

Trachyspermum ammi (L.) Sprague
ነጭ አዝመ-ድ



***Trachyspermum ammi* (L.) Sprague**

Local and common names: ነጭ አዝሙድ Nech-azmud (Amh); Azmuudii-adii, kamunnii (Oro); አዝሙድ Azmud (Tig); Gumur-hurtui (Som); White cumin, Ajwain/Ajowan, Caraway (Eng)

Voucher and identification: GA058/AHRI/2025

Synonyms: *T. ammi* is also known by 32 synonyms, among which *Carum ammi*, *C. aromaticum* and *C. korolkowii* are the later published names.

Varieties recorded in Ethiopia

There are no recognized infraspecific taxa but numerous landraces of *T. ammi* are reported in Ethiopia. However, only two nationally released (registered) varieties are known: *T. ammi* var. *Takusa-1* and *T. ammi* var. *Dembia-1*. These varieties are characterized by high yield and stable genotypes and are recommended for large-scale cultivation in Ethiopia.

Family: Apiaceae

Botanical and habitat description

T. ammi is an erect annual herb with 10-60 cm height. The plant is much branched near the base. The leaves are also branched, the basal leaves withering early at time of flowering. Flowers are self-fertile, and clustered and born in umbels (numerous flowers born from the same point of emergence) bearing grayish-brown aromatic seeds. Calyx has short but distinct triangular and pale teeth. Petals are white or tinged with pink. Fruits are ovate (egg-shaped in outline with the broadest part near the base and the narrow part near the apex or tip) and densely covered with white papillae (hairlike structures). The species is widely cultivated at altitudes of 1500-2200 masl, although it prefers below 2000 m.

Conservation status

T. ammi is not currently included in the IUCN Red List. However, POWO reports that the species is not threatened, which broadly corresponds to the IUCN category of Least Concern. In Ethiopia, the plant is mainly cultivated for its culinary use.

Propagation method

T. ammi is propagated from seeds, which require well-drained, loose, and weed-free soil to ensure germination. The land is ploughed two or three times before planting. Seeds are sown by hand drilling at a depth of about 1 cm, either in rows or broadcasting. Row planting with spacing of 40 cm between rows and 10 cm between plants gives optimal seed yield, using a seeding rate of 4-4.5 kg/ha, while broadcasting requires 12kg/ha. The crop can be grown as a monocrop, mixed crop, or in double cropping systems often with safflower, barley, or teff in Ethiopia. Sowing time varies by region, typically from mid- to late July in Arsi, Showa, and Wollo, and from late July to mid-August in Dembia and Takussa of Gondar. Climatic conditions during sowing are reported to influence seed productivity. It grows best at altitudes below 2000 meters above sea level.

Botanic garden information

The plant was cultivated in AHRI-ALERT botanic garden in July 2024 using seeds of *T. ammi* var. *Dembia-1*, which were procured from the Gondar Agricultural Research Center (Accession number 0112).

Ethnomedicinal uses

The fruit and roots of *T. ammi* are used in various polyherbal preparations for the treatment of stomach complaints. The fruit is further employed as a vermifuge and as an abortifacient. Roasted and pulverized seeds are commonly taken to relieve stomach ache or discomfort. Fresh or dried leaves are boiled, and the resulting decoction is taken orally for asthma relief. In veterinary practice, the root is crushed in water and administered orally to animals to treat blackleg disease. In Ethiopia, although noted for its medicinal uses, *T. ammi* is cultivated and sold for its fruits, which are widely available in markets and mainly used in culinary purposes.

Major phytoconstituents

The major bioactive constituent of *T. ammi* seeds is the essential oil (EO), which contains more than 20 compounds. Thymol, p-cymene, and γ -terpinene together constitute over 90% of the oil. Their relative proportions, as well as the total EO yield (2.2%-10% in Ethiopia), vary depending on genotype, environmental conditions, agronomic practices, growth stage, post-harvest handling, storage, and extraction methods.

Pharmacological and safety evidences

Preclinical evidences

Antimicrobial effect: The essential oil of *T. ammi* and crude *T. ammi* seed extracts demonstrated broad-spectrum antibacterial activity against both Gram-positive (such as *Staphylococcus aureus* and *Enterococcus faecalis*) and Gram-negative (*E. coli*, and *Salmonella spp.*) pathogens. Both the oil and its crude extract demonstrated antifungal (*Candida albicans*, *Trichophyton spp.*) activity.

Antiprotozoal effect: The essential oil of *T. ammi* demonstrated strong larvicidal efficacy against the *Aedes aegypti* mosquito larvae, achieving 100% mortality in laboratory tests.

Anthelmintic effect: Aqueous extract of seeds of *T. ammi* exhibited *in vitro* anthelmintic activity against Indian adult earthworms, *Pheretima posthuma*. Crude powder and aqueous crude extract of seeds of *T. ammi* also demonstrated modest anthelmintic activity against strongyle-type nematodes in infected donkey.

Other pharmacological effects: antioxidant, cytotoxic, antinociceptive, hypolipidaemic, antihypertensive, antispasmodic, broncho-dilating, antilithiasis, diuretic and antifilarial Activity.

Clinical evidences

In a double-blind, controlled clinical trial involving 92 patients with neuropathic conditions, the plant's 10% topical cream demonstrated a statistically significant reduction in burning sensations of the feet, as well as improvements in numbness, tingling, and allodynia when compared with the placebo group.

Safety

Acute and sub-acute toxicity assessments reported no observable signs of toxicity in either study phase, as evidenced by normal relative organ weights and the absence of pathological alterations on histological evaluation. However, some components of *T. ammi* essential oil may pose specific risks.

Product registration

Thymol, one of the major components of the essential oil, is widely used in the formulation of toothpastes, mouth washes, and elixirs due to its antiseptic and antimicrobial properties.

Research gaps and recommendations

The phytoconstituents identification was limited to GC-MS analysis. Further chromatographic and spectroscopic analysis on the phytoconstituents is recommended.

References

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