



Erythrcytic Studies on Tectona Grandis

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ABSTRACT

Fresh flowers of *Tectona grandis* is found to contain the flavones luteolin and its glycoside luteolin – 7 O – glucoside. The structures have characterized by modern physical methods, colour reactions, Paper chromatography and hydrolytic studies. An *in vitro* study has been carried out to establish its haemolytic properties. The glycoside is observed to be having a hypotonicity induced haemolysis, at higher concentrations

Keywords : *Tectona grandis*, luteolin, luteolin 7 - O – glucoside, haemolysis

Introduction

Teak is the common name for the tropical hardwood tree species *Tectona grandis* and its wood products. The species is placed in the family Lamiaceae. *Tectona grandis* is a large, deciduous tree that is dominant in mixed hardwood forests. It has small, fragrant white flowers and papery leaves that are often hairy on the lower surface. It is sometimes known as the "Burmese Teak". Teak wood has a leather-like smell when it is freshly milled. Teak timber is particularly valued for its durability and water resistance, and is used for boat building, exterior construction, veneer, furniture, carving, turnings, and other small wood projects.[1] *Tectona grandis* is native to south and southeast Asia, mainly India, Indonesia, Malaysia, Thailand and Burma, but is naturalized and cultivated in many countries in Africa and the Caribbean. Burma accounts for nearly one third of the world's total teak production.^[citation needed]

The word teak comes from the Tamil/Malayalam word thekku. [2] and it is mentioned in the seventh-century literature of Tamil popularly known as the Tevaram. In Bengali it is called 'Segun' (সগুন) or more commonly as Sagwan in various Indian languages. *Tectona grandis* is one of three species in the genus *Tectona*. The other two species, *T. hamiltoniana* and *T. philippinensis*, are endemics with relatively small native distributions in Myanmar and the Philippines, respectively.[6] *Tectona grandis* is native to India, Indonesia, Malaysia, Myanmar, northern Thailand, and northwestern Laos.[3][4]. *Tectona grandis* is found in a variety of habitats and climatic conditions from arid areas with only 500 mm of rain per year to very moist forests with up to 5,000 mm of rain per year. Typically, though, the annual rainfall in areas where teak grows averages 1,250-1,650 mm with a 3-5 month dry season.

EXPERIMENTAL

Extraction and Fractionation

Fresh flowers (1 kg) of *Tectona grandis* collected from in and around Kumbakonam, Thanjavur District, during May-June were extracted with 85% methanol (5 X 500 ml) under reflux. The alcoholic extract was concentrated in vacuo and the aqueous concentrate was successively fractionated with petroleum ether (60-80°C) (4 X 250 ml) peroxide - free Et₂O (3 X

250 ml) and EtOAc (4 X 250). The petrol fraction did not yield any crystalline solid and could not be studied further.

Et₂O fraction :

The ether fraction was concentrated in vacuo and left in an ice chest for about a week. The details of the compound isolated are given below. It appeared as yellow needles, m.p. 330-31 °C. UV: λ_{max}^{MeOH} nm 240 sh, 253, 268, 348; + (NaOMe) 265 sh, 329 sh, 403; + (AlCl₃) 274, 298 sh, 328, 425; + (AlCl₃/HCl) 265 sh, 275, 294 sh, 356, 384; + (NaOAc) 269, 326 sh, 384; + (NaOAc/H₃BO₃) 259, 301 sh, 370, 430 sh. It answered usual tests for flavones and it was identified as the flavones luteolin.

EtOAc fraction :

The ethyl acetate fraction was identified as luteolin 7 – O – glucoside by Rf values, UV, and NMR spectral studies. The isolated glycoside was hydrolysed by 7% sulphuric acid and it was characterized as luteolin and sugar moiety being glucose. The structure was confirmed by co and mixed PC with an authentic sample of the same from *Cassia mimosoides*5

Haemolytic effect of the glycoside

Luteolin-7-Oglucoside isolated from EtOAc fraction was tested for its HRBC membrane stabilization5 in vitro studies. It showed relatively low value of haemolysis at 10 µg of the drug, while a plot drawn with concentrations in abscissae and transmittance in ordinates, read at 560 nm in a photoelectric colorimeter. The curve reached a maximum at 50 µg. As the concentration increases, only hypotonicity-induced haemolysis was observed.

S.No.	Glycoside concentration in µg	Percentage of Haemolysis
1	10	0.55
2	20	0.95
3	30	1.40
4	50	1.73
5	100	1.57
6	150	1.65
7	200	1.74
8	250	1.81

Results and discussion

The fresh flowers of *Tectona grandis* have been found to contain luteolin and luteolin 7-O-glucoside. The UV spectrum of aglycone obtained from ether fraction exhibited two major peaks at 253 nm and 349 nm which showed a flavones skeleton. A bathochromic shift of 52 nm on the addition of sodium methoxide revealed the presence of a free 4'-OH in the B-ring. A shift of +36 nm on the addition aluminium-HCl showed the presence of a free 5-OH in the A-ring. The presence of a free OH at C-7 was ascertained by a shift of +16 nm (band II) on the addition sodium acetate. The aluminium chloride spectrum was having a bathochromic shift of +41 nm over and above that of Aluminium chloride-HCl, spectrum, revealed the presence of a catechol type of substitution in B-ring. The boric acid spectrum also

confirmed it as there was +21 nm shift on the addition of sodium acetate-boric acid. Thus on the basis of m.p., colour reactions, Rf values and the pigment has been characterized as luteolin.

The UV spectrum of the glycoside exhibited two major peaks at 255 nm (band II) and 348 nm (band I) indicating a flavones skeleton. Subsequently the shifting agents helped to characterize the compound as luteolin 7-O-glucoside. While the concentration of the drug is increased, only haemolysis is observed.

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