Achillea millefolium L. (common yarrow) has previously yielded acetylbalchanolide, millefolide, and a lactone with mp 138°C [1], and also leucodin and achillin [2].

We have investigated the lactones of the leaves and flower heads of *Achillea millefolium* collected in the Bostandyk region of Tashkent oblast in the flowering stage (July, 1970). The air-dry raw material was extracted with ethanol, and the extract was concentrated and diluted 1/3 with water. The aqueous ethanolic solution, after filtration, was shaken with chloroform, and the chloroform extract was chromatographed on neutral alumina. Elution with benzene and benzene-ether (8:2) gave three lactones. By a comparison of the IR spectra and a mixed melting point, one of them was identified as desacetylmaticarin [3], this being the first time that this substance has been found in this species of *Achillea*.

The IR spectrum of the second lactone (mp 188–189°C) showed absorption bands at 1790 cm⁻¹ (C=O of a γ -lactone), 1745 and 1245 cm⁻¹ (acetyl group), and 1690 cm⁻¹ (conjugated carbonyl group). A comparison of this spectrum with the IR spectrum of matricarin shows that the structures of the two lactones are similar and, apparently, they are isomeric compounds.

The third lactone, with the composition C₁₉H₂₆O₆, mp 209–210°C, mol. wt. 350 (mass spectrometry) proved to be new, and we have named it millefin. Its IR spectrum shows absorption bands at 1770 cm⁻¹ (C=O of a γ -lactone), 1735 and 1250 cm⁻¹ (acetyl groups), and 1670 cm⁻¹ (double bonds). The NMR spectrum (δ scale) has the following signals: doublet at 1.23 ppm (J=8 Hz) (–CH–CH₃), and singlets at 1.45 and 1.65 ppm due to methyl groups on double bonds. Singlets at 1.98 and 2.04 ppm correspond to the protons of two acetyl groups, and a lactone proton is responsible for the signal at 4.70 ppm. Protons at C₃ and C₈ are represented by a multiplet at 5.09 ppm. By comparing the results obtained with the properties of acetylartabin [4], the following most probable structural formula may be proposed for millefin:

LITERATURE CITED

1. J. Hochmannova, V. Herout, and F. Šorm, Collection Czech. Chem. Commun., **26**, 1826 (1961).
2. R. de V. Alfonso and F. Olmos, Rev. Soc. Quim. Mex., **12**, No. 5, 212A (1968).
3. K. S. Rybalko, A. I. Ban'kovskii, and R. I. Evstratova, Med. Prom. SSSR, **1962**, No. 3, 13.
4. I. S. Akhmedov, Sh. Z. Kasymov, and G. P. Sidyakin, Khim. Prirodn. Soedin., 691 (1970).

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR. Translated from *Khimiya Prirodnikh Soedinenii*, No. 2, pp. 246–247, March–April, 1972. Original article submitted December 21, 1971.

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