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ISOLATION AND STUDY OF THE FLAVONE GLYCOSIDE; LUTEOLIN-7- O-β-D-GLUCOPYRANOSIDE FROM THE SEEDS OF THE *CAPPARIS DECIDUA* (FORSK)

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ABSTRACT

Capparis decidua Forsk[1-4] (NO.Capparidaceae) is commonly known as Karer in Hindi. It has been found to possess important medicinal value. It is used for curing stomach troubles, piles and dysentery. The alcoholic extract of this plant is used as analgesic, diaphoretic and anthelmintic. The present communication deals with the isolation and structural elucidation of flavone-O-glycoside, characterized as; luteolin-8-O-β-D-glucopyranoside isolated from the seeds of the *Capparis decidua*.

Key words : *Capparis decidua*, Capparidaceae, Flavone-O-glucoside, Luteolin.

INTRODUCTION

Capparis decidua Forsk (NO Capparidaceae) is commonly known as Karer in Hindi. It has been found to possess various important medicinal properties. It is used for curing stomach troubles, piles and dysentery.

EXPERIMENTAL

Plant material

The seeds of the plant *Capparis decidua* were collected locally and authenticated by the reputed taxonomist, of Botany Department, Dr. H. S. Gour University, Sagar (M.P.) India.

Extraction and isolation

3.0 kg of the seeds of the *Capparis decidua* were air dried and crushed into powdered from. This powder was defatted with petroleum ether (40-60^{0}C) in a Soxhelt

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apparatus and then extracted with 95% ethanol in a round bottom flask over an electric bath. The concentrated extract was partitioned between diethyl ether and water. The aqueous layer on extraction with ethyl acetate and on concentration gave brown viscous mass, which on TLC examination showed a mixture of three compounds using solvent system. $CHCl_3$: MeOH (89 : 11) and 10% aqueous H_2SO_4 as visualizing agent. Therefore, it was subjected to column chromatography using a eluants as $CHCl_3$: MeOH in varying proportion and the eluants collected from $CHCl_3$: MeOH (3 : 2) were combined and subsequently solvent was removed to get a yellow amorphous mass, which was crystallized from methanol as yellow crystals.

Compound: It was obtained as yellow crystals, analysed for m.f. $C_{21}H_{20}O_{11}$, m.p. 260-262^{0}C, [M^+] 448 (FABMS).

IR ν (cm^{-1}) 3424.0 (-OH group), (-CH-stretching), 1637.2 (*a, β*- unsaturated, >C=O group) 1612.0, 1561.0, 1459.6 (aromatic ring system).

FABMS m/z 616 [M^+] 448, 420, 315, 313, 299, 286, 258, 165, 153, 134, 124 and123

^{1}H NMR : δ 6.24 (s, H-3), 6.28 (d, J 2.5 Hz, H-6), 7.76 (d, J 7.5 Hz, H-8), 6.93 (d, J 7.5, H-2'), 6.92 (1H, d, J 7.5, H-5'), 7.56 (1H, dd, J 7.6, 1.842, H-6'), 5.60 (1H, d, J 9.5, H-1"), 3.40-4.15 (6H, m, glucose protons).

Acid hydrolysis of the compound

The compound on acid hydrolysis with 7% concentrated H_2SO_4 afforded an aglycone identified as 5, 7, 3', 4' - tetrahydroxyflavone (by m.m.p. and super-imposable spectral studies) m:p. 320-321^{0}C, [M^+] 286 (FABMS). The aqueous layer was found to contain a sugar identified as D-glucose.

Periodate oxidation of the compound

50 mg of glycoside on periodate oxidation with $NaIO_4$[9] consumed 2.1 moles of periodate and in turns produced 1.06 moles of formic acid, thereby suggesting that the D-glucose and aglycone were present in equimolar ratio (1 : 1) which also confirmed that the sugar was present in the form of pyranose form[10].

RESULTS AND DISCUSSION

The alcoholic extract from the seeds of the plant *Capparis decidua* after

concentration was partitioned between diethyl ether and water. The aqueous layer was extracted with ethyl acetate and the concentrated ethyl acetate afforded a compound, which was crystallized from methanol as yellow crystals. The compound responded to Molisch's test-positively, specified for the glycoside as well as various characteristic colour reactions for flavonoids. The compound analysed for molecular formula $C_{21}H_{20}O_{11}$, m.p. 260-262^{0}C, [M^+] 778 (FABMS).

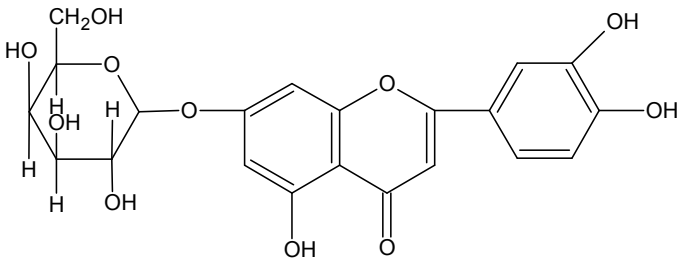
Hydrolysis of the glycoside with 7% aqueous sulphuric acid afforded an aglycone and the sugars identified as D-galactose (By Co-PC and Co-TLC). The aglycone crystallized as yellow crystals m.f. $C_{15}H_{10}O_{10}$, m.p. 323-324^{0}C [M^+] 616 (FABMS).

IR spectrum of the compound showed a peak at 3523.0 cm^{-1}, which indicated the presence of –OH group(s) in it. The compound was found to form an acetyl derivative, $C_{23}H_{18}H_{10}$, m.p. 221-222^{0}C, [M^+] 454 (FABMS).

The estimated percentage of acetyl group was found to be 37.18%[5] as described in Belcher and Godbert[6]. which indicated the presence of seven (OH) groups. The alkaline degradation with 50% ethanolic KOH gave phloroglucinol m.f. $C_6H_6O_3$, m.p. 113-114^{0}C [M^+] 126 and protocatechuic acid m.f. $C_7H_6O_4$, m.p. 203-204^{0}C, [M^+] 154, which were identified by Co-PC and Co-TLC with authentic sample.

The formation of protocatechuic acid showed the presence of two -OH groups at C-3' and C-4' in ring B in the aglycone. UV spectrum of the aglycone with NaOAc/H_3BO_3 relative to MeOH confirmed the presence of-OH groups at C-3' and C-4'.

Formation of phloroglucinol showed the presence of two -OH groups at C-5 and C-7, respectively. UV shift with $AlCl_3$/HCl relative to MeOH indicated the presence of -OH group at position C-5 and NaOAc relative to MeOH confirmed the presence of -OH groups at position C-7.



Keeping all the facts together, the structure to the aglycone was assigned as

5,7,3',4' - tetrahydroxy flavone. The hydrolysis of the glycoside with almond emulsion yielded D-glucose. On the basis of all the above facts, the compound was identified as luteolin-7-O-β-D-glucopyranoside.

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