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BRANCHED FATTY ACIDS IN TWO *ABIES* SPECIES

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Key Word Index—*Abies alba*; *Abies tazaotana*; Pinaceae; *n*-fatty acids; branched fatty acids.

Plant. Abies alba Mill. *Source.* Setcases (Gerona). Collected in March 1970. *Previous work.* Lipids on leaves.[1] *Plant part examined.* Heartwood. Extracted with Et_2O and then with acetone. A free and a combined acid fraction were isolated. Non hydroxylated methyl esters were isolated by column chromatography on silica gel and analyzed by GLC.[2,3] We were able to identify the following fatty acids: in the free acid fraction; (<1%) 13:0, 15·0, br 15:0, 17:0, 19:0, 21:0, 25:0, 26·0, 27:0, 28:0, 12:1, 13.1, 14:1, 17:1, 19:1, 21:1, 23:1, 20:2, 18:3 (9, 12, 15); (1–3%) 12.0, 14:0, 18·0, 20:0, 23·0, 16:1, 20:1, 18:3; (3–8%) 22:0, 24:0, 18:2; (14%) 16:0, br 17:0; (20%) 18:1 (9), on the combined acid fraction; (<1%) 13:0, 15.0, br 15:0, 17:0, 19:0, 21:0, 25.0, 26.0, 12.1, 13·1, 14:1, 17.1, 19:1, 21:1, 23:1, 20:2, 18·3 (9, 12, 15); (1–3%) 12.0, 14:0, 18·0, 20·0, 23·0, 16:1, 20.1; (3–8%) 22:0, 24:0, 18:3; (12%) 16:0, br 17:0; (35%) 18:1 (9).

The nonhydroxylated free acid fraction by repeated column chromatography on $AgNO_3$–silica gel and urea complex formation, afforded a mixture of branched fatty acids including unsaturated members. Hydrogenation with PtO_2–AcOEt (10 min) and urea complex formation gave a fraction with 15% straight chain acids (mainly 18.0) and $[\alpha]_D$ +6·0°. Analyzed by GLC-MS, the branched fatty acids were identified as, C_{13} (2%), C_{15} (3%), C_{16} (4%), C_{17} (50%), C_{18} (1%), C_{19} (20%). MS showed the acids were all monomethyl-branched.[4–6] The majority were *anteiso* (ω3). Isomers with a methyl group between carbon atom 7 and position ω5 were always present. Branching at the 3 or 4 carbon atoms was small and no Methyl groups were found on the 2 or 6 carbon atoms and in the ω4 position. Detection of branching at *iso* and at carbon atoms 5 is difficult when other types are present.

The amount of br 19:0 and isomers with branching between carbon atom 7 and position ω5, suggest that cyclopropane and cyclopropene fatty acids might be present and, hydrogenation might have opened the ring.

Plant. Abies tazaotana S. Cozar. *Source.* Tazaot mountains (Morocco). *Previous work.* On cyclitols and phenolics.[7]

Plant part examined. Heartwood. The free acid fraction coming from,[7] was analyzed by GLC as before. The proportion of br 17:0 and br 15·0 related to 16:0 was 70% and 20% respectively.

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