Eleutherococcus senticosus (Rupr. & Maxim.) Maxim.

Eleuthero Root and Rhizome (Siberian Ginseng)

Radix Eleutherococci

Araliaceae

Eleuthero, more commonly known as Siberian ginseng, is a member of the ginseng family Araliaceae and was once botanically classified as Acanthopanax or "thorny ginseng." It continues to be cited as *Acanthopanax* throughout most of Asia. Like *Panax* species plants, eleuthero is used as an adaptogenic tonic and is one of the most widely researched adaptogens in the world. Eleuthero may be used interchangeably with a number of the other 34 species of *Eleutherococcus* (aka Acanthopanax*;* e.g., *E. gracilistylus* syn. *Acanthpanax gracilistylus;* pin yin wu jia pi) or adulterated with the potentially toxic Chinese silk vine (*Periploca sepium*). Analytical reviews suggest that the chemistry of a number of these species is similar and that roots of different species can be mixed in trade. A number of pharmacopoeial references (e.g., British Herbal Pharmacopoeia, 1996; European Pharmacopoeia, 2005; Pharmacopoeia of the People's Republic of China, 2005, and United States Pharmacopeia, 2006) report that eleuthero contains no sclereids. The botanically authenticated samples examined for this work did have sclereids in the secondary phloem of the root. Other microscopists have similarly found sclereids in authentic samples (Sudberg, 2006, personal communication to AHP; Zhao 2005). However, sclereids are not always present.

A. Rhizome

Transverse section: Cork, cortex, and secondary phloem as in root; secondary xylem occurs in a ring around a central pith or pith cavity; medullary rays run all the way to the pith; primary xylem caps the interior ends of the cuneiform regions of secondary xylem tissue.

Longitudinal section: Bordered-pitted, reticulate, or scalariform vessels.

B. Root

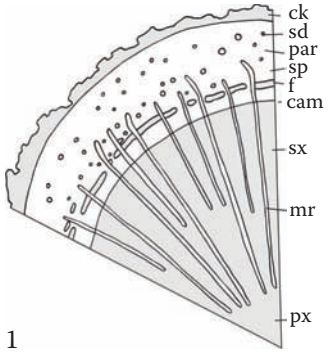
Transverse section: Thick cork, with alternating lighter and darker brown tangential rows; thickened parenchyma between the cork and secondary phloem has secretory ducts up to 60 µm diameter; secondary phloem contains fibers, secretory ducts, and sclereids; fiber bundles are separated by medullary rays one to three cells wide; fibers and sclereids have considerable wall thickening and pit channels; cluster crystals of calcium oxalate up to 70 µm diameter are abundant in the phloem parenchyma, with smaller ones in the medullary rays; broad, lignified secondary xylem, vessels up to 60 µm diameter, fibers present; cells of medullary rays are thickened, pitted, and radially elongated; primary xylem is in the center; pith is absent.

Longitudinal section: Bordered-pitted, reticulate, or scalariform vessels.

Starch: May be present in medullary ray cells of the root and rhizome; simple, small (less than 7 µm) granules, with a centric point hilum.

Powder: Fragments of pitted fibers; bordered-pitted, reticulate, or scalariform vessels; sclereids; cork; parenchyma cells with cluster crystals of calcium oxalate; secretory tissue is rare; starch may be present.

The rhizome and root are identical in all respects except for the arrangement of the primary and secondary xylem and the occurrence of a pith in the rhizome.



1