

## Eleutherococcus senticosus

*Eleutherococcus senticosus* is a species of small, woody shrub in the family Araliaceae native to Northeastern Asia.[1][3] It may be colloquially called devil's bush,[4] Siberian ginseng, eleuthero, ciwujia, Devil's shrub, shigoka, touch-me-not, wild pepper, or kan jang.[5] *E. senticosus* has a history of use in folklore and traditional Chinese medicine.[1] Root extracts of *E. senticosus* are sold as a dietary supplement or cosmetic, usually under the name Siberian ginseng.[3]

The scientific name (genus), *Eleutherococcus* (from Greek) means "free-berried," and *senticosus*, (from Latin) means *sentis* (thorn-bush, briar), an adjective meaning "thorny" or "full of briars or thorns." [citation needed] It is not the same plant as American ginseng (*Panax quinquefolius*) or Asian ginseng (*Panax ginseng*). It has a diversity of common names across its range of distribution.[1][3]

The herb grows in mixed and coniferous mountain forests, forming low undergrowth or is found in groups in thickets and edges. *Eleutherococcus senticosus* is sometimes found in oak groves at the foot of cliffs, rarely in high forest riparian woodland. Its native habitat is East Asia, China, Japan, and Russia.[1][3] *E. senticosus* is broadly tolerant of soils, growing in sandy, loamy, and heavy clay soils with acid, neutral, or alkaline chemistry and including soils of low nutritional value. It can tolerate sun or dappled shade and some degree of pollution. *E. senticosus* is a deciduous shrub growing to 2 metres (6.6 ft) at a slow rate. It is hardy to zone 3. It flowers in July in most habitats. The flowers are hermaphroditic and are pollinated by insects.[6]

Roots of *E. senticosus* are cylindrical, up to 0.5 centimetres (0.20 in) in diameter, straight or branched, dark brown, and have a smooth surface with bark fixed closely to the xylem.[3] The derived extract from the roots has been characterized for its major constituents, including lignans, sesamin (eleutheroside B4), syringaresinol, phenylpropanes, coumarins, beta-sitosterol and daucosterol.[3]

Berries from *E. senticosus* contain diverse polyphenols, including caffeic acid, vanillic acid, ferulic acid, p-coumaric acid, and benzoic acid, with significant content of calcium, magnesium, and potassium.[7]

Major constituents of essential oil from leaves of *Eleutherococcus senticosus* include  $\alpha$ -bisabolol (26%),  $\beta$ -caryophyllene (7%), germacrene D (7%),  $\beta$ -bisabolene (5%), and  $\alpha$ -humulene (4%).[8]

Extracts from the root of *Eleutherococcus senticosus*, including eleutherosides, are promoted in alternative and traditional medicine for providing health effects, which are supported by clinical evidence.[5][9] According to the WHO, only "as a prophylactic and restorative tonic for enhancement of mental and physical capacities in cases of weakness, exhaustion and tiredness, and during convalescence" is backed up by clinical evidence.[3][10] The plant has been assessed in preliminary research for its potential use as an antimicrobial or antistress agent.[3][5]

People with high blood pressure, sleep apnea, narcolepsy, heart disease, mental illness, a compromised immune system, people in the processes of pregnancy and lactation, and

people taking digoxin or hexobarbital may have adverse reactions to *E. senticosus*.<sup>[5]</sup> High doses may cause irritability, confusion, insomnia, or anxiety.<sup>[5]</sup>

