

## ***Clematis armandii* Franch.**

### **Armand's Clematis Stem**

#### ***Caulis Clematidis armandii***

**Pinyin:** Chuan mu tong, xiao mu tong

#### ***Ranunculaceae***

Armand's clematis is primarily used in traditional Chinese medicine as a form of mu tong, originally derived from *Akebia* spp. This species of clematis is also cited as an alternate species to *Clematis chinensis* (wei ling xian). According to China's pharmacopoeia (PPRC 2005), *Caulis Clematidis armandii* may consist of the stems of either *Clematis armandii* Franch. or *Clematis montana* Buch.-Ham. It should be sold with the outer bark removed. Historically, *C. armandii* and *C. montana* (both called chuan mu tong) were substituted for the *Akebia* spp. also referred to as mu tong, as was *Aristolochia manshuriensis* (guan mu tong). All of these species can be confused in trade due to their shared common name of mu tong and long history of substitution. This problem is compounded by the similarity in macroscopic appearance of *C. armandii* and *A. manshuriensis*. The latter's stem contains toxic aristolochic acids (AAs) and is no longer included in China's pharmacopoeia, and not permitted to be sold raw or in products in the United States or the European Union. Clematis species do not contain AA.

**Transverse section:** Bark is narrow and scalloped when present, with convex areas aligned with the secondary xylem and concavities aligned with the medullary rays; narrow, sickle-shaped bundles of fibers cap the secondary phloem; sclereids occur at the ends of these fiber caps, partially connecting adjacent bundles; secondary phloem of

thin-walled, frequently ruptured cells is arranged in semi-circular bundles; a lacuna frequently occurs between these bundles and their fiber caps; secondary xylem consists of compact cuneiform regions of vessels, tracheids, and thickened parenchyma, separated by narrow medullary rays up to 10 cells wide; vessels may be very large, up to 250  $\mu\text{m}$  diameter; narrow tracheids; medullary rays have thin-walled parenchyma in the outer part of the stem and thickened cells toward the interior; medullary ray cells are slightly radially elongated, interrupted in places by areas of cells that have an oblique orientation; small pith is composed of slightly thickened and pitted cells; crystals are absent.

**Longitudinal section:** Vessels and tracheids with pitted cell walls; tracheids taper on both ends; thickened parenchyma cells of the secondary xylem have straight and pitted cell walls.

**Tangential longitudinal section:** Medullary ray cells are circular in outline.

**Starch:** Rare or lacking; simple or two- or three-compound granules; spherical to ovate; small individual granules, up to 17  $\mu\text{m}$  diameter, with a central hilum or slit.

**Powder:** Most fragments are colorless; bordered-pitted tracheids, pitted parenchyma, and pitted vessels are the most frequent cell types; most fragments are birefractive; septate fibers with dense reticulated pits; phloem fibers; sclereids and parenchyma are rare; starch is rare or lacking.

