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Tetraphyllin B, volkenin and cyclopentenylglycine in *Androsiphonia adenostegia*☆

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1. Subject and source

Androsiphonia Stapf is a monotypic genus of Passifloraceae represented in Western Tropical Africa. Leaves of *A. adenostegia* Stapf were collected in a wet evergreen forest in Ankasa Wildlife Resource Reserve, Ghana, in April 1999. Voucher specimen (GC47677) was deposited in Herbarium GC (Ghana Herbarium, Botany Department, University of Ghana, Legon).

2. Previous work

No phytochemical studies on *Androsiphonia* are reported.

3. Present study

Isolation of cyanogenic constituents from dried leaves of *A. adenostegia* by silica gel chromatography, followed by preparative HPLC, was carried out in the usual

☆Part 19 in the series "Natural Cyclopentanoid Cyanohydrin Glycosides". For Part 18, see Andersen et al., 2000.

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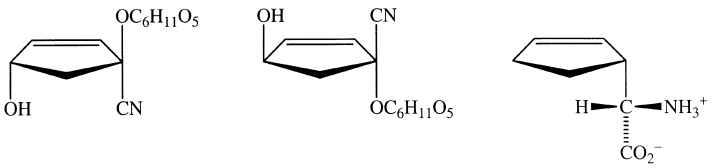

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way (Olafsdottir et al., 1989); 80.4 g of the plant material yielded 45 mg of a mixture of tetraphyllin B (**1**) and volkenin (**2**) in a ratio of 4 : 1 (0.06%).

The identity of the glucosides was established by ^{1}H and ^{13}C NMR spectra of the free glucosides and of their acetates obtained by acetylation with Ac_2O/pyridine (Jaroszewski et al., 1987).

In another experiment, 31.5 g of the plant material was extracted three times by overnight treatment with 50% aqueous EtOH. The combined extracts were freeze-dried and the residue subjected to ion-exchange on Dowex-50W (H^+), from which the total amino acids were eluted with 2 M aqueous NH_3. The amino acid fraction was chromatographed on silica gel using *t*-BuOH/2-butanone/acetone/MeOH/H_2O/concentrated NH_3 40 : 20 : 20 : 1 : 14 : 15, using synthetic cyclopentenylglycine (Olafsdottir et al., 1992; Dennis et al., 1955) as a reference. Appropriate fractions were pooled, freeze-dried, dissolved in D_2O, and subjected to 400 MHz ^{1}H NMR analysis at pH 6.2, as previously described (Andersen et al., 2000); the content of (2S,1′R)-2-(2′-cyclopentenyl)glycine (**3**) was 1.5 mg (0.005%).

4. Chemotaxonomic significance

Of the genera of Passifloraceae, the cyclopentanoid cyanohydrin glycosides in *Passiflora* and *Adenia* have been studied most extensively. The pattern of the glycosides found has taxonomic interest at the genus and subgenus level (Olafsdottir et al., 1989; Adsersen et al., 1993; Andersen et al., 1998). Of the remaining genera of Passifloraceae, cyclopentanoid cyanogens have been reported in *Barteria*, *Smeathmania* and *Efulensia* (Olafsdottir et al., 1989). The present work demonstrates that with respect to cyanogenesis, *A. adenostegia* is a typical species of Passifloraceae. The presence of (**3**), the possible biosynthetic precursor of (**1**) and (**2**), was also demonstrated. Accumulation of (**3**) has previously been demonstrated only in three species of Flacourtiaceae (Andersen et al., 2000; Cramer et al., 1980).

References

Adsersen, A., Brimer, L., Olsen, C.E., Jaroszewski, J.W., 1993. Phytochemistry 33, 365.
Andersen, L., Adsersen, A., Jaroszewski, J.W., 1998. Phytochemistry 47, 1049.
Andersen, L., Clausen, V., Oketch-Rabah, H., Lechtenberg, M., Adsersen, A., Nahrstedt, A., Jaroszewski, J.W., 2000. Biochem. Syst. Ecol., 29 (2), 219−222.
Cramer, U., Rehfeldt, A.G., Spener, F., 1980. Biochemistry 19, 3074.

Dennis, R.L., Plant, W.J., Skinner, C.G., Sutherland, G.L., Shive, W., 1955. J. Am. Chem. Soc. 77, 2362.
Jaroszewski, J.W., Olafsdottir, E.S., Cornett, C., Schaumburg, K., 1987. Acta Chem. Scand. B41, 410.
Olafsdottir, E.S., Andersen, J.V., Jaroszewski, J.W., 1989. Phytochemistry 28, 127.
Olafsdottir, E.S., Jørgensen, L.B., Jaroszewski, J.W., 1992. Phytochemistry 31, 4129.