



REGULAR ARTICLE

ISOLATION AND IDENTIFICATION OF A BIOLOGICALLY ACTIVE ISOFLAVONOID FROM *CUDRANIA JAVANENSIS*

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SUMMARY

Isolation of isoflavonoids has become a frequent endeavor, due to their interesting biological activities. Osajin, 1 ({5-hydroxy-3-(3-hydroxyphenyl)-8,8 dimethyl-6-(3-methylbut-2-enyl)-4H.8H-pyrano[2,3-h]chromen-4-one}) is a naturally occurring isoflavonoid which was isolated from the fruits of *Cudrania javanensis*^{1, 2}. The structure was elucidated using spectroscopic methods, including NMR, IR, and MS.

Key words: *Cudrania javanensis*, Moraceae, Isoflavonoids, Osajin

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1. Introduction

The plants of Moraceae family are widely distributed in the North Eastern region of India. It has been reported that a number of species of this family exhibit physiological activity. These plants are used in folk medicine as antioxidative as well as cardioprotective agents. Phytochemical investigation of Moraceae family has revealed the occurrence of flavonoids and isoflavonoids, most of them showing antioxidative activities. Antioxidants are micronutrients that have gained importance in recent years due to their ability to neutralize free radicals or their actions³. Free radicals have been implicated in the etiology of several major human ailments, including cancer, cardiovascular diseases, neural disorders, diabetes and arthritis⁴⁻⁶.

Among the family Moraceae, the species *Cudrania javanensis* is the most popular, whose powdered fruits show marked antioxidative properties. A petroleum ether extract of fruits of *Cudrania javanensis* yielded a reported isoflavonoid, osajin^{7,8} {5-hydroxy-3-(3-hydroxyphenyl)-8,8 dimethyl-6-(3-methylbut-2-enyl)-4H.8H-pyrano [2,3-h]chromen-4-one} **1**, **Fig. 2**. Although the isoflavone **1** is reported, but no data are available about the isolation of **1** from the plant *Cudrania javanensis* till date. So, we report here the isolation of **1** from *Cudrania javanensis* collected from tropical evergreen forests of Meghalaya India. The chemical structure assigned to this compound on the basis of IR, NMR, and Mass spectral data, is shown in **Table 1**.

Fig. 1: Fruits of *Cudrania javanensis*



Fig. 2: {5-hydroxy-3-(3-hydroxyphenyl)-8,8 dimethyl-6-(3-methylbut-2-enyl)-4H.8H-pyrano[2,3-h]chromen-4-one}

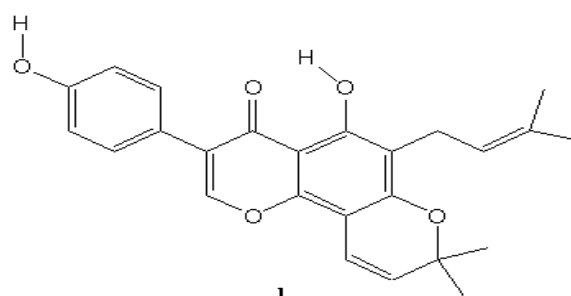
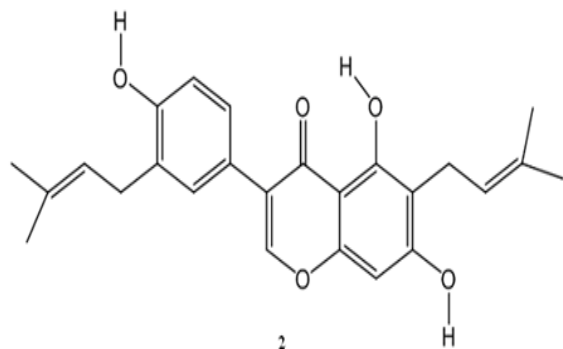


Fig. 3: Structure of 5,7,4'-trihydroxy-6,3'-diprenylisoflavone



2. Materials and Methods

The plant materials of the fruits (**Fig. 1**) have been collected from Meghalayan forests during October-November, 2007. The identification of the plant species is made by comparing with the Herbarium maintained at Botany Department, Gauhati University, Assam. Collected fruits of *Cudrania javanensis* (1 Kg) are first shed dried in an airy room and the finely powdered fruits are extracted with Methanol in a soxhlet apparatus. The extract on concentration under reduced pressure gave a yellow coloured material (45g). These materials are washed several times by petroleum ether (60-80°C) followed

by ethanol. This amount is then column chromatographed using solvents like Pet Eth (60-80°C), EtOAc, and MeOH. After careful chromatographic separation a yellow coloured semi solid (0.09g) is obtained. These solid gave two major purple spots on T.L.C. (Petroleum ether: Ethyl acetate 8:2), when sprayed with vanillin/H₂SO₄ followed by heating at 100°C. On further chromatography followed by crystallization from benzene : MeOH (9:1), the solid yielded two light yellow compounds **1** and **2**. After doing different chemical tests, it is confirmed that these two compounds are unsaturated isoflavonoids. These two pure compounds are identified as osajin {5-hydroxy-3-(3-hydroxyphenyl)-8,8-dimethyl-6-(3-methylbut-2-enyl)-4H.8H-pyrano[2,3-h]chromen-4-one}}, **1** and {5,7,4'-trihydroxy-6,3'-diprenylisoflavone}⁹, **2** (**Fig. 3**) by comparison of their m. p., IR,¹H NMR and Mass spectral data with the reported values as well as by comparing with authentic samples. However, the compound **2** was reported from the fruits of the same plant *Cudrania javanensis*, therefore it is rejected from our discussion. The physical as well as spectral data of the compound **1** is shown in **Table 1**.

Table 1: Physical and spectral data of compound 1

Compd.	M.P.	Yield (°C)	Molecular (gm)	Molecular weight (gm)	IR formula	¹ H NMR (δ ppm) (ν _{max} cm ⁻¹)
1	175	0.09	404.3	C ₂₂ H ₂₄ O ₄	3405(OH), 2971, 29219(-CH), 1645 (Conjugated C=O), 1610 (Conjugated C=C), 1245, 1215 (C-O-C)	(δ _H 13.086,s,H-2),(δ _H 7.377,s,H-2'),(δ _H 7.353,s,H-4'),(δ _H 7.252 ,d, H-6'),(δ _H 3.359 ,dd,H-5),(δ _H 1.610,d,CH ₃)

This is the first report of the isolation of the isoflavonoid **1** from this species. The cardio protective effects of the isoflavonoid, **1** against ischemia-reperfusion induced injury are studied^{10, 11}.

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