



## LUTEOLIN-7-O- $\beta$ -D-GLUCOPYRANOSIDE FROM THE KERNALS OF *SAMADERA INDICA*-GAERTN

ALOK SAHAI<sup>\*</sup>, SUDHANSHU DWIVEDI<sup>a</sup> and NIDHI SAXENA

P. G. College of Excellence, SAGAR (M.P.) INDIA

<sup>a</sup>M. P. BOU, BHOPAL (M.P.) INDIA

### ABSTRACT

*Samadera indica* (Gaertn) is locally known as Lakhandi. This Plant belongs to natural order Simarubaceae. Its bark is useful for curing fever. Its leaves when bruised is applied for curing insect bites. Its kernels are used for treating rheumatism. In the present study, we describe the isolation and structural elucidation of the flavone-o-glycoside, luteoline-7-o- $\beta$ -D-glucopyranoside isolated from the kernels of *Samadera indica* (Gaertn).

**Key words:** Luteolin-7-o- $\beta$ -D-Glucopyranoside, Kernal, *Samadera Indica*.

### INTRODUCTION

*Samadera indica* (Gaertn) – N.O. Simarubaceae, known as Lakhani locally is reported to be useful for curing fever, insect bites and rheumatism. In view of its very important medicinal values, its kernels were subjected to systematic photochemical investigation.

### EXPERIMENTAL

#### The plant material

The kernels of the plant were procured from the Konkan region and authenticated by the reputed taxonomist.

#### Extraction and isolation

About 2.5 Kg of kernel of *samadera indica* (Gaertn) were dried and crushed into powder and extracted with 95% ethanol in a round bottomed flask over an electric water

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<sup>\*</sup> Author for correspondence; E-mail: n\_saxena4@yahoo.co.in

bath and filtered while hot. There after the filtrate was concentrated and the concentrated extract was then partitioned between diethylether and water. The aqueous layer on extraction with ethyl acetate and on concentration gave brown viscous mass, which on TLC examination showed it to be mixture of two compounds using solvent system,  $\text{CHCl}_3$  : MeOH and 5%  $\text{H}_2\text{SO}_4$  as visualizing agent. Subsequently it was subjected to column chromatography using a eluants as  $\text{CHCl}_3$  : MeOH (1 : 1) in varying proportion and solvent removed to get an amorphous light brown mass, which was crystallized from methanol as cream colored crystals.

### Study of the glycoside NS-1

The NS-1 was obtained as light cream color crystals, which analysed for m.f.  $\text{C}_{21}\text{H}_{20}\text{O}_{11}$ , m.p. 260-261°C,  $[\text{M}^+]$  448 (CIMS).

**IR**  $\nu$  ( $\text{cm}^{-1}$ ) 3226.0 (-OH group), (-CH-stretching), 1635 ( $\alpha$ ,  $\beta$ -unsaturated,  $> \text{C} = \text{O}$  group) 1610, 1560.0, 1460 (aromatic ring system).

**CIMS** m/z  $[\text{M}^+]$  448, 420, 315, 313, 299, 286, 165, 153, 134, 124 and 123.

**$^1\text{H}$  NMR:**  $\delta$  6.24 (s, H-3), 6.25 (d, J2.5Hz, H-6), 7.76 (d, J7.5 Hz, H-8), 6.93 (d, J7.6, H-2'), 6.90 (1H,d, J7.5, H-5'), 7.56 (1H, dd, J7.5, 1.842, H-6'), 5.6(1H, d, J9.4, H-1''), 3.40-4.21 (6H, m, glucose protons).

### Acid hydrolysis of the glycoside NS-1

The glycoside NS-1 on acid hydrolysis with 6% concentrated  $\text{H}_2\text{SO}_4$  gave an aglycone NS-1 (A) which (NS-1A) was identified as 5,7,3',4'- tetrahydroxyflavone (by m.m.p. and super-imposable spectral studies) m.p. 320-321°C,  $[\text{M}^+]$  286 (CIMS). The aqueous layer was found to contain the sugar, which was identified as D-glucose (TLC and Co TLC)<sup>2-5</sup>.

### The periodate oxidation of the glycoside NS-1

About 50 mg of the glycoside NS-1 on periodate oxidation with  $\text{NaIO}_4$ <sup>6</sup> consumed 2.0 mole of periodate and in turn gave 1.05 mole of formic acid, thereby suggesting that the D-glucose and aglycone (NS-1A) were present in the form of pyranose form in the gluycoside<sup>7</sup> NS-1.

## RESULTS AND DISCUSSION

The alcoholic extract from the kernels of the plant *samadera indica* (Gaertn) was concentrated and partitioned between diethyl ether and water. The aqueous layer was then extracted with ethyl acetate and the concentrated ethyl acetate extract when worked up by column chromatography gave a glycoside, NS-1 which was crystallized from methanol. The glycoside NS-1 responded to positive Molisch's test, which is specific for the glycoside as well as various characteristic colour reactions for flavonoids. The glycoside NS-1 analysed for molecular formula  $C_{21}H_{20}O_{11}$ , m.p. 260-261°C,  $[M^+]$  448 (CIMS).

On hydrolysis with 7% aqueous sulphuric acid the glycoside NS-1 gave an aglycone NS-1 (A) and the sugar which was identified as D-glucose (by Co- PC and Co-TLC). The aglycone arystallized as yellow crystals m.f.  $C_{15}H_{10}O_6$ , m.p. 320-321°C,  $[M^+]$  350 (CIMS).

The glycoside NS-1 exhibited in the IR spectrum at  $3226.0\text{ cm}^{-1}$ , which indicated the presence of  $-\text{OH}$  group(s) in it. The compound was found to form an acetyl derivative,  $C_{23}H_{18}O_{10}$ , m.p. 221-222°C,  $[M^+]$  454 (CIMS).

The percentage of the acetyl group was determined by the method as described in Balcher and Godbert<sup>4</sup>, and was found to be 37.16%, which indicated the presence of seven (OH) groups in the glycoside NS-1. The aglycone NS-1A on degradation with 50% ethanolic KOH gave phloroglucinol m.f.  $C_6H_6O_3$ , m.p. 113-114°C,  $[M^+]$  126 and protocateuchic acid m.f.  $C_7H_6O_4$ , m.p. 202-203°C,  $[M^+]$  154, which were identified with authentic samples.

As such the formation of protocateuchic acid showed the presence of two  $-\text{OH}$  groups at C-3' and C-4' in the ring B in the aglycone NS-1(A). The UV spectrum of the aglycone with NaAc/ $H_3BO_3$  relative to MeOH confirmed the presence of OH groups at C-3' and C-4' in aglycone.

The formation of phorglucinol showed the presence of two  $-\text{OH}$  groups at C-5 and C-7, respectively. The  $\lambda_{\text{max}}$  in  $AlCl_3/HCl$  relative to MeOH confirmed the presence of  $-\text{OH}$  groups at position C-7 is the aglycone NS-1 (A). Thus considering all the facts together, the structure to the aglycone NS-1A was assigned as 5,7,3',4'-tetrahydroxy flavone and also the flycoside NS-1, on hydrolysis with almond emulsion yielded D-glucose.

Therefore, on the basis of all the above facts, the glycoside NS-1 was identified as luteolin-7-o- $\beta$ -D-glucopyranoside.

## REFERENCES

1. R. N. Chopra, S. L. Nayer and I. C. Chopra, Glossary of Indian Medicinal Plants, CSIR, New Delhi, Page No 220 (1968).
2. E. Weisenberger, Mikrochemic Ver., Mikrochim. Acta, Page 33 (1947).
3. Egon Stahl, Longman Green, Thin Layer Chromatography, Academic Press, New York, London (1972).
4. R. Belcher and A. L. Godbert, Semimicro Quantitative Organic Chemistry, Longmans green, New York (1956).
5. E. L. Hirst and J. K. N. Jones J. Chem, Soc., Page 1659 (1949).
6. F. G. Mann and B. C. Soonders Practical Organic Chemistry, Longmann Green, New York, Page 365 (1936).
7. S. Ramaswamy and H. Hariharan, Phytochemistry, **9**, Page 409 (1970).

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