins are capable of inducing photo-sensitization such as psoralen, xanthotoxin, and bergapten. Furanocoumarins have long been used for the treatment of vitiligous areas. After contact with juice of the plant, the skin can develop erythema, hyperpigmentation, and occasionally vesiculation upon exposure to sunlight.

**Traditional Medicine and Indigenous Knowledge:**

Flowering branches are used as vulnerary, emmenagogue, spasmodic. Fresh plant as scorpion and insects repellent, leaves and seeds boiled in olive oil and the mixture is rubbed for rheumatism pains and swellings.
The infusion of the aerial part is used orally or in external application in respiratory affections, gout, edema, oliguria, paralysis, and menstruation with pain, epistaxis, headache (poultice on the head). Oral administration of the infusion of entire plant for colds, in abdominal pains, intestinal parasites, and scorpion bites. Plant boiled in milk and taken against nervousness; dried plant used as snuff for nasal diseases. The infusion of plant is cooled and used as eardrops for earaches. It is also used as nose drops against vomiting and fevers in children and babies. The powder is snuffed to children in case of fever (east of Morocco). The infusion of the roots is used for treatment of hepatic diseases, especially jaundice with 2 cups per day. In fumigation the plant combined with harmel, coriander seeds, and cade oil is used to treat epilepsy, against the bad eye. The toxic as well as abortive properties of the plant are well known by women, who use it for this purpose in decoction to drink or for vaginal injections. Therefore, the plant is best avoided during pregnancy.

History:
Ruta is known since ancient times for its medicinal uses. HIPPOCRATE mentioned it as a remedy against snake’s venom. RHAZES reported its use as a constituent of asa fetida used against “colds poisons”. ABDEREZAQ mentioned that the plant is a good appetizer, diuretic, enmenagogue. It was used in paralysis, and all the affections of the articulation (Arthritis). Its sap was used to purify the eyes. In the writings of DAWOUD EL-ANTAKI, in his “Tazkarat Oli El-albab” gave a detailed account of drug in treating the skin diseases. Both spontaneous and cultivated species were mentioned by IbN AL-BAYTAR (LECLERC, 1877-1883, n° 905, 999, 1166, 1413, 1718), Umdat at-tabib (n° 2240), AL-WAZIR AL-GHASSANI (n° 286), Tuhfat al-ahbab (n° 364, 404) and ABDEREZAK (LECLERC, 1974, n° 712, 819) under the names sudab and figel. Ruta chalepensis was said, in addition to its medicinal properties, to be used as antifertility plant in Turkish and Chinese civilizations for hundreds of years.

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