PP53. Brasilane sesquiterpenes, bioactive essential-oil constituents

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A bicyclo[4.3.0]nonane sesquiterpene skeleton with a gem-dimethyl group at C-3, methyl group at C-9 and an isopropyl group at C-5, is referred to as the brasilane skeleton. Biosynthetically, brasilanes originate from α-humulene. The structural complexity of this skeleton is illustrated by the first synthesis of conocephalenol from (1R*,7aS*)-1-methyl-7,7a-dihydroindan-5(6H)-one in 20 steps [1]. A shorter 7-step synthetic strategy was successfully accomplished by Cossy et al. starting from (R)-pulegone with an overall yield of 15% [2].

Up to now, 32 brasilane sesquiterpenes have been identified mainly in liverworts, fungi, and algae. Brasilane-type structures have been previously known only from marine organisms of the Rhodomelaceae family (species Laurencia obtusa (Huds.) Lamouroux and Laurencia implicata J.Agardh). In addition, brasilanes were detected in the sea hare Aplysia brasiliana due to its algae diet. A number of isolated derivatives bear an –OH at C-9, while there are four C-8 halogenated brasilanes and three metabolites with a 1,6-epoxy moiety [3]. In the equatorial liverwort species Noteroclada confluens (Hooker & Taylor) Spruce (Pelliaceae), two brasilane-type sesquiterpenes, similar to those found in Conocephalum conicum (L.) Dum. with tetrasubstituted double bonds at C-1, C-6, and C-5, were recorded. Xylarenic acid, possessing the brasilane structure, is recorded in the ascomycetous fungus Xylaria sp. [4]. The endophyte Diaporthe sp. [5], isolated from the leaves of Rhizophora stylosa Griff., yielded six brasilane-type sesquiterpenoids, diaporols J-O. In vitro cytotoxicity evaluation of brasilanes was performed on various human cancer cell lines (HL-60, SMMC-7712, A-549, MCF-7, HepG2, HCT116, MDA-MB-231, and SW480) [5,6]. A related, moderately cytotoxic, brasilane compound was isolated from the basidiomycete Coltricia sideroides (Lév.) Teng.

References:

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