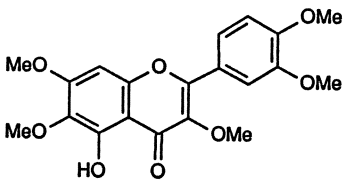
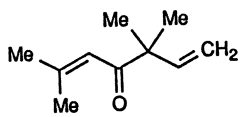
Some flavone and coumarin derivatives were also isolated from *A. annua*: Coumarin [18, 19], scopoletin [18, 20], esculetin [21], 3,5-dihydroxy-6,7,3′,4′-tetramethoxyflavone [18, 22, 23], 5,4′-dihydroxy-3,6,7,3′-tetramethoxyflavone [24], and artemetin (*22-14*) [18–20] were identified.

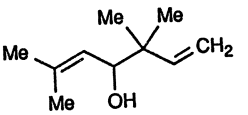


Artemetin (5-Hydroxy-3,6,7,3′,4′-pentamethoxyflavone) (*22-14*)

All parts of *A. annua* herbs contain essential oil, but the content is highest in the inflorescences. A maximal essential oil yield of 3.2% was obtained from plants in full bloom [25]. Camphor, 1,8-cineole, bornyl acetate, α-pinene, β-pinene, caryophyllene, *p*-cymol, β-myrcene, benzyl isovalerate, β-farnesene, artemisia ketone (*22-15*), and artemisia alcohol (*22-16*) were identified [9, 12, 25, 26]. The acid value of the essential oil of *A. annua* showed a seasonal variation with 2.5 for a June sample and 0.8 for an October sample [27].



Artemisia ketone (*22-15*)



Artemisia alcohol (*22-16*)

The sesquiterpenes isolated from *A. annua* are all closely related compounds characterized by the presence of a *cis*-decalin skeleton with the isopropyl group *trans* to the hydrogen on the ring junction. There is no doubt that artemisinin is the most important component among the sesquiterpenes.

Analysis, chemical modification, and synthesis of artemisinin has been extensively studied. Artemisinin content can be determined quantitatively by volumetric titration using acidimetric [28] or iodometric [29] methods, by spectrophotometric methods [30, 31], or by HPLC using different columns and eluents [32–35]. A reductive electrochemical HPLC assay [36] and a polarographic determination [37] have been described. Since artemisinin only shows a UV absorption at $\lambda \leq 220$ nm, chemical modification has been proposed for UV spectrophotometric determination or HPLC analysis using UV detection. Alkaline treatment of artemisinin gives Q 292 (*22-17*) with a UV absorption maximum at 291–292 nm. Q 260 (*22-18*) (λ_{max} 258–260 nm) is formed after acidification [31, 34] (Fig. 22-1).