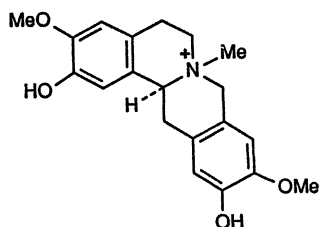


### 95.1 Introduction

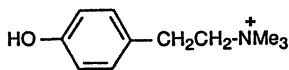
Huangbai, Cortex *Phellodendri*, is the dry stem bark of *Phellodendron amurense* Rupr. or *P. chinense* Schneid. (Rutaceae). It is officially listed in the Chinese Pharmacopoeia and used as an antiphlogistic, antibacterial, antiinflammatory agent for the treatment of diarrhea, icterus, ulcer, carbuncle, and eczema.

### 95.2 Chemical Constituents

The major chemical constituents in the bark of *P. amurense* are alkaloids of the isoquinoline type. Alkaloids isolated from the bark of *P. amurense* are berberine (47-2), palmatine (47-5) [1], magnoflorine, phellodendrine (95-1) [2], candicine (95-2) [3], and jatrorrhizine (47-3) [4]. Phellodendrine is an alkaloid of the protoberberine type [5–8], whereas candicine is an aliphatic quaternary ammonium compound.



Phellodendrine (95-1)



Candicine (95-2)

Berberine, jatrorrhizine, phellodendrine, and candicine were also isolated from the root bark, whereas the fruits including seeds contained berberine and jatrorrhizine and only berberine was isolated from the wood [9]. An aqueous acid-lime method for the isolation of berberine from the bark of *P. amurense* with a yield of 1.7% was described [10]. Comparative study on the alkaloid content in the bark of *P. chinense* and *P. amurense* showed that the bark of *P. chinense* contained much more berberine than that of *P. amurense*, but the latter had higher palmatine and jatrorrhizine contents [4]. In addition to the alkaloids, limonin and related compounds (95-3, 95-4) with a  $\gamma$ -hydroxybutenolide moiety [11] were isolated and structurally determined.