

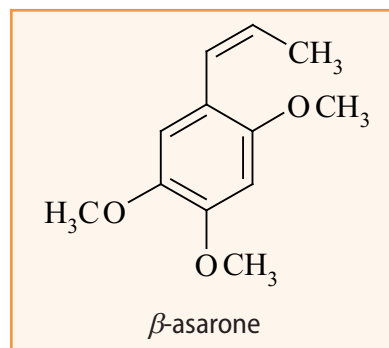
**Traditional Uses:** The taste is hot and bitter, and the potency is sharp and coarse. It is used for the following: treating diphtheria and malignant carbuncle, improving the power of the stomach and appetite, and heart function. Also used to halt diarrhea, enhance bone growth, destroy parasitic worms (nematocide), to treat fever from bacterial infection, desiccate suppuration, healing the lymph system, some skin diseases, and to treat tumors.

**It is an ingredient of the following traditional prescriptions:** Shingun-8, Shudag-4, Senden-6, Dinman 12, Donjugohaw, Menbo-9, Ulchu-18, Chun-5, Archun, Boichun, Gurchun, Sugchun, Shichun, Ludud 18, Shur-25, and Yamala-3 [4–7].

### Microscopic characteristics:

**Rhizome:** Stele is of a rounded parenchyma enclosing large spaces. Oleoresinous cells and abundant starch grains are found. Vascular bundle numerous, small, ovate and concentric type. Secreting cells are present in the parenchyma [8].

**Chemical constituents:** sugars [9], organic acids and their derivatives, terpenoids: *trans*-2-ethoxy-2(10)-pinene, 4-ethoxy-1-*n*-menthene, *endo*-isocamphanone, carvenone, *n*-menthadien-1(7),2-ol-8, selinadienol [10], 1.4–5.8% essential oil [9,11]:  $\alpha$ -pinene, camphene, camphor, borneol, calamen,  $\beta$ -pinene, calamin, calamol, azulene [9], sesquiterpenes: calamenone, isocalamendiol [12], acoragermacrone, germacrone, pre-isocalamendiol [13], and others [14], aromatic compounds:  $\alpha$ -asarone [15–17],  $\gamma$ -asarone, *cis*-isoeugenol methyl ether, *trans*-isoeugenol methyl ether and others [17], flavonoids, quinones [18], 4.6% fat [9].  $\beta$ -asarone [17,19,20], acorenone, (*Z*)-sesquilavandulol, and dehydroxy-isocalamendiol [19] are the main components.



**Bioactivities:** Spasmolytic, anticonvulsant, antibacterial, antifungal, bile-expelling [9], sedative, anesthetic [21], immunosuppressive [22], and cytotoxic [23].