

Senna alexandrina Mill

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***Senna alexandrina* Mill**

Local and common names: Sanu (Afa); Jelalo-jel (Som); Muka-arbaa (Oro); ሰነዎህ. Senemekki (Tig); Alexandrian senna (*S. alexandrina* var. *alexandrina*) and Tinnevelly senna and Indian senna (*S. alexandrina* var. *obtusata*) (Eng)

Voucher number and identification: GA075/AHRI/2025

Synonyms: The species is recognized by two infraspecific taxa (varieties), each associated with different synonyms. *S. alexandrina* var. *alexandrina* is the most widely referenced variety and has 23 recorded synonyms, including the commonly used names *Cassia acutifolia*, *C. angustifolia*, *S. angustifolia*, and *C. senna* var. *eriocarpa* (Maire) Maire., *Senna alexandrina* var. *obtusata* (Brenan) Lock is known by the synonym *C. senna* var. *obtusata* Brenan.

Varieties recorded in Ethiopia: Two infraspecific taxa (varieties) of *S. alexandrina* are recorded in Ethiopia and Eritrea, as well as globally: *S. alexandrina* var. *alexandrina* and *S. alexandrina* var. *obtusata*.

Family: Fabaceae

Botanical and habitat distribution

S. alexandrina is a small to medium sized, often straggly shrub that can reach a height of 0.2-3 m in arid habitats. Its leaves are compound, featuring a wide range of 4-13 pairs of small leaflets that are narrow and can be described botanically as lanceolate or elliptic. The plant produces showy, erect clusters of bright yellow to orange-yellow flowers. Following flowering, the plant develops flattened, papery, slightly curved, oblong pods that measure about 3-7 cm long and 1.5-2.5 cm wide. Two infraspecific varieties exist: *S. alexandrina* var. *alexandrina* has leaflets that are usually pointed, and its pods have only a light covering of fine hairs. In contrast, *S. alexandrina* var. *obtusata* is distinguished by its broader, slightly leathery leaflets with tips that are consistently blunt or rounded, and it possesses more densely hairy pods and flower stalks. *S. alexandrina* is a lowland species that grows from sea level up to about 1300 masl.

Conservation status

According to IUCN Red List, *S. alexandrina* is categorized globally as a species of Least Concern.

Propagation method

S. alexandrina naturally grows in dry lowland regions of Ethiopia, such as Afar (where *S. alexandrina* var. *alexandrina* commonly occurs) and Somali (where *S. alexandrina* var. *obtusata* is found). The plant is currently collected from the wild for its traditional uses in Ethiopia, and there is no documented information on its cultivation in the country. Therefore, the information presented below is based on verified literature sources.

S. alexandrina is propagated exclusively from seeds, which have hard seed coat and therefore require pre-treatment to improve germination. Pre-soaking in warm water for 12-24 hours or mechanical scarification, such as incision of testa, can enhance germination, although treatment with sulphuric acid is reported to be more effective for larger quantities of seed. For small scale propagation, the seed can be sown in containers, whereas in field production, treated seed is generally broadcast at a rate of 15-25 kg/ha and placed shallowly at a depth of about 1-2 cm depth in well-drained soil. Early weed control is required before canopy closure, and although *S. alexandrina* is often managed as an annual crop, stands may be retained for up to 2-3 years to allow repeated harvests when branching is encouraged.

Cultivation in botanic garden

S. alexandrina is not currently cultivated in the AHRI-ALERT botanic garden because the agroecological conditions of Addis Ababa are not suitable for its growth. It is included in this compendium due to its strong potential for development and commercialization as a herbal purgative in Ethiopia.

Ethnomedicinal uses

S. alexandrina is an important medicinal plant in Ethiopian traditional medicine, widely recognized for its laxative and purgative properties. The leaves and pods (fruits) are the main parts used for this purpose. These plant materials are prepared as “senna,” traditionally administered for short term relief of constipation and for bowel cleansing. The use of pod infusions as purgative specifically for pregnant women is also documented.

