

components such as flavonoids, polysaccharides, and phenolic compounds while ensuring tuberous root yield, thereby achieving simultaneous improvement in medicinal yield and intrinsic quality.

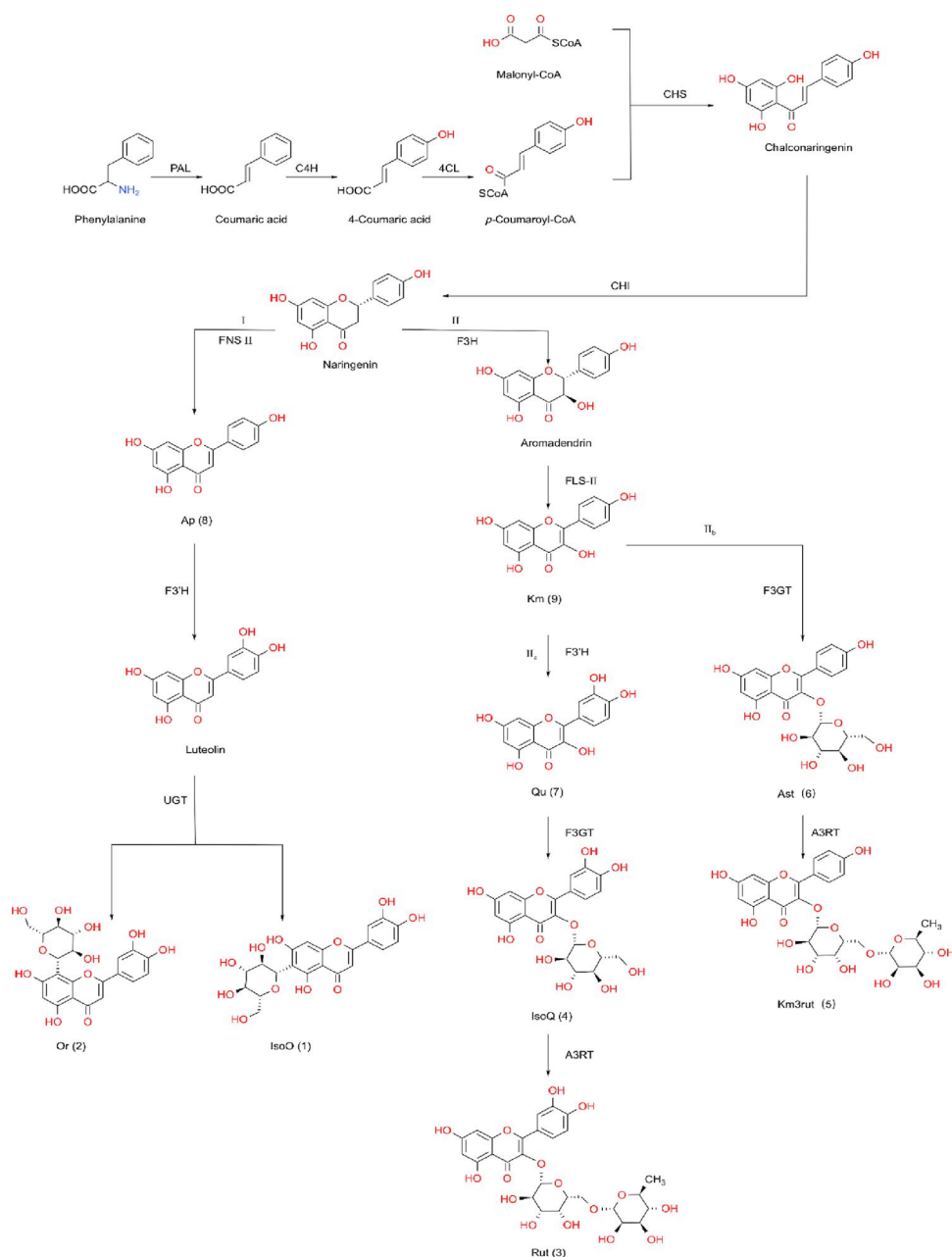


Figure 2 A schematic outline of flavonoid pathway proposed for *T. hemsleyanum* (Adopted from Shi et al., 2022)

Image caption: PAL, phenylalanine ammonia-lyase; C4H, trans-cinnamate 4-monooxygenase; 4CL, 4-coumarate-CoA ligase; CHS, chalcone synthase; CHI, chalcone isomerase; FNS II, flavone synthase II; F3'H, flavonoid 3'-hydroxylase; F3H, flavonone 3-hydroxylase; FLS-II, flavone synthase II; UGT, UDP-glucosyltransferase; F3GT, flavonol-3-O-glucosyltransferase; A3RT, anthocyanidin-3-O-glucoside-6-O-rhamnosyltransferase (Adopted from Shi et al., 2022)

6 Mechanisms by Which Shading Regulates Medicinal Quality Formation in *Tetrastigma hemsleyanum*

6.1 Light signal perception and transduction mechanisms

Shading simultaneously alters light intensity and spectral composition, such as reducing the proportions of UV-B, blue light, and red light while enriching far-red light. Therefore, *Tetrastigma hemsleyanum* is expected to perceive shading environments through a series of photoreceptors similar to those identified in other plant species. Under canopy or shaded conditions, plants use phytochromes to perceive red and far-red light, cryptochromes and phototropins to perceive blue light/UV-A, and UVR8 to perceive UV-B, thereby recognizing changes in light