A SAPONIN FROM Naumburgia thyrsiflora

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Plants of the family Primulaceae are characterized by a considerable content of saponins of the triterpene group [1-3]. In a preliminary communication [4] we have given information on the determination of the structure of saponin A from Naumburgia thyrsiflora.

From this plant by column chromatography on alumina, Sephadex, and silica gel we have isolated saponin B [mp 224-226°C $[\alpha]_D^{20}$ −20° (c 1.5; methanol)], which makes up 15% of the total amount of glycosides.

When saponin B was subjected to acid hydrolysis, we identified (by paper, thin-layer, and gas–liquid chromatography with markers) the aglycone priverogenin A, glucose, and arabinose (3:1). The melting points, specific rotations, and IR spectra of the priverogenin A used as marker and of the aglycone obtained from saponin B coincided completely.

The structure of the carbohydrate component of saponin B was shown by comparing the results obtained by the use of a series of known methods. Thus, when the glycoside was methylated by Kuhn's method [5] and the product was hydrolyzed with sulfuric acid, 2,3,4,6-tetra-O-methyl-D-glucose, 2,3,6-tri-O-methyl-D-glucose, and 3-O-methyl-L-arabinose were identified by chromatography in the presence of authentic samples. When saponin B was oxidized by Smith's method [6], only arabinose was found in a hydrolyzate.

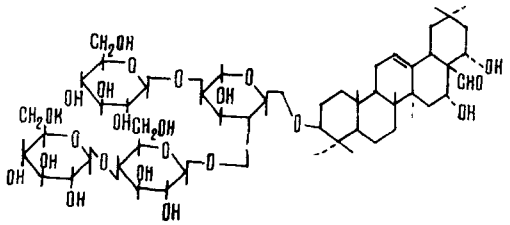
In order to determine the site of attachement of the monosaccharides to one another, partial hydrolysis was performed. This gave a monoside [mp 230-232°C, $[\alpha]_D^{20}$ + 12° (c 1.5; methanol)], saponin A [mp 248-250°C, $[\alpha]_D^{20}$ −8° (c 1.0; methanol)], and a new progenin with mp 220-222,C $[\alpha]_D^{20}$ −25° (c 1; methanol).

On hydrolysis, the monoside gave arabinose, saponin A gave two molecules of glucose, one molecule of arabinose, and priverogenin A, and the new progenin two molecules of glucose, one molecule of arabinose, and priverogenin A.

When the progenin was methylated and hydrolyzed, 2,3,4,6-tetra-O-methyl-D-glucose, 2,3, 6-tri-O-methyl-D-glucose, and 3,4-di-O-methyl-L-arabinose were identified.

Consequently, the cellobiose residue is attached to the arabinose in position 2 and the other terminal glucose in position 4.

According to these results, the structure of saponin B can be represented by the following formula:



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