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## The Detection of Phorbic Acid in *Euphorbia palustris* L.

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Phorbic acid, a new dilactone acid, was recently isolated from Euphorbium,<sup>1,2</sup> which is the dried up latex isolated from the North African stem succulent *Euphorbia resinifera* Berg. Phorbic acid has now been detected also in the Norwegian species *Euphorbia palustris* L., which is an herbaceous, thinleaved perennial. This seems to indicate that phorbic acid is widely distributed within the genus *Euphorbia*.

While phorbic acid is the predominating part of the non volatile organic acids of Euphorbium, it represents only a small percentage of the mixture of non volatile organic acids that could be isolated from *Euphorbia palustris*. For this reason the acid might easily have been overlooked

in this material if we had not been specially on the look-out for it.

For the purposes of this investigation 1.90 kg of airdried *Euphorbia palustris* was used, and from this material 155 g of a crude acid-mixture was isolated over the lead salts.

Our first attempt to demonstrate phorbic acid in *Euphorbia palustris* failed: 30 g of the 155 g acid-mixture just mentioned was esterified with diazoethane and the esters fractionated *in vacuo* at 10<sup>-1</sup> mm Hg. When the acids from Euphorbium are treated under such conditions, the ethyl ester of dilactophorbic acid crystallizes from the fractions that boil between 180–220°C especially when the fractions are diluted with ethanol and left in the refrigerator for a couple of days. But this time no crystalline ethylester could be obtained.

An examination of the two upper fractions (180–215°C and 215–220°C) showed that these contained an admixture of phenolic substances that were not found in the acid-mixture from Euphorbium. A closer investigation of an I. R. spectrum of the same fractions revealed an absorption peak at 1800 cm<sup>-1</sup>. This is close to the absorption peak at 1808 cm<sup>-1</sup> which is given by pure dilactophorbic acid monoethylester.

Encouraged by the last mentioned finding, we worked up a new sample of the crude acid-mixture. This time 70 g was used and the acids were esterified with anhydrous ethanol, using dry HCl gas (2%) as a catalyst. The phenolic substances were removed from the ester-mixture by washing with sodium carbonate solution and water, whereupon the esters were fractionated in the same way as in the first experiment. The two upper fractions were diluted with equal volumes of ethanol, and this time the expected ester crystallized out after a few hours. The yield after recrystallization from ethanol was 40 mg.

The substance melted at 91–92°C, and showed no melting point depression when mixed with monoethylester of dilactophorbic acid. Also the I.R. spectrum of the isolated substance was identical with the monoethylester of dilactophorbic acid.

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