

# FLAVONOIDS FROM *EUPHORBIA LARICA*, *E. VIRGATA*, *E. CHAMAESYCE* AND *E. MAGALANTA*

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As a part of our continuing study of the flavonoid chemistry of Iranian *Euphorbia* species (1, 2) we report here the quercetin and kaempferol derivatives obtained from *E. larica* Boiss, *E. virgata* W. K., *E. chamaesyce* L. and *E. magalanta* L. (Euphorbiaceae).

## EXPERIMENTAL

GENERAL EXPERIMENTAL PROCEDURES.—Spectra were recorded with the following instruments: uv, Varian Techtron model 635; pmr, Varian 90 MHz and NT-200 MHz; ms, Dupont-490. Adsorbants for tlc and cc were from E. Merck. Sephadex LH-20 was from Pharmacia.

PLANT MATERIALS.—*Euphorbia larica* was collected by Dr. Y. Aynehchi near Bandar Abbas 1500 km south of Tehran in March 1976 (voucher No. 91), *E. virgata* from Abali, 40 km east of Tehran in July 1977 (voucher No. 98), *E. chamaesyce* from Garmsar 70 km east of Tehran in June 1977 (voucher No. 86), and *E. magalanta* from Amol near Tehran in May 1977 (voucher No. 178). Vouchers of all species are deposited in the Herbarium of the Faculty of Pharmacy, University of Tehran.

EXTRACTION AND ISOLATION OF THE FLAVONOIDS.—Dried and powdered leaf material of *E. larica* (1.2 kg), *E. virgata* (0.8 kg), *E. chamaesyce* (1.1 kg), and *E. magalanta* (0.5 kg), after being defatted with light petrol, were each extracted with ethanol in a Soxhlet. The alcohol concentrate from each extract was fractioned on Polyclar columns. Kaempferol 3-O-glucoside and quercetin 3-O-glucoside were obtained from all four species. In addition *E. larica*, *E. virgata*, and *E. magalanta* yielded kaempferol 3-rutinoside and rutin, *E. larica* also yielded 6-methoxyapigenin while *E. virgata* and *E. magalanta* yielded kaempferol and *E. chamaesyce* kaempferol 3-O-glucoside. An acylated kaempferol derivative was obtained from *E. magalanta*, which, after hydrolysis with 5% NaOH in MeOH, afforded kaempferol 3-glucoside but, because of the small amount of the compound available, the nature of the acyl group was not established.

All compounds were identified by spectral and hydrolytic data as well as by standard sample comparisons and color reactions (3). Full details of isolation and identification of the compounds are available on request to the senior author.

## ACKNOWLEDGMENTS

This study was supported by the Robert A. Welch Foundation (Grant F-130). The work in Turkey was supported by the Faculty of Pharmacy, University of Istanbul.

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Received 13 December 1982