

## SESQUITERPENE LACTONES OF *Artemisia santolina*

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In Turkmenia, 31 species of the genus *Artemisia* L. grow [1], but they have scarcely been studied for their content of lactones. We have investigated the lactones of several species of wormwood, including *Artemisia santolina* Schrenk. The species names of these plants were determined by A. Ya. Butkov and N. S. Nardina.

The plants were collected at the end of the vegetation stage (end of September) to the southeast of the Karakums (Chardzhou oblast). To isolate these lactones, 4 kg of the epigeal part (leaves, small stems, flowerheads, unripe seeds) were extracted seven times with ethanol. This gave 1200 g of extractive substances, which were dissolved in 50% ethanol, and the solution was treated successively with petroleum ether, ether, and chloroform. The petroleum ether extract yielded a hydrocarbon with mp 79–80°C. The bulk of the lactones (34 g or 0.85% of the weight of the raw material) passed into the ether, and only traces of them were found in the chloroform. The ethereal extract was chromatographed on normal alumina (1500 g, activity grade IV). The column was eluted successively with petroleum ether–benzene (1:1), benzene and chloroform. Four crystalline sesquiterpene  $\gamma$ -lactones were obtained [2].

Lactone (1),  $C_{15}H_{22}O_3$ , mp 172°C (from ethanol), mol. wt. 250 (mass spectrometry). The IR spectra of the substance had absorption bands in the 3490  $cm^{-1}$  region (OH group), the 1750  $cm^{-1}$  region (carbonyl of a  $\gamma$ -lactone), and the 1660  $cm^{-1}$  region (double bond). The UV spectrum had no maxima characteristic for a conjugated system.

Lactone (2),  $C_{15}H_{22}O_4$ , mp 168°C, mol. wt. 266 (mass spectrometry). The IR spectrum showed absorption bands in the 3500  $cm^{-1}$  region (OH group), at 1760  $cm^{-1}$  ( $\gamma$ -lactone carbonyl) and at 1715  $cm^{-1}$  ( $C=O$ ). The UV spectrum exhibited an absorption maximum at 290 nm ( $\log \epsilon$  1.27).

Lactone (3),  $C_{15}H_{22}O_4$ , mp 193–194°C (from ethanol) mol. wt. 266 (mass spectrometry). The IR spectrum of the substance showed absorption bands in the 3490  $cm^{-1}$  region (OH group), at 1770  $cm^{-1}$  ( $\gamma$ -lactone ring), and at 1705  $cm^{-1}$  ( $C=O$ ).

Lactone (4), mp 185–187°C (from ethanol). The IR spectrum of the substance had absorption bands in the 3400  $cm^{-1}$  region (OH group), at 1750  $cm^{-1}$  ( $\gamma$ -lactone carbonyl), and at 1660  $cm^{-1}$  ( $C=C$  bond).

Apparently, all the lactones isolated are derivatives of one and the same basic skeleton.

The study of the structures of the lactones is continuing.

### LITERATURE CITED

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