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The Chemistry of Brazilian Lauraceae. XLVII. Ferulic esters from *Endlicheria* and *Ocotea* species

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A specimen from the Torquato-Tapajós Highway, km 133, Amazonas, voucher Herbarium INPA 48255, was identified tentatively with *Endlicheria anomala* Nees (Lauraceae) by Dr. W. A. Rodrigues. A trunk wood sample (1.2 kg) was extracted with ethanol. The chloroform-benzene 1:1 soluble part (15 g) of the extract (38 g) was chromatographed on a silica (360 g) column. Elution with C_6H_6 gave, in order, fatty ester (2 g, oil), n-tetracosyl ferulate [347 mg, mp 65-67° (C_6H_6)], n-tetracosanol [93 mg, 71-73° (C_6H_6)] and sitosterol [1230 mg, 138-140° (EtOH)]. Elution with C_6H_6-$CHCl_3$ 9:l, C_6H_6-$CHCl_3$ 8:2 to 0:10, $CHCl_3$--AcOEt 9:1 and AcOEt-MeOH 9:1 gave respectively stearic acid [70 mg, mp 68-69° (C_6H_6-EtOH)], a stearate of a fatty alcohol [58 mg, mp 86-88° (EtOH-$CHCl_3$)], a ferulate of a fatty alcohol [90 mg, mp 77-78° (EtOH-$CHCl_3$)] and a glycoside [28 mg, mp 291-293° (EtOH-$CHCl_3$)].

n-Tetracosyl ferulate was identified by spectral data (IR, ^{1}H NMR, MS) and direct comparison with an authentic sample [Franca *et al.*, 1975]. n-Tetracosanol was identified by direct comparison with the alcohol obtained by saponification of the ferulate. Sitosterol and stearic acid were identified by direct comparison with authentic samples. Saponification of the additional esters, mp 86-88° and 77-78°, gave respectively stearic acid, mp. 69-70°, and ferulic acid, 169-170°.

The simplicity of composition of *E. anomala* contrasts with the diversity and complexity of cinnamate derived metabolites of Lauraceae species described in all previous reports of the present series [for part XLVI see Diaz *et al.*, 1977]. In this respect, the species, nevertheless, does not occupy a peculiar position. Absence of detectable quantities of cinnamate derived metabolites and accumulation of ferulic acid was noted additionally for the following species.

Ocotea canaliculata Mez from the Manaus-Itacoatiara Highway, km 140, Amazonas, cf. voucher Herbarium INPA 16896, identified by Dr. W. A. Rodrigues.

O. guianensis Aubl. from the Manaus-Ponta Negra Road, Amazonas, voucher Herbarium INPA 50121, identified by B. Albuquerque.

O. neesiana (Miq.) Kosterm. from the Manaus-Itacoara Highway, km 69, voucher Herbarium INPA, Manaus 47243, identified by Dr. W. A. Rodrigues

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O. opifera Mart. from the vicinity of Manaus, Amazonas, cf. voucher Herbarium INPA 9210, identified by M. Freitas.

O. sp. from the Ducke Forest Reserve, near Manaus, voucher Herbarium INPA 42208.

It must be concluded that all these species lack the enzymes necessary to channel cinnamates into more complex end products. The ferulic acid, which is thus accumulated, inhibits L-phenylalanine ammonia-lyase activity [Havir and Hanson, 1968] and, as a consequence, the formation of benzylisoquinoline alkaloids should be favoured. Indeed, the above mentioned unclassified *Ocotea* species contains two papaverine type alkaloids [Franca et al., 1975)]. This mechanism may explain the fairly general substitutive presence of benzylisoquinolines vs. arylpropanoids in the Magnoliidae [Gottlieb, 1972], i.e. the phenomenon by which a species contains predominantly one of these classes of metabolites, producing, if at all, only traces of the other

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On the Vectors of Cutaneous Leishmaniasis in the Central Amazon of Brazil. I. Preliminary Findings (*)

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It is of prime importance in the study of the epidemiology of vector borne diseases to identify the vector species. This problem often becomes complicated by the fact that the vector species is a part of more intricate "species-complexes" composed of several different species and subspecies. The problem of "species complexes" has been the cause of considerable confusion in such groups as the *Anopheles gambiae* "complex" (malaria) and the *Simulium damnosum* "complex" (filariasis) in Africa, and the *Simulium amazonicum* "complex" (filariasis) situation in Brazil. The "species complex" concept has not been widely used for many groups of New World sandflies, but we are becoming so involved with such subtle morphological differences in sandflies that we are forced to consider if we too are not faced with the "species complex" problem in our leishmaniasis research.

The search for the vectors of cutaneous leishmaniasis in Latin America has undergone much progress in the last decade, particularly in South America. Wijers & Linger (1966) found that *Lutzomyia anduzei* (Rozeboom) [1] was a possible vector of *Leishmania braziliensis* in Surinam, and Lainson & Shaw (1968) showed that *Lu. flaviscutellata* is the vector of *Leishmania mexicana amazonensis* in silvatic rodents and marsupials in the lower Amazon. In southern Brazil, Forattini *et al.* (1972) incriminated *Lu. intermedia* and *Lu. pessoai* as the vectors of *Le. braziliensis.* Lainson *et al.* (1973) incriminated *Lu. wellcomei* as the vector of *Le. braziliensis braziliensis* in the Serra dos Carajás, Pará State, also in the Amazon basin. Lainson *et al.* (1976) also showed that *Lu. anduzei* (Floch & Abonnenc) was the major vector of leishmaniasis in the Jarí River area of the State of Pará.

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(1) — For the difference between **Lu. anduzei** (Rozeboom) and **Lu. anduzei** (Floch & Abonnenc) see Lainson **et al.** (1976).