

Akebia trifoliata* (Thunb.) Koidz.*Akebia Stem*****Caulis Akebiae*****Pinyin: Mu tong, san ye mu tong*****Lardizabalaceae***

Akebia is predominantly used in traditional Chinese medicine, where it is classified among herbs that drain dampness. This is partly due the ability of *Akebia* to promote diuresis. According to the Chinese pharmacopoeia (2005), *Caulis Akebiae* may consist of the stems of either *Akebia quinata* (Thunb.) Decne. or *Akebia trifoliata* (Thunb.) Koidz. There has been a long history of substitution of *Akebia* spp. with *Clematis armandii* and *Clematis montana* (both called chuan mu tong) and *Aristolochia manshuriensis* (guan mu tong). This confusion continues today. The *Clematis* species are non-toxic and do not pose a danger in cases of substitution, whereas *A. manshuriensis* contains toxic aristolochic acids and is no longer included in China's pharmacopoeia or permitted to be sold raw or in products in the United States or European Union. Nonetheless, *A. manshuriensis* may still be encountered in commerce, potentially as an adulterant of *Akebia* spp. For the microscopic differentiation of *Akebia trifoliata*, *Aristolochia manshuriensis*, *Clematis armandii*, and *Clematis chinensis*, see the entry for *C. armandii* stem. For a complete discussion of AA-containing plants and plants that may be substituted with those containing AA, see AHP (2006a).

Transverse section: The bark may be partially or completely separated from the rest of the stem; narrow, reddish brown cork; primary cortex is composed of thickened parenchyma cells, some with considerably thickened walls and filled with one or several calcium oxalate prisms up to 20 μm long; between the cortex and secondary phloem, a characteristic, undulating, scalloped ring of fibers occurs, with the convex portions of the ring capping regions of secondary phloem and the concave portions projecting in toward a medullary ray; fibers have a narrow cell lumen and are usually filled

with small calcium oxalate prisms up to 10 μm long; at each medullary ray, the fiber ring is extended into the ray by a narrow radial bundle of somewhat radially elongated sclereids containing prisms; secondary xylem consists of vessels and tracheids arranged in numerous compact, more or less rectangular, regions separated by narrow medullary rays a few cells wide; vessels are up to 150 μm diameter; rays consist of radially elongated cells that have thin walls in the outer portions and thick walls toward the interior; large pith, with outer cells considerably thickened and pitted, partly filled with several calcium oxalate prisms, and with inner cells of thin-walled parenchyma.

Longitudinal section: Septate fibers; vessel and tracheid walls are pitted and textured with very fine oblique lines; outer pith cells are somewhat axially elongated.

Starch: Infrequent in cortex and pith; mostly simple, elliptical or rounded polygonal granules are small, up to 14 μm diameter.

Powder: Fragments of brown or colorless cork are very frequent; large calcium oxalate prism sheaths are around fibers; partially thickened and pitted parenchyma contains compact tabular groups of large calcium oxalate prisms; many fibers are filled with small prisms; few fragments of colorless parenchyma; thickened and pitted parenchyma; narrow tracheids and few bordered-pitted vessels.

