

**Hedysarum polybotris Hand.-Mazz.****Hedysarum Root****Hedysari Radix****Pinyin: Hong qi****Apiaceae**

Hedysarum is used in Chinese medicine as an energy tonic and is similar in action to astragalus. However, hedysarum is sometimes used as a substitute for astragalus, and while the two are similar in activity, they may not be medicinally equivalent from an immunomodulatory perspective. Specifically, hedysarum lacks astragaloside IV, a primary immunomodulatory triterpene of *Astragalus mongholicus*. In hedysarum, fiber bundles are surrounded by parenchymatous cells containing prisms of calcium oxalate 7-14  $\mu\text{m}$  in diameter and up to 22  $\mu\text{m}$  long. Astragalus lacks calcium oxalate crystals (see entry for *Astragalus mongholicus*).

**Transverse section:** Cork; secondary phloem of numerous radially arranged narrow bundles of fibers with attached calcium oxalate prismatic crystal sheaths; fibers ~8–17  $\mu\text{m}$  diameter with a narrow lumen; crystals ~15  $\mu\text{m}$  long, 10  $\mu\text{m}$  wide; parenchymatous medullary rays 5–7 cells broad; secondary xylem composed of vessels up to 80  $\mu\text{m}$  diameter arranged in narrow radial strands; groups of fibers with calcium oxalate prism sheaths found between vessels; parenchyma with small areas of primary xylem is located in the center of the root.

**Longitudinal section:** Vessels reticulate or bordered pitted.

**Starch:** Abundant; granules solitary or compound, up to 15  $\mu\text{m}$  diameter with a partly-slit- or slit-shaped hilum.

**Powder:** Fragments of fibers with calcium oxalate prism sheaths; reticulate or bordered-pitted vessels; starch granules.

