Ruta chalepensis L.
ጤና አዳም

Ruta chalepensis L.

Local and common names: **ጤና አዳም** T'iena-addam (Amh); Cilaatama, Ciiraakoota (Oro), **ጨናአዳም** Ch'enaaddam (Tig); Rue, Herb of grace, Fringed rue (Eng)

Voucher number and identification: GA063/AHRI/2025

Synonyms: *R. chalepensis* is known by four synonyms, among which *R. chalepensis* subsp. *latifolia*, *R. chalepensis* var. *latifolia* and *R. latifolia* are the later published names.

Varieties recorded in Ethiopia: There are no recognized infraspecific taxa or registered varieties of this species in Ethiopia.

Family: Rutaceae

Botanical and habitat distribution

R. chalepensis is a blue-green strongly aromatic perennial subshrub that can grow up to 1 m tall. The lower part of the stem is somewhat woody, while the upper stem remains herbaceous. The leaves are arranged alternately along the stem and are divided into many narrow, delicate segments, giving the plant a fine feathery appearance. The plant produces small yellow flowers at the tip of the brunches, each with 4-5 petals that have slightly fringed or finely toothed edges. The fruit is small, lobbed capsule that opens at the top when mature and contains several small black seeds. *R. chalepensis* is widely grown in the Ethiopian highlands, particularly in areas above 1500 meters above sea level, where it is commonly cultivated for its aroma and traditional uses.

Conservation status

R. chalepensis is not currently included in the IUCN Red List, although POWO reports that the species is not threatened, which broadly corresponds to the IUCN category of Least Concern. The species is commonly cultivated in homegardens for various uses in Ethiopia, a practice that contributes to its continued conservation (Accession number 0094).

Propagation methods

R. chalepensis can be propagated from seeds, stem cuttings or by splitting older plants. Seeds should be sown in well-drained soil and kept moist until germination. Stem cuttings taken from healthy plants root readily, and older plants can carefully divided to produce new individuals. This species is adaptable and grows in a wide range of soils, provided the soil is not waterlogged, which can damage the roots and inhibit growth.

Ethnomedicinal uses

R. chalepensis has been widely used in traditional medicine in Ethiopia. The root is utilized to treat leishmaniasis by grounding into powder, and then mixed with black teff dough to create a paste for topical application on affected areas until recovery. The cooled decoction obtained from boiling the dry and fresh leaves is taken orally to treat malaria. Diarrhea is treated by chewing a fresh leaf mixed with salt, while common cold symptoms are relieved by inhaling the vapour of crushed fresh leaves through the nose. In veterinary practices, coccidiosis in hens is treated by crushing the bark and leaves of *R. chalepensis* with the root of *Justicia schimperiana* and mixing the paste with injera before feeding it to the birds. Additionally, for cough, *Cussonia ostinii* is used to pound *R. chalepensis* leaves, and the resulting mixture is also consumed with injera. *R. chalepensis* is commonly cultivated in most households in Ethiopia for its use in culinary and medicinal uses. Its local name (T'iena-addam) reflects its medicinal significance.

Major phytoconstituents

The essential oil of *R. chalepensis* contains 2-undecanone, 2-nonanone, 2-dodecanone, 1-nonene, α-phellandrene, and 2-methyl-octyl acetate as major constituents. In addition, the aerial part of the plant is rich in xanthotoxin, psoralen, rutin, hesperidin myricetin, rutin, and isorhamnetin. In addition, alkaloids such as dictamnine, pteleine, skimmianine, rutacridone, isogravacridonechlorine, maculosidine, graveoline, and graveolinine are also reported from the plant.

Pharmacology and safety evidences

Pharmacological evidences

***Antimicrobial effect*:** In disc diffusion and broth dilution assays, ethanol extracts of the aerial parts of *R. chalepensis* demonstrated strong antibacterial activity against *Proteus penneri* and *Staphylococcus aureus*, as well as antifungal activity against common fungi, including *Candida albicans*. In addition, the ethanolic extract of dried leaves exhibited dose-dependent *in vivo* antimalarial activity against *Plasmodium berghei* in animal models.

***Antidiabetic effect*:** Leaf infusion extracts of *R. chalepensis* demonstrated concentration-dependent inhibition of α-amylase and α-glucosidase enzymes and also exhibited insulinomimetic activity.

***Antidiarrheal effect*:** The 80% methanol leaf extract of *R. chalepensis* showed significant, dose-dependent antidiarrheal activity in a castor oil–induced diarrhea model in mice. Doses of 200 and 400 mg/kg effectively delayed diarrhea onset and reduced both defecation frequency and fecal output, comparable to the standard drug loperamide.

***Others pharmacological effects*:** Anthelminthic, antioxidant, anticoagulation, anticonvulsant, cytotoxic, anti-hypertensive, anti-inflammatory.

Clinical evidence

There are no clinical trials reports so far.

Safety

Oral administration of the crude ethanolic extract of *R. chalepensis* to mice elicited signs of toxicity, including lacrimation, reduced appetite, and depressive behavior, at a dose of 3000 mg/kg, although no mortality was observed at this dose.

Research gaps and recommendations

In addition to standardizing the plant, additional isolation and characterisation of the phytoconstituents from different plant portions should be carried out. Correlation study between the phytoconstituents and their pharmacological properties should be carried out.

References

1. Fullas FA (2016). Short Review on Tena'adam (*Ruta chalepensis* L)—Herb of Grace. https://wemezekir.blogspot.com/2016/09/culinary-and-medicinal-uses-oftenaadam.html.
2. Loizzo MR, Falco T, Bonesi M, Sicari V, Tundis R and Bruno M (2018). *Ruta chalepensis* L. (Rutaceae) leaf extract: chemical composition, antioxidant and hypoglicaemic activities. *Natural Product Research* 32(5): 521–528.
3. Alemayehu K, Engidaw D and Mustofa S (2016). Phytochemical analysis, antibacterial and antioxidant activity of the leave extracts of *Ruta chalepensis*. *Chemistry and Materials Research* 11(6): 1–7.
4. González-Trujano ME, Urbina-Trejo E, , Santos-Valencia F, Villasana-Salazar B, Carmona-Aparicio L and Martínez-Vargas D (2021). Pharmacological and toxicological effects of *Ruta chalepensis* L. on experimentally induced seizures and electroencephalographic spectral power in mice. *Journal of Ethnopharmacology* 271: 113866.