Synthesis of a Fish C_{20} Furanoid Fatty Acid from the Lipid Extract of the Latex of the Rubber Plant (*Hevea brasiliensis*)

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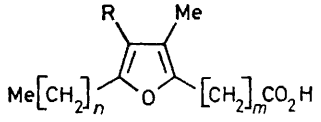
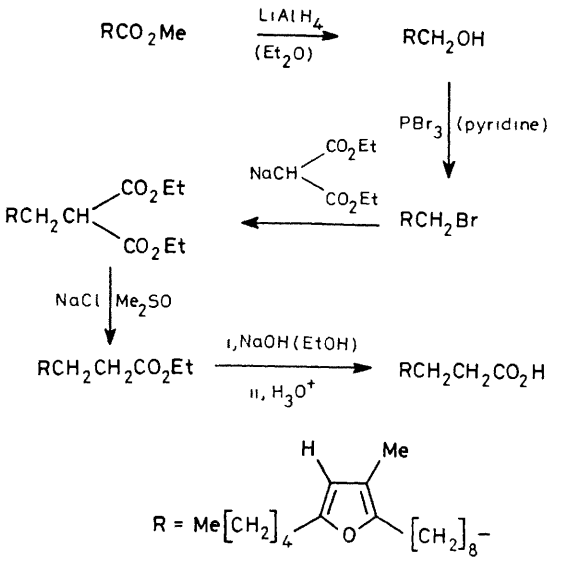
Summary 10,13-Epoxy-11-methyloctadeca-10,12-dienoic acid, isolated from the latex of the rubber tree, was chain-extended by two carbons to give the naturally occurring 12,15-epoxy-13-methyleicosa-12,14-dienoic acid in high yield.

FURANOID fatty acids (**1**—**8**) are not found in seed oils, but occur in high concentrations in the lipid extracts of the liver and testes of certain fish species during spawning.[1] The role of this unique class of fatty acids in nature remains vague; however, these compounds are believed to be associated with the reproductive system or sexual maturity of the fish Recently the triglyceride fraction of the latex of the rubber tree (*Hevea brasiliensis*) was reported to contain more than 90% of a single C_{18} furanoid fatty acid, *viz* 10,13-epoxy-11-methyloctadeca-10,12-dienoic acid (**2**) [2]



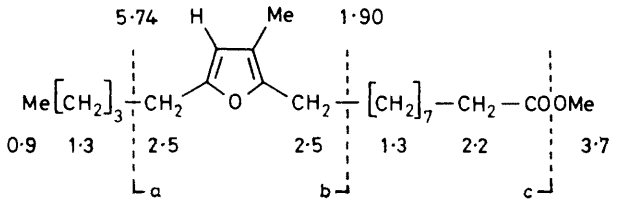
	n	*m*	R
(**1**)	2	8	Me
(**2**)	4	8	H
(**3**)	4	8	Me
(**4**)	2	10	Me
(**5**)	4	10	H
(**6**)	4	10	Me
(**7**)	4	12	H
(**8**)	4	12	Me

In an effort to produce pure furanoid fatty acids for detailed physical, chemical, and biochemical studies, Lie Ken Jie and Lam,[3] and Gunstone *et al*[4] have synthesised series of disubstituted furanoid fatty acids for such purposes Schlenk *et al.*[5] have lately reported the total synthesis of the acids (**5**) and (**6**).



SCHEME

Since the acid (**2**) is available from the latex of the rubber tree, the extension of the chain by 2 carbons would readily lead to the production of the acid (**5**) in large quantities (Scheme). Thus, the methyl ester of (**2**) was treated with lithium aluminium hydride in anhydrous diethyl ether to give the corresponding furanyl alcohol (100% yield) Bromination of the latter with PBr_3 in pyridine allowed complete conversion of the alcohol into the bromide (46% yield). The reaction of sodio diethyl malonate with the derived bromide gave the furanyl diester (85%) which was decarboxylated in a mixture of dimethyl sulphoxide and sodium chloride under reflux



Methyl ester of (**5**) showing ^{1}H n.m.r. assignments (δ). Mass spectral analysis: fragment (*m*/*z*), M^+ = 350 (30%), a = 293 (10), b = 165 (100), c = 319 (5).

yielding the ethyl ester of the acid (**5**) (97%).[6] Base hydrolysis of the ethyl ester furnished the required (**5**).

The methyl ester derivative of (**5**) exhibited ν_{max} (cm^{-1}): 3100w, (C–H, furan), 1740s, (C=O ester), and 1010m, (furan ring breathing).

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