Beyond its primary role in treating gastrointestinal disorders, *S. alexandrina* is used in traditional medicine to manage several other ailments. Pod decoctions are taken to expel intestinal worms and to ease breathing difficulties. Pod infusions are also used to reduce fever, while leaf infusions are

used to relieve flatulence, suppress convulsions, and stop nosebleeds. In addition, the leaves are used to treat certain livestock health problems in Ethiopia.

Major phytoconstituents

S. alexandrina is rich in anthraquinone glycosides, particularly sennosides A, B, C, D, E, and F from the leaf and pods parts of the plant.

Pharmacological and safety evidences

Preclinical evidences

Laxative activity: *S. alexandrina*, primarily through its active constituent sennosides, is a well-established stimulant laxative widely used for short-term relief of occasional constipation. It facilitates bowel movements through a combination of mechanisms: accelerating transit through the large intestine, inhibiting the net absorption of water and electrolytes, and stimulating fluid secretion. These actions collectively result in softer, bulkier stools and passage easier. Beyond its use for constipation, senna is also recognized for its efficacy in bowel cleansing prior to diagnostic procedures, such as colonoscopy.

Other pharmacological effects: Antibacterial, antioxidant, organoprotective and anticancer.

Clinical evidences

S. alexandrina and its sennosides are effective stimulant laxatives for short term and chronic constipation, outperforming alternatives like lactulose in geriatric patients. The drug is also used at high doses for effective bowel cleaning prior to diagnostic procedures.

Safety

Preclinical studies indicate that *S. alexandrina* and its active compounds, the sennosides, can cause gastrointestinal alterations such as epithelial hyperplasia in the cecum and colon. However, chronic toxicity studies in rats reported no carcinogenicity at doses up to 300 mg/kg, highlighting inconsistency across findings. Systemic effects at high exposure levels caused reduced body weight and tissue damage such as kidney lesions and necrosis of cardiac and nerve cells, while metabolites like emodin have shown genotoxic effects by increasing precancerous changes in the colon.

Product registration

S. alexandrina, particularly its leaf and fruit, is recognized worldwide as a stimulant laxative, due to its active compounds, sennosides A and B, and is validated for short term relief of occasional constipation. In the United States and European Union, senna preparations have formal regulatory status: the FDA lists them in the Over-the-Counter (OTC) Monograph M007, while the European Medicines Agency (EMA) classifies them in herbal monographs for both “well established” and “traditional” medicinal use. Finished products are generally standardized to contain a minimum level of hydroxyanthracene glycosides (sennosides), with a typical adult nightly dose of 10-30 mg (as sennoside B). Despite its native abundance and traditional use, no senna based product is currently registered or officially marketed in Ethiopia.

Research gaps and recommendations

S. alexandrina is a well-established laxative, but several research gaps remain in Ethiopia. Comprehensive ethnomedical documentation of its medicinal uses is lacking, and other gaps include the absence of documented cultivation and propagation methods, limited data on sennoside content and standardization in local varieties, and insufficient long-term safety and toxicity studies. Moreover, there is no information on coppicing practices or regrowth responses after severe cutting, limiting knowledge for sustainable leaf production. No senna based products are also currently registered, highlighting the need for data to support regulatory approval. Drawing on global experience in the United States and European Union, *S. alexandrina* or its sennosides can be recommended for short term relief of occasional constipation, with use limited to brief periods, standardized for sennoside content, and guided by proper dosing. Sustainable cultivation should be promoted to reduce wild collection and produce quality raw materials that meet WHO GACP, as required by EFDA, ensuring safe and effective use of this medicinal plant. Investigation of the coppicing potential of *S. alexandrina* is recommended to determine whether managed shoot regeneration could enhance leaf yield and reduce re-establishment costs.

References

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