Laporan Proyek Penelitian

The Alkaloids of Antidesma tetrandrum

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Preliminary Report

THE ALKALOIDS OF ANTIDESMA TETRANDRUM

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Abstract : Two alkaloids have been isolated from Antidesma tetrandrum. One of them by means of spectroscopic methods was identified as a new compound (I)

Introduction

During a phytochemical survey of West Sumatran plants in Sungai Dareh in which the main concern was a search for traditional antihypertensive and antidiabetic, A. tetrandrum (Euphorbiaceae) was found to give positive alkaloid test.[1] This plant is known to local healers as "obat panas" which term applies to antipyretic, antimalaria and general infection.

The genus Antidesma comprises 170 species which spread over tropical and subtropical regions, especially in Asia.[2] There has been some debate concerning the classification of this genus, for Willis considers that it belongs to the small family Stillaginaceae while Bentham and Hooker as well as Engler and Melchior have included it in the family Euphorbiaceae.[2]

Previous chemical work on members of this genus was concerned with triterpenoids and steroids they contain.[3-7] The isolation of the alkaloids from the genus Antidesma was first reported by one of us,[8] where A. montanum was found to contain myrianthine B[9] and aralionine B.[10]

Due to its interesting traditional usage and our special interest in studying the chemical constituents of West Sumatran traditional medicinal plants, it was decided to study this species.

Result and Discussion

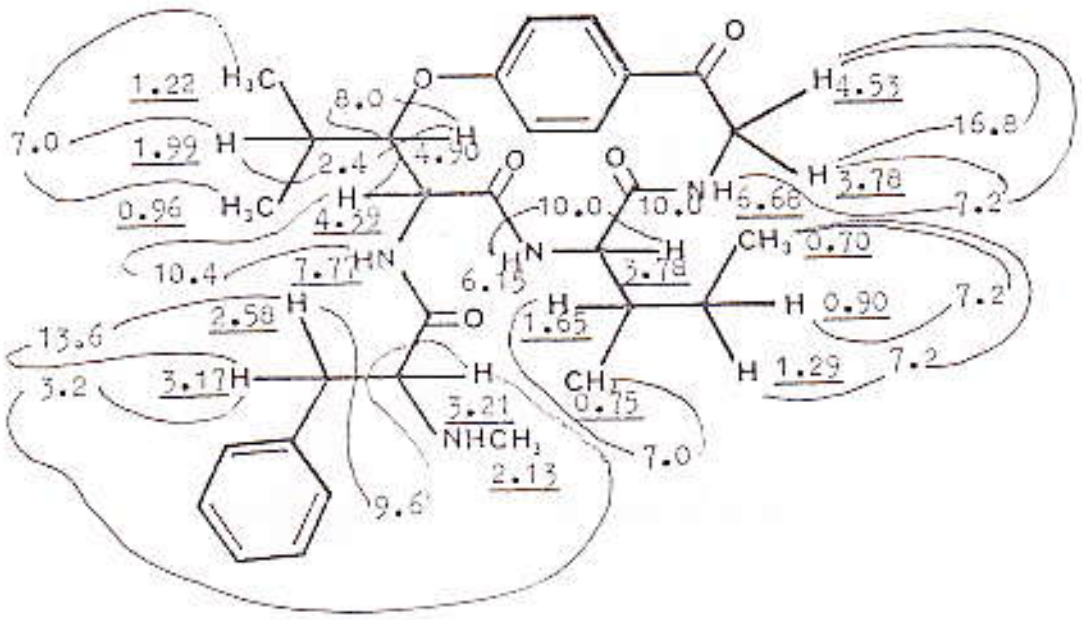
Classical extraction of the alkaloids by maceration of the finely chopped fresh leaves of A. terandrum followed by evaporation of methanol in vacuo, fractionation between weak and veryweak base

between 2% aqueous tartaric and ethyl acetate led to preliminary separation of the two major bases. Neither preparative tlc nor column chromatography was able to separate the two major bases. Attempts to purify any of the alkaloid by recrystallization were also unsuccesful. By using preparative hplc, at last the mixture could be separated.

The first base called DA 599-1 (I) was isolated as fine colourless needles, mp 265°, showed an M+1 at m/z 567 (CI) suggesting the empirical formulae $C_{30}H_{40}N_4O_5$. The ir spectrum exhibited bands to peptide linkages (1680 cm^{-1}), phenol ether (1260), NH strech (3400) which similar to many other cyclic peptide alkaloids.[11]

^{13}C nmr of (I) (300 MHz, DMSO) exhibited a typical Ar-CO peak at 202.9 ppm, three other CO peptide signals at 172.33, 171,8 and 170.82., 13 aliphatic carbons and approximately 12 aromatic carbon atoms.

^{1}H nmr of (I) (400 MHz, $CDCl_3$) employing decoupling technique and 2 Dimensions (2-D COSY) gave connectivities, coupling constants as follows :



(I)

recorded on Bruker WP 400 operating at 400 MHz. Voucher specimens (Da-599) were determined by Ms. Afriastini and had been lodged in Herbarium Bogoriense and Herbarium Biology University of Andalas.

Extraction and isolation

Finely chopped fresh leaves of Antidesma tetrandrum collected in Sungai Dareh West Sumatra in April (7 kg) were covered with methanol (4 x 10 l x 7 days). The combined methanolic extract was evaporated in vacuo to a volume of ca 1.5 l. This concentrated extract was washed with light petroleum (5 x 250 ml) and tartaric acid (30 g) was added, shaken till dissolved and extracted with ethyl acetate(10 x 500 ml).

The combined ethyl acetate fraction was extracted with 5% aqueous sulfuric acid (4 x 250 ml), combined acid extract then was basified with ammonia solution and reextracted with chloroform (4 x 250 ml). The combined chloroform extract was washed with brine, dried with sodium sulfate and evaporated to give greenish ethyl acetate crude alkaloid fraction (4.9 g)

The tartaric acid fraction was basified with ammonia solution and extracted with chloroform (10 x 250 ml). After washing the chloform extract with brine and drying with sodium sulfate, this was evaporated to give tartaric acid crude alkaloid fraction (6.2 g)

Direct crystallization and chromatography on silica gel both gave colourless needles which showed similar behavior in tlc, ^{1}H-NMR revealed that both contain the same mixture.

Repeated preparative hplc on C18-reverse phase using methanol water (5:1) of both fraction yielded alkaloid Da 599-1 and Da 599-2 in a ratio 1 : 2, both of which crystallised from methanol as colourless fine needles.

Attempts to obtain good spectroscopic data of Da 599-2 are still in progress.

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