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Alpinum isoflavone from *Erythrina stricta* Roxb

[Alpinum isoflavona de *Erythrina stricta* Roxb]

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Abstract

Alpinum isoflavone was isolated from the n-hexane extract of stem bark of *Erythrina stricta*. The structure of the compound was elucidated by extensive spectroscopic studies and comparision with published spectroscopic data.

Keywords: *Erythrina stricta*, Fabaceae, Alpinum isoflavone

Resumen

A partir de un extracto, obtenido con n-hexano de corteza de *Erythrina stricta*, se aisló la alpinum isoflavona. La estructura del compuesto fue determinada por métodos espectroscópicos y comparación con datos espectroscópicos publicados

Palabras Clave: *Erythrina stricta*, Fabaceae, Alpinum isoflavona

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INTRODUCTION

A medium size deciduous tree with deeply cracked cork bark. Branches armed with white or pale yellow prickles. The genus *Erythrina* belongs to the family Leguminosae and comprises over 100 species of which 8 are known to occur in Bangladesh (Ghani, 2003, Kirtikar *et al*, 1980). Previous investigation of *Erythrina* species have led to the isolation of several phenolic metabolites, such as pterocarpans, isoflavones, flavonones and chalcones. *Erythrina stricta* has been reported to contain alkaloids, erythline, erysodine, erythrinine and other known compounds. *E stricta* roxb is used for various ailments. Crude extract and elucidated compounds showed antiplasmodial activity, antimicrobial activity and cytotoxic property (Rukachaisirikul *et al*, 2007). As part of our research project on bioactive compounds from Bangladeshi medicinal plants for the treatment of tropical diseases, we have investigated this plant species.

METHODS AND MATERIALS

Collection and preparation of plant material

Plant sample of *Erythrina stricta* was collected from Brahramanbaria in April 2008. A voucher specimen has been deposited in University of Dhaka Herbarium (Herbarium No: 20250). The plant(s) part usually collected in fresh condition Therefore it should be washed well. It is cut in small pieces and then sun dried followed oven dried at reduced temperature and powdered after drying.

Column chromatography of n-hexane crude extract

The extract (550 mg) was fractionated by column chromatography (Kiesegel 60, mesh 70-230) with a step gradient of *n*-hexane, *n*-hexane-ethyl acetate, ethyl acetate and ethyl acetate-methanol.

Analysis of the column fraction

The fractions were screened by TLC under UV light and by spraying with vanillin-sulphuric acid reagent. A number of compounds were detected, which were purified from the different sub-fractions employing various techniques. After evaporation of solvent from fraction 66-70, it was subjected to solvent treatment. It was washed with *n*–hexane and then with ethyl acetate in a sample vial. White needle shaped crystals were obtained. It was proved to be pure by TLC.

RESULT AND DISCUSSION

Chromatographic separation and purification of the *n*-hexane soluble fraction of the bark of *Erythrina stricta* afforded one flavones (compound 1). Compound 1 was obtained as needle shaped crystals. It melted at 213 °C, which was identical to that reported for alpinum isoflavone (Martinez *et al*, 1982, Rahman *et al*, 2007, Hernandez *et al*, 2000). It was evident as a yellow spot on TLC (silica gel PF_{254}) when the developed plate was sprayed with vanillin-sulphuric acid followed by heating at 110 °C for 5-10 minutes. The R_f value of the compound was 0.533 in toluene-ethyl acetate (90:10) over silica gel PF_{254} plate. It was found to be soluble in ethyl acetate, chloroform, acetone and methanol. The ^{1}H NMR spectrum of compound-1 (400 MHz, $CDCl_3$) revealed well resolved signals typical of an isoflavone nucleus having a pyran ring. Thus the ^{1}H NMR spectrum showed a pair of doublets (J = 10.6 Hz) centered at δ 5.53 and 6.60 and a sharp singlet of six proton intensity at δ 1.48. These were assigned to a 2,2-dimethylchromene ring system. The characteristic C-2 proton of the isoflavone skeleton was evident as a singlet at δ 7.83 (1H). The ^{1}H NMR spectrum also displayed a pair of doublets (J=8.5 Hz), each integrating for two protons, at δ 6.96 and 7.27, which were assigned to the H-3′ & H-5′ and H-2′ & H-6′ of the *para*-disubstituted aromatic nucleus. The relatively upfield resonance (δ 6.90) of H-3′ and H-5′ suggested the presence of an oxygenated substituent at C-4′. This was substantiated by the presence of a broad singlet at δ 5.63 (1H), due to a hydroxyl group proton. The remaining two

signals at δ 13.14 and 6.34 (each 1H) could be attributed to the chelated hydroxyl group proton at C-5 and H-18, respectively.

On the basis of the above spectral data and by comparison of these values with those reported for Alpinum isoflavone (Martinez *et al*, 1982, Rahman *et al*, 2007, Hernandez *et al*, 2000). The identity of compound-1 was confirmed as Alpinum isoflavone and this is the first report of its isolation from *Erythrina stricta.*

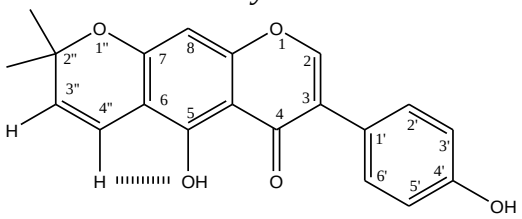

Figure 1: Compound 1

CONCLUSIONS

The chemical study of the stem bark of *Erythrina stricta* afforded Alpinum isoflavone. The structure was established by extensive spectroscopic studies and comparison with published spectroscopic data (Martinez *et al*, 1982, Rahman *et al*, 2007, Hernandez *et al*, 2000).

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