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RESEARCH ARTICLE

Quercetin-3-O-α-L-Rhamnopyranosyl-(1-6)-β-D-Glucopyranoside Isolated from Bougainvillea Glabra

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ABSTRACT

Flavonoids were isolated from *Bougainvillea Glabra* using column and thin layer chromatography separation techniques. By comparing their, UV, ^{1}H-NMR, ^{13}C-NMR spectral data proved it to be quercetin – 3 – O – α - L-rhamnopyranosyl - (1- 6) – β – D – glucopyranoside.

KEYWORDS

Antioxidants Activity, Quercetin – 3 – O – α - L-rhamnopyranosyl - (1 - 6) – β – D – Glucopyranoside, ^{13}C-NMR, ^{1}H-NMR

INTRODUCTION

Most flowering ornamental plants are utilized more for their beauty as they radiate different colors to the surroundings. When the flowers bloom, they serve their purpose; however, when they wilt, they just fall off as trash. Before this happens, these flowers could still be of use as pharmaceuticals or nutraceuticals. Several studies show that flowers have a wide array of secondary metabolites of medicinal value, offering antioxidant, antifungal, antibacterial and cytotoxic activities.[1,2,3]

Secondary metabolites from plants have important biological and pharmacological activities, such as anti-oxidative, anti-allergic, antibiotic, hypoglycemic and anti-carcinogenic.[4,5,6]

Nutritionists have shown an increased interest in plant antioxidants which could be used in unmodified form as natural food preservatives to replace synthetic substances.[7]

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MATERIALS AND METHOD

Plant Material

The plant materials (flowers) were collected from Guru Govind Singh nursery, Bhopal. The flowers were dried under shade at room temperature. The flowers were powder and stored in sterile container for the further use. The dried powder was then treated with hydro-alcoholic solution (50 ml each) in a soxhlet apparatus for 72hours according to successive solvent extraction. Then the solvent was removed by evaporation and brownish colour semisolid crude extract was obtained

Phytochemical Screening of Plant Extract

A small amount of the dry extract was used for the phytochemical tests[8] for compounds which include alkaloids, flavonoids, tannins, saponins, glycosides, phenol and terpenoids while steroids, coumarin and cardiac glycosides are absent in all the crude extracts.

Isolation and Identification

The isolation of the methanol extract was subjected to column chromatography with silica gel (60-120 mesh) as the stationary phase. The charged column was then eluted with different mobile phases with gradual increase in polarity. The fractions were collected and the solvent recovered by simple distillation. All the concentrated fractions were subjected to TLC for the identification of the desired bands

TLC was performed on the 20 × 20 cm plates precoated with silica gel (Sigma Aldrich Co., India). TLC analysis of acetic acid extracts were performed using 2 propanol-ethanol-acetic acid (6:7:1) developing solvent systems Based on the Rf-value, number of fractions were obtained and the one with good resolution was visualized under ultraviolet (UV) light, indicating that it was a pure compound, was selected.

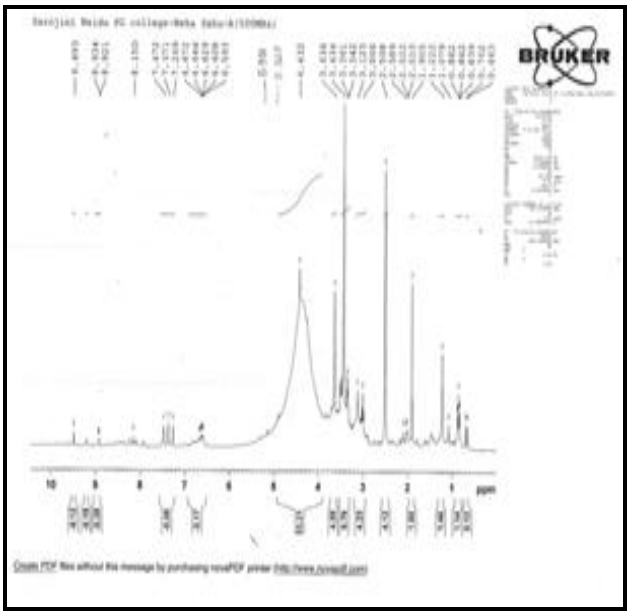
Supporting evidence for the structure of the flavone and glycoside is provided by the UV and NMR (125 MHz, DMSO) Spectral data that were recorded on a Bruker AMX 400 NMR spectrometer. Chemical shifts were referenced to the respective residual solvent peaks and the values were recorded in δ.

