

***Ruta chalepensis* L.**
Rutaceae



Compiled by: Dr. Driss Lamnauer
Edited by: Prof. Kamal Batanouny

■ **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

***Ruta chalepensis* L.**

Ruta bracteosa DC. ; *Ruta graveolens* L. var. *angustifolia* Hook. ; *Ruta Frangiata* (*Ruta Chalepensis*)
The genus name "Ruta" comes from the Greek word "reuo", to set free, showing its reputation as a freer from disease.

Arabic: Fijel, Fijla, fidjel, Fidjla, Bou ghans, Chedab, Sadhab, Sadab, Routsa, Rutsa, Ruta. Shazab, Fejel
فيجل - فديجل - روط - روة - سذاب

Berber: Aourmi, Issin, Zent, Issel, Dje

English: Aleppo rue, Syrian rue, Fringed rue, Egyptian rue, Ruda

French: Rue d'Alep, Rue.

■ **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, graveoline, graveolinine, dictamnine, pteleine, skimmianine, isogravacridonechlorine, maculosidine, and 4-methoxy-1-methyl-2 (1H)-quinolinone, kokusaginine, ribalinidine, rutacidone, isotaifine, 8-methyltaifine, taifine, Chaloridone, 1-hydroxy-N-methylacridone, 5-methoxy-dictamnine and others. Among these, some were also found in other *Ruta* species like *Ruta graveolens*, the cultivated species.

Coumarins and coumarin glucosides: xanthotoxin, bergapten, chalepentin, clausidine (= rutolide), isopimpinellin psoralen, chalepine (= heliottine), chalepine acetate, rutarin, byakangelicine, chalepentinol, acetyl chalepentinol ritalpine, xanthilone, angustifolin 7-methyl ether, rutarensine, daphnoline, and other coumarins : umbelliferone. This species contains 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 ethanolic 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 possess 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 (bergapten, chalepentin, xanthotoxin, chalepin) was established. Bergapten being the most active compound. In *Ruta graveolens*, chalepentin was the most active principle.

Chalepentin was shown, on the other hand, to have an effect on the sleep time of hexobarbital in mice. Chalepentinol had no effect whereas chalepin has 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 bilirubin by liver.

Chalepentin 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 photosensitization such as psoralen, xanthotoxin, and bergapten. Furanocoumarins have long been used for the treatment of vitiliginous 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, spasmolytic. Fresh plant as scorpion and insect 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, emmenagogue. 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.

■ References

- Sekkat M. 1996. *Ruta chalepensis* : Composition chimique et activités insecticides. These de Troisième Cycle (DES), Faculté des Sciences, Rabat.
- Brooker R.M., J.N. Eble, and N.A. Starkovsky, 1967. Calepentin, chalepin and Calepin acetate, three novel furocoumarins from *Ruta chalepensis*. *Loyda*, 30: 73-77.
- Kong Y.C., C.P. Lau, K.H. Wat et al. 1989. Antifertility principle of *Ruta graveolens*. *Planta medica*, 55: 176-178.
- Gandhi M., R. Lal , A. Sankaranarayanan , and P.L. Sharma, 1991. Post-coital antifertility action of *Ruta graveolens* in femal rats and hamsters. *Journal of Ethnopharmacology*, 34: 49-59.
- Ulubelin A., L. Ertugrul, H. Birma, R. Yigit, G. Erseven, and V. Olgac, 1994. Antifertility effects of some coumarins isolated from *Ruta chalepensis* and *Ruta chalepensis* var. *latifolia* in rodents. *Phytotherapy Research*, 8: 233-236,
- Ulubelen A., H. Guner, and M. Cetindag 1988. Alkaloids and coumarins from the roots of *Ruta chalepensis* var. *latifolia*. *Planta Medica*, 54: 551-2.
- Al-Said M.S., M. Tariq, M.A. Al-Yahya, S. Rafatullah, O.T. Ginnawi, and A.M. Ageel, 1990. Studies on *Ruta chalepensis*, an ancient medicinal herb still used in traditional medicine. *Journal of Ethnopharmacology*, 28: 305-12
- Brener S., J. Friedman, 1985. Phytophotodermatitis induced by *Ruta chalepensis* L. *Contact-Dermatitis*, 12: 230-2.
- Shah AH, S. Qureshi, and AM. Ageel, 1991. Toxicity studies in mice of ethanol extracts of *Foeniculum vulgare* fruit and *Ruta chalepensis* aerial parts. *Journal of Ethnopharmacology*, 34: 167-72
- El Sayed K., M.S. Al-Said, F.S. El-Ferally, and S.A. Ross, 2000. New quinoline alkaloids from *Ruta chalepensis*. *J. Nat. Products*, 63: 995-7
- Zeichen de Sa R., A. Rey, E. Arganaraz, E. Bindstein, 2000. Perinatal toxicology of *Ruta chalepensis* (Rutaceae) in mice. *Journal of thnopharmacology*, 69: 93-8.

General references

- Bourarach K., M. Sekkat, et D. Lamnaouer, 1994. *Activité insecticide de quelques plantes médi-*

nales du Maroc. Actes Inst. Agron. Vét. (Maroc), 14: 31-36.

Lamnaouer D., K. Bourarach et S. Hannin, 1995. Evaluation de l'activité insecticide de quelques espèces végétales du Maroc. Actes Inst. Agron. Vét. (Maroc), 16: 49-54.

Charnot A., 1945. *Ruta chalepensis* L. in: La Toxicologie au Maroc. Mémoires de La

Société des Sciences Naturelles du Maroc, Rabat n° XLVII, Bellakhdar J., 1997. *Ruta chalepensis* L. in: La Pharmacopée traditionnelle Marocaine. Edition La Fennec, Ibis Press. 481-482.

Boulos L., 1983. *Ruta chalepensis* L. in: Medicinal plants of North Africa. Reference Publications, Inc. Algonac, Michigan, 158.