

A NOVEL FLAVONE GLYCOSIDE FROM THE ROOTS OF *PITHECELLOBIUM DULCE* AND ITS ANTIMICROBIAL ACTIVITY

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ABSTRACT

The isolation was done and spectral data of flavone glycoside Quercetin 3-O-β-D glycopyranoside from the root extract in ethyl acetate of *Pithecellobium dulce* were obtained. The extract was tested for antimicrobial activity and was found to possess remarkable antifungal and antibacterial activities.

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KEY WORDS : *Pithecellobium dulce*, Root extract, Flavone, Antimicrobial activity.

Introduction

*Pithecellobium dulce*¹⁻³ is commonly known as jungle jalebe or vilayati imali. It belongs to natural order Leguminosae. It is important indigenous plant, cultivated through-out India and a native of tropical America. The plant possess significant medicinal value. Earlier workers reported that significant number of compounds have been isolated from the plant⁴.

Materials and Methods

The roots of *Pithecellobium dulce* were collected locally and authenticated by Department of Botany, D. V. (P.G.) College, Orai (U.P.)

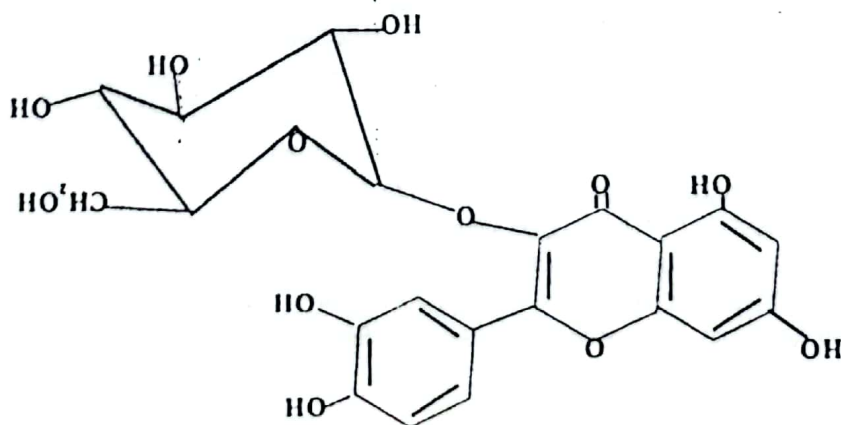
Air dried and powdered roots (2.5kg.) of *Pithecellobium dulce* was extracted with aqueous methanol. The extract was concentrated under reduced pressure to get a viscous mass, which was poured into excess of water. The aqueous solution was concentrated to a brown mass, and successively extracted with petroleum ether, benzene, ethyl acetate. The ethyl acetate extract was tested separately for antimicrobial activity. The extract was concentrated under reduced pressure to get yellow mass which then subjected to silica gel G column chromatography and eluted with methanol and water mixture in varying proportions.

Finally the solid mass obtained by the removal of solvent was subjected to thin layer chromatography. It gave two spots, so rechromatographed in a silica gel column with methanol and chloroform mixture in various proportions. Different fractions (7:3,5:5) having same R_f value were mixed. After removing the solvents there was yellow crystalline compound which gave single spot on thin layer chromatography using ethyl acetate : acetic anhydride : acetic acid : water :: 5 : 3 : 1 : 1 v/v as solvent system. The molecular formula $C_{21}H_{20}O_{12}$, m.p. 228-30° C, $[M]^+ 464$ EMIS, was obtained from the methanolic extract. On hydrolysis it yielded an aglycone which on fusion with potassium hydroxide gave phloroglucinol and protocatechnic acid. Thus the aglycone was identified as; 3,5,7,3',4' penta hydroxy flavone. The sugar obtained on hydrolysis, was identified as D- glucose (Co- PC and Co-TLC).

The glycoside⁵ (HKG -IV) was identified as; quercetin 3-O-β-D glycopyranoside by specific colour reactions, chemical degradations and spectral studies.

UV max : (MeOH) 257, 364; (AlCl₃) 344, 458; (AlCl₃ + HCl) 354, 421; (NaOMe) 323,401; (NaOAc) 272,329 nm;
IR⁶ bands (KBr) : 1700 (keto group), 3375 (hydroxyl group). ¹³C -NMR⁷ (DMSO- d₆/ TMS) : 157 (C-2), 134 (C-

Fig. 1 :



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TABLE 1 : Antifungal activity of root extract of *Pithecellobium dulce*

Fungle Species	Diameter inhibition zone (in mm)	
	Et O Ac Root extract	Control. (β -Naphthol) (1000 p pm)
1. <i>Aspergillus flavus</i>	10.5	20
2. <i>Aspergillus niger</i>	12	18

TABLE 2 : Antibacterial activity of root extract of *Pithecellobium dulce*

Bacterial Species	Diameter inhibition zone (mm in) *	
	Eto Ac Root Extract	Control *
1. <i>Bacillus anthracis</i>	19	22
2. <i>Bacillus subtilis</i>	15	28
3. <i>Escherichia coli</i>	13	28

* [streptomycin (400ppm) against gram positive gram -negative bacteria]

3), 177 (C-4), 161 (C-5), 97 (C-6), 165 (C-7), 91 (C-8), 157 (C-9), 104 (C-10), 113 (C-1'), 114 (C-2'), 145 (C-3'), 149 (C-4'), 115 (C-5'), 120 (C-6'), 100 (C-1''), 73 (C-2''), 78 (C-3''), 69.5 (C-4''), 77 (C-5''), 63 (C-6''),

¹H- NMR^a (400 MHz-CDCl₃TMS) δ 7.65 (1H, s, H-2'), δ 7.5 (1H, d, J 8.0 Hz, H-6'), δ 6.75 (1H, d, J, 8.0 Hz, H-5'), δ 6.4 (1H, d, J 2.0 Hz, H-6), δ 5.2 (1H, d, J 7.0 Hz, H-1''), δ 3.6 (6 H, m, glycosyl protons)

MS [M]⁺ 464 EIMS M/Z : 302, 274, 152, 124.

Thus from the above data, it was finally determined the structure of flavone glycoside as follows : Quercetin 3-O- β -D glucopyranoside.

The ethyl acetate fraction of roots extract of *Pithecellobium dulce* containing compound (HKG - IV0) was tested for its antimicrobial activity by filter paper disc method

^a. The result was expressed in terms of inhibition zone. The "Oxide Nutrient Broth" and "Sabourad Dextrose Agar" media ¹⁰ were used to check antibacterial and antifungal activities respectively.

The tables 1 and 2 show the antifungal and anti bacterial activities of roots extract of *Pithecellobium dulce*.

Result and Discussion

The flavone glycoside isolated from an ethyl acetate extract of the roots of *Pithecellobium dulce* was indentified as quercetin 3-O- β -D glucopyranoside represented in figure.

From tables 1 and 2 it is clear that the root extracts of *Pithecellobium dulce* in ethyl acetate were found to possess prominent antifungal and antibacterial activities.

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