TETRAOXYGENATED XANTHONE FROM STEMBARK *Garcinia cowa* ROXB

Darwati¹, Supriyatna², Husen H. Bahti¹ dan Dachariyanus³

¹ Departement of Chemistry, Faculty of Science, Padjadjaran University, Jatinangor 45363, Sumedang, Indonesian
² Faculty of Pharmacy, Padjadjaran University, Jatinangor, Sumedang 45363, Indonesian
³ Departement of Pharmacy, Faculty of Science, Andalas University, Limau Manis, Padang, Indonesian

ABSTRACT

A xanthon of the tetraoxygenated xanthon type, cowanin has been isolated from the crude hexane extract of the stem bark of *Garcinia cowa*. Tetraoxygenated xanthon was obtained as yellow crystals. The structure of these compound had been determined by spectroscopic methods, including UV, IR, ¹H and ¹³C NMR. The crude extract of *G. cowa* and isolated compound were investigated for their antimicrobial activity.

Keywords: tetraoxygenated xanthon, *Garcinia cowa*

INTRODUCTION

*Garcinia cowa* Roxb. (Guttiferae, Claciaceae), commonly known as manggis hutan or kandis in locally name of West Sumatra. The fruits have been can eat as candy and additive of food. The leaves has been used in the folk medicine for various purposes. The tree is found scattered in lowland, undulating areas and peat swamp forests. The bark has been used as an antipyretic and antimicrobial agent. The latex has been used as antifever agent (Na Pattalung et al., 1994) Some pharmacological properties of crude extracts of leaves, e.g., antitumor-promoting activity (Murakami et al., 1995) and inflammation induