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Phytochemical Study of *Glycosmis Mauritiana*

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ABSTRACT

Three quinolinone alkaloids, two acridone alkaloids and a flavones glycoside were isolated from the aerial parts of Glycosmis mauritiana. These compounds were characterized as 7, 8-*Dimethoxy*-2,2,6-*trimethyl*-*pyrano quinolin*-5-*one*, 4-*Methoxy* 1-*methyl quinolin*-2-*one*, 6-*Hydroxy N-methyl* 2,3-*furo*-*quinolin*-4-*one*, 1-*Hydroxy*-10-*methyl acridone*, 1-*Hydroxy*-2, 3-*dimethoxy*-10-*methylacridin*-9-*one and Luteolin*-4′-*O*-[*α-L-rhamnopyranosyl*-(1→2)-{*α-L-rhamnopyranosyl*-(1→6)}-*β-D-glycopyranoside*]. *The isolated compounds were characterized by UV, IR and N. M. R* (^{1}H, ^{13}C) *studies.*

***Keywords*:** *Glycosmis Mauritiana*, *Rutaceae*, *Flavanone Glycoside*

1. Introduction

Glycosmis mauritiana (syn. *Limonia pentaphylla* Auct; Glycosmis pentaphylla Auct.; *Limonia mauritiana* Lam.) commonly known as Ash-sheora, Orange berry, Rum Berry and Gin Berry. *Glycosmis mauritiana* is native of India, Malaysia, China, Sri Lanka, Myanmar, Thailand, Indonesia and Malaya. *Glycosmis mauritiana* is a small tree or shrub, widely used in Hindu medicine [1-3]. Plants of this genus used as a traditional medicine for the treatment of various diseases [4]. The genus *Glycosmis* (Family Rutaceae) is a rich source of quinolone, quinazoline, furoquinoline, carbazole, acridone type of alkaloids and also sulphur-containing amides, coumarins and flavonoids [4-7]. Plant flavonoids have been shown in current years to be of essential meaning to mankind as well as to plants. The several thousand polyphenols that have been described in plants can be grouped into distinct classes, most of which are found in fruits and vegetables. Flavonoids are particularly common in higher plants belonging families Leguminoseae, Rutaceae, Primulaceae, Polygonaceae, Salicaceaem, Pinaceae, Rosaceae, Asteraceae, Lamiaceae, Bignoniaceae, Moraceae, Betulaceae, Rubiaceae, and Mytaceae. Flavanoids, are the largest group of naturally occurring phenolic compounds, which occur in different plant parts both in the free state and as glycosides [8-11].

Flavonoids have been shown to have a wide range of biological activities, including antiallergic, antibacterial, antiinflammatory, antimutagenic, antioxidant, antiproliferative, antithrombotic, antiviral and hepatoprotective [8-15]. These flavonoids also showed antitumor and anti-HIV effect, strong antioxidative effects and provide powerful scavengers against superoxide, hydrogen peroxide, hydroxyl radicals, nitric oxide and peroxynitrite produced by various chemicals and biological systems moreover they have anticarcinogenic properties [16].

2. Results and Discussion

The compound was isolated as yellow semi solid from the ethyl acetate extract by the elution with $CHCl_3$: MeOH (5:14). The compound showed positive test for sugar and flavonoid moiety suggested that the compound might be a flavanoid glycoside. The UV spectrum of the compound showed absorption bands at 257, 269 and 337 nm characteristic of flavonoid [17-20]. The methanol UV spectra of this compound showed two peaks at 257 and 269 nm, respectively, indicating that the B-ring is either 3', 4'- or 3', 4', 5'-oxygenation. The IR spectrum of the compound exhibited absorption bands at 3421 (O-H), 2925 (C-H), 1654 (α, β-unsaturated C=O), 1620 (C=C), 1517, 1493 (aromatic), and 1108 - 1018 (glycosidic nature) cm^{-1} functionalities. Mass spectrum exhibited a molecular ion peak at m/z 740 (M + H) which corresponded to the molecular formula C33H40O19 [17-20].

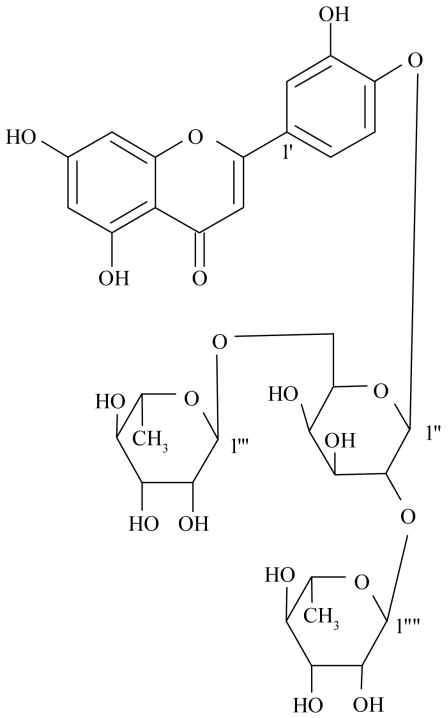
In the ^{1}H NMR spectrum a singlet appeared at δ 12.13 applicable for C_5-OH group, which was hydrogen, bonded with carbonyl group at C-4. The ^{1}H NMR spectrum of this compound further displayed a one proton singlet signals for the other two phenolic protons at δ 9.04 (^{1}H,

H-3') and 10.80 (^{1}H, H-7) [17-20].

The ^{1}H-NMR demonstrated two one-proton doublets at δ 7.82 (^{1}H, d, J = 2.2 Hz) and δ 7.34 (^{1}H, d, J = 8.3 Hz) and one double doublet δ 7.74 (^{1}H, dd, J = 2.2, 8.3 Hz) assignable to H-2', H-5' and H-6' protons respectively. The ^{1}H NMR displayed one proton singlet at δ 6.74 could be assigned to H-3 proton [19]. In addition, the methine carbon signal at δc 105.41 was attributed to C-3 in the ^{13}C NMR spectrum, indicating a 3', 5, 7-trihydroxy flavone [21].

The ^{1}H NMR spectrum of the compound showed two meta-coupled doublets at δ 6.49(^{1}H, d, J = 2.2 Hz) and 6.26(^{1}H, d, J = 2.2 Hz) each integrating for one proton, were assigned to H-8 and H-6, respectively of ring A of 5, 7-dihydroxy flavone. The ^{1}H NMR studies of the compound showed it to be flavonoid with sugar moieties *i.e.* glactose and rhamnose in a trisaccharide fashion. In the ^{1}H NMR spectra the resonances of the anomeric protons observed in the low-field region at δ 5.58 (^{1}H, d, J = 7.9 Hz, H-1"), 5.46 (1H, d, J = 3.6 Hz, H-1'"), and 5.41 (^{1}H, d, J = 3.1 Hz, H-1'"") applicable for three sugar anomeric protons suggesting the presence of triglycoside linkage [17-19]. The anomeric proton signals were consistent with the *β*-configuration of one glactose and *α*-configuration of two rhamnose moieties.

The downfield chemical shift of C-2" and C-6" and slight upfield shift of C-1' and C-5'of galactopyranosyl moiety provided evidence for the sites of attachment of rhamnose to the galactose.



Luteolin-4'-O-[α-L-rhamnopyranosyl-(1→2)-{α-L-rhamnopyranosyl-(1→6)}-β-D-glycopyranoside].

The structure was further supported by its ^{13}C NMR spectrum, which demonstrated a downfield signal at δ 181.5 clearly assignable to carbonyl carbon C-4 of the pyron ring [20,21]. The three downfield signals appeared at δ 160.47, 165.80 and 149.45 were assigned to C-5, C-7 and C-3' bearing hydroxyl group. Two signals at δ 99.93 and 94.86 assigned to C-6 and C-8 further supported that hydroxyl group present at C-5 and C-7 [21]. Moreover, a signal at δ 151.56 assigned to C-4' supports the attachment of glycoside moiety to this compound at C-4' [21]. On acid hydrolysis, compound afforded *β*-D-galactose and *α*-L-rhamnose were identified by Co-PC with those of an authentic sample.

Thus on the basis of the above spectral evidences the structure of the isolated compound was finally concluded to be Luteolin-4'-O-[α-L-rhamnopyranosyl-(1→2)-{α-L-rhamnopyranosyl-(1→6)}-β-D-glycopyranoside].

3. Conclusions

Although several compounds have been isolated from *Glycosmis mauritiana* among them Luteolin-4'-O-[α-L-rhamnopyranosyl-(1→2)-{α-L-rhamnopyranosyl-(1→6)}-*β*-D-glycopyranoside is new for this plant.

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