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SYNTHESIS OF MANGIFERIN

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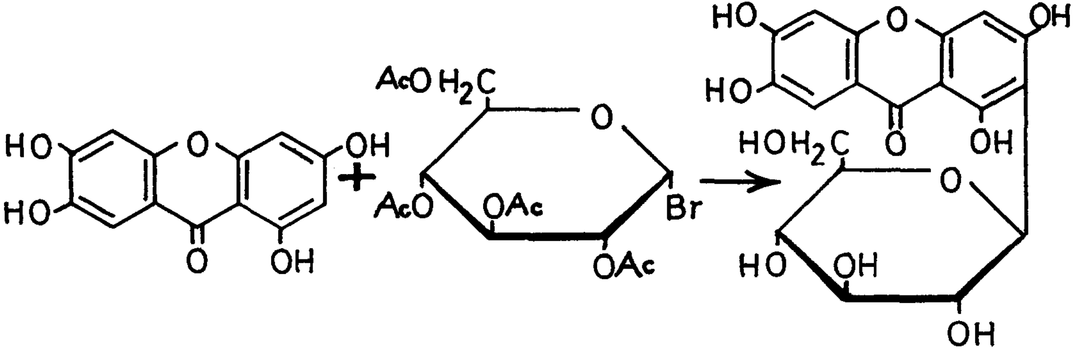
Mangiferin is the only known xanthone-C-glycoside and is conveniently prepared from the stem-bark of *Mangifera indica*. It is also present in the leaves, fruits and heartwood of this plant and in a few other plants also. The aglycone involved is 1,3,6,7-tetrahydroxyxanthone. Because of the stability of the glycoside it was considered to be a C-glycoside and the location of the sugar group was first suggested to be 2 based on the consideration that sugar groups enter generally at the last stage in biosynthesis and in 1,3,6,7-tetrahydroxy xanthone, the 2-position is the most active nuclear position in the molecule[1]. This structure has been fully established by degradative studies[2]. The above mentioned considerations that led to the proposal of the structure would also suggest that mangiferin could be synthesised by nuclear glucosylation somewhat analogous to nuclear methylation. This has now been achieved by the reaction of 1,3,6,7-tetrahydroxyxanthone with tetra-O-acetyl-α-D-glucopyranosyl bromide. The former was obtained by condensing 2,5-dihydroxy-4-methoxy benzoic acid with anhydrous phloroglucinol in the presence of zinc chloride and phosphorous oxychloride followed by demethylation using hydriodic acid[3].



The tetrahydroxyxanthone (5 g) and tetraacetyl glucosyl bromide (80 g) were dissolved in methanol (450 ml), sodium methoxide (16 g of sodium in 350 ml methanol) added and the mixture kept under reduced pressure for 72 hrs. The dark red solution was then diluted with water (150 ml), made slightly acidic by adding 2N acetic acid and methanol removed as far as possible under reduced pressure. The remaining solution was made 7% with respect to sulphuric acid and refluxed for 2 hrs. to hydrolyse the O-glycosides formed. The aglycone produced was removed by exhaustive extraction of the aqueous solution with ether. This was followed by extraction with ethyl acetate which gave mangiferin contaminated with a little of the aglycone in very low yields (about 20 mg). The product was crystallised from acetone-ethyl acetate when pure mangiferin (4 mg) was obtained, m.p. 270-71° (dec.) undepressed on admixture with the natural sample. Both the samples agreed well on TLC and their UV and IR spectra were superimposable. The synthetic sample formed an acetate (acetic anhydride-pyridine) melting at 144° undepressed by an authentic sample.

This synthesis confirms that the glucoside has the β-configuration.[4,5]

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