Withania somnifera L. Dunal

Ashwagandha Root

Withaniae somniferae Radix

Sanskrit: Ashva-gandha

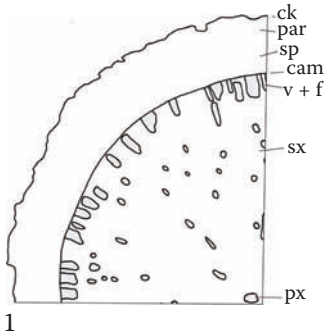
Solanaceae

Ashwagandha is among the most highly regarded herbal tonifiers in ayurvedic herbalism. It is considered a tonic, nervine, and adaptogen. In modern research, it has been compared to *Panax ginseng* for its endurance-enhancing properties. Three primary chemotypes of ashwagandha are traded. Because only one chemotype was used for this characterization, the other chemotypes may differ microscopically from the sample used.

A. Root

Surface view: Cork consists of thin-walled, reddish brown cells.

Transverse section: Cork of reddish brown, thin-walled cells, one to three layers thick in young roots and wider in older primary roots, sometimes collapsed and indistinct; outer parenchyma is broad and secondary phloem narrow, both consisting of subspheroidal or elongated parenchyma cells packed with starch and occasional idioblasts containing sandy crystals of calcium oxalate; very large secondary xylem is composed mainly of axially elongated parenchyma cells with idioblasts containing crystal sand; white parenchyma walls are irregularly thickened but not lignified; rectangular groups of vessels, fibers, and thickened parenchyma occur along the vascular cambial line; fibers have few pits, but the parenchyma is heavily pitted, and both cell types have a distinct cell lumen; within the secondary xylem, bordered-pitted or, rarely, reticulate vessels up to 100 µm diameter occur in small groups; parenchymatous medullary rays are one to four cells broad; parenchyma contains starch and idioblasts with crystal sand; primary xylem is visible in the center.



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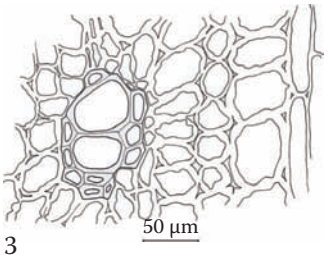


3

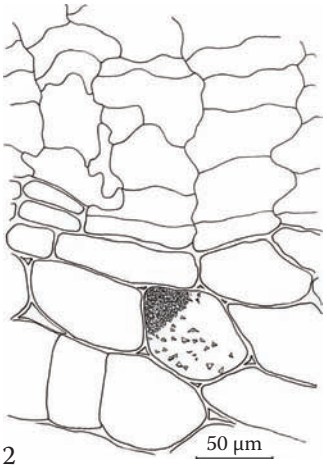
B. Rhizome

Surface view: Cork is identical to root.

Transverse section: Cork, cortex, and secondary phloem are identical to root; secondary xylem is a solid broad ring of vessels, fibers, and heavily thickened parenchyma cells; medullary rays of thin-walled parenchyma, one to three cells wide; pith or pith cavity is large.

Starch: Abundant; granules are simple or compound in aggregates of two or three (four) granules; subspherical individual granules are 8–40 µm long; hilum is pronounced but irregular in shape.

Powder: Fragments of parenchyma with idioblasts containing crystal sand; bordered-pitted vessels; few fibers and pitted parenchyma cells; cork cells; starch.



2