RESULTS AND DISCUSSION

Chemical Constituents

The flowers of *Bougainvillea glabra* have been found to contain Quercetin-3-O-α-L-rhamnopyranosyl-(1-6)-β-Dglucopyranoside.
The UV spectrum of the aglycone exhibited two major peaks at 278 nm (band-I) and 232 nm (band-II), to reveal a flavonoid skeleton. The 1H and 13C NMR spectra (Table 1) showed the expected signals in the aromatic region for the quercetin moiety in the flavonoids. The 13C NMR data indicated that were 27 carbons in this structure, 15 of which were typical for a flavone skeleton, while others were assigned to glycoside. In the ^{1}H - NMR spectrum, A-ring protons at C-6 and C-8 appear separately at δ 5.90 ppm and δ 6.593 ppm respectively. The signal at δ 7.37 ppm corresponds to the protons at C-2ı and C-6ı. The protons at C-5ı appear at δ 6.67 ppm. The two signals were observed in the region characteristic for anomeric protons of sugars. Doublets at δ 5.32 ppm were assigned to glucose β-linked to the aglycone. Signals at δ 4.43 ppm corresponded to the anomeric proton of α – linked rhamnose[15]. The methyl protons of the sugar rhamnose appear at δ 0.88 ppm and rest of the sugar protons appear in the range δ 3.00 - 3.36 ppm.[9]

In ^{13}C NMR signals corresponding to the anomeric carbon of glucose were found at 73.21 ppm and those corresponding to rhamnose were seen at 84.22 ppm. The attachment of the rhamnose to C-6 of the glycosyl moiety was evidenced by the downfield shift of the glycosyl C-6 carbon resonance to δ 60.11 ppm and accompanying up field shift of the resonances of the adjacent carbons C-5 to 73.08 ppm. The chemical shift values of all the recorded sugar carbon resonances confirmed the pyranose form of the two sugar moieties in the Quercetin-3-O-α-L-rhamnopyranosyl-(1-6)-β-glucopyranoside (Figure 1). The sugar moiety was proved to be acylated at C-3 of the aglycone as deduced from the correlation between the anomeric proton at δ ppm 4.43 and the C-3 at δ ppm84.2. By comparing their UV, 1HNMR and 13C-NMR data it was proved to be Quercetin-3- O-α-L-rhamnopyranosyl-(1-6)-β-D-glucopyranoside with those reported for similar compound.[10]



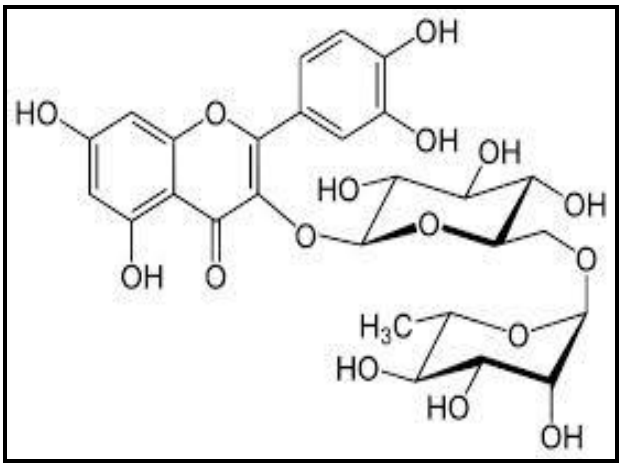


Figure 1: Quercetin-3- O-α-L-rhamnopyranosyl-(1-6)-β-D-glucopyranoside

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