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Isolation of flavonoid glycoside from *Moringa pterygosperma*

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ABSTRACT

Chromatographic resolution of the flower of the Moringa pterygosperma furnished quercetin 3-O-α-L rhamnosyl (1→6) β-D-glucoside (I) which were characterized by spectral analysis..

Key words: *Moringa pterygosperma,* flavonoid glycosides.

INTRODUCTION

The flavonoids are considered potential for human health as well as constitute on important part of human diet. They are also considered as active principles in various medicinal plants.*Moringa pterygosperma* Gaerthn (Moringaceae) commonly known as Drumstick.It is commonly used in Indian folk medicine[1-2]. for the treatment of various illness. It is grows to 10-15 meter high and rapidly growing tree that resembles legume has tripinanate, leaves, a gummy bark and fragrant flower with white petals. The flower 1.5 to 2 cm long.

The plant used in antitumor[3] hypertensive[4], antioxidant[5] and anti-cancer[6]. In the present paper, we here report the isolation and characterization of a new flavonoid glycoside from the flower of *Moringa pterygosperma*.. The plant is a source of various novel bioactive compounds[7]

EXPERIMENTAL

Extraction, Isolation and Identification

The air dried and defatted powdered flowers of Moringa pterygoserma were extracted with hexane ,benzene, chloroform, ethylacetate and n-butanol. $CHCl_3$ soluble part after concentrated under reduced pressure was subjected to column chromatography on silica gel and eluted with increasing proportion of ethyl acetate and methanol elution of column with EtOAc-MeOH (6:4 v/v) and (8:2 vv) afforded a new compound (I) 0.5 gm.

Compound (I) : The compound was recrystallised form methanol as yellow crystal mf. $C_{27}H_{30}O_{16}$, mp 272-274°C, Rf-0.15; Ana Found : C, 52.88; H, 4.70, Calcd. For $C_{27}H_{30}O_{16}$: UV l Max (nm); (MeOH) 257, 269 (sh), 300 (sh) 361 (sh) + NaOMe 273, 327,408; +$AlCl_3$ 274, 304(sh), 331 (sh) 463; + $AlCl_3$+HCl 268, 303, 365(sh), 402;+NaOAc 274, 327, 382; +NaOAc+H_3BO_3, 263, 297(sh), 377; IR(KBr):1651,3355,1208,1256,1033,1103,3001,2907 cm^{-1}; MS (m/z); 610(M+); ^{1}HNMR ($DMSOd_6$); 2.78 (2H, m, H-3) 3.33-4.50 (6H, m Sug-H). 0.90 (br, J=6Hz, rhamnose methyl), 5.69 (1H, d, 7= 4 and 12 Hz, H-2), 6.42 (1H d, J=2.5 Hz, H-6), 7.39 (1H,d,J 9.5 Hz, H-2',6');C^{13} NMR; 80.07 (C-2), 46.09 (C-3), 196.01 (C-4), 163.98 (C-5), 97.33 (C-6), 163. 74 (C-7), 106.28 (C-8), 166.03 (C-9), 103.3 (C-10), 119.44 (C-1'), 156.45 (C-2'), 98.58 (C-3'), 159.58 (C-4'), 104.5 (C-5'), 126.43 (C-6'), glucose 101.3 (C-1), 69.00 (C-2), 78.80 (C-3), 64.00 (C-4), 77.00(C-5), 63.00(C -6), rhamnose 100.50(C-1),70.50(C-2),70.90(C-3),72.20(C-4), 68.00 (C-5), 17.50 (C-6).

Acid Hydrolysis of (I)

Compound (I) was hydrolysed with 7% H_2SO_4 (40 ml) by refluxing 5 hrs.. The resulting solid

was washed with water to afford quercetin and the aqueous portion was found to contain D-glucose and L-rhamnose (co-pc); Aglycone was yellow needles (0.09 gm), mp. 312-314°C; mf $C_{15}H_{10}O_7$; Ana. found C, 59.65; H, 3.31; Calcd for $C_{15}H_{10}O_7$; C, 59.61; H,3.34%; MS : (m/z); 302 (M+); 301, 274, 153, 152, 134, 132, 124; C^{13} NMR : 80.07 (C-2), 46.09 (C-3), 196.01 (C-4), 163.98 (C-5), 97.33 (C-6), 163.74 (C-7), 106.28 (C-8), 166.03 (C-9), 103.3 (C-10), 119.44 (C-1') 156.95 (C-2') 98.58 (C-3'), 159.58 (C-4'), 104.5 (C-5'), 126.43 (C-6'), glucose : 101.3 (C-1), 69.00 (C-2) 78.80 (C-3) 64.00 (C-4), 77.00 (C-5) 63.00(C-6); Rhamnose ; 100.50 (C-1), 70.50 (C-2),70.90(C-3),72.70 (C-4), 68.00 (C-5), 17.50 (C-6).

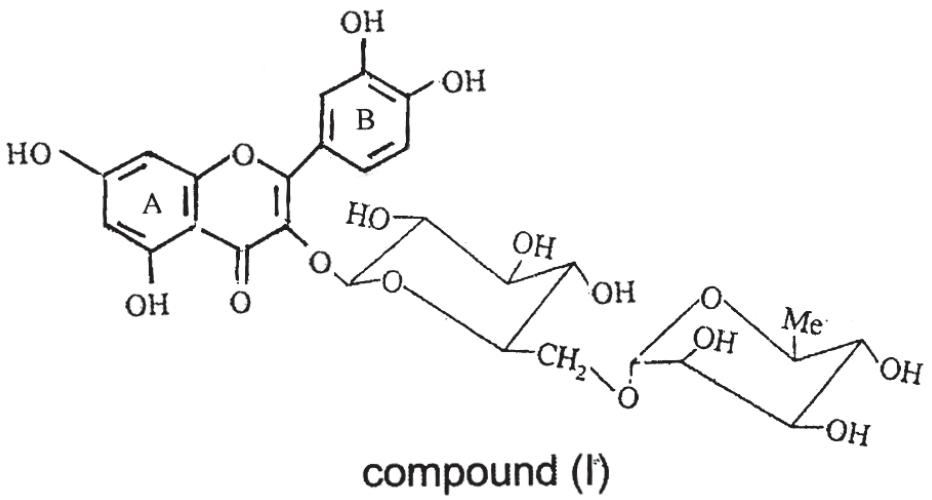
RESULTS AND DISCUSSION

Compound (I) mp 272-274°C, was analyzed for mf $C_{27}H_{30}O_{16}$, element analysis and M^+ 610. The conclusive colour reaction and UV spectrum with different chemical shifts indicated it to be a flavone glycoside [8]. The glycoside on acid hydrolysis gave yellow aglycone and two sugars identified as glucose and rhamnose by Rf value 0.18 and 0.34 respectively by pc and column chromatography with authentic sample.

The aglycone mf $C_{15}H_{10}O_7$ (M+ at 302), mp 312-314°C responded to all positive test and colour reaction of flavonoid .It was confirmed by red colour with Mg and HCl (Shinoda test)[9] the aglycone was characterized as 3,5,7,3',4' penta hydroxyl flavone on the basis UV, IR, ^{1}H NMR ,^{13}C NMR and Co-TLC.

The UV spectrum of (I) recoded in MeOH showed two absorption maximum at 355 and 357 nm. This range of absorption in typical for 3-O substitution presence of free hydroxyl group at position -7 of ring (A) was indicated. Addition of $NaOAc/H_3BO_3$ showed the presence of 3'4' ortho dihydroxylation,. A bathochromic shift of 76 nm with 5% MeOH Solution of $AlCl_3$ and a decrease of 29 nm after the addition of HCl acid indicated the presence of free hydroxyl group at position 5 of a ring A and 3'4' orthodihydroxylation ring(B).

UV spectrum recorded in MeOH and on addition of diagnostic shift reagent suggested compound (I) to be a 3 substituted flavonoid glycoside. The glycoside was methylated hydrolysed and the resulting practically methylated sugar, were identified and 2,3,4 tri O-methyl L- rhamnose and 2,4,5 tri O-methyl D-glucose by the reported method using 2,3,4,6 tetra –O-methoxyl glucose as standard[10] and column chromatography with authentic sample. This indicated that the inter sugar linkage is rhamnosyl (1→6) glucose in the one spectrum of the glycoside acetate as broad signal at 50-90 observed which is typical of rhamnose



compound (I)

Scheme 1.

methyl group. The acid hydrolysis with emulsion indicated the L-rhamnose is linked to D-glucose through α linkage and D-glucose to flavone thought β linkage. Thus the structure of the compound (I) was established as quercetin 3-O-α-L rhamnosyl (1$\rightarrow$ 6) β D-glucoside.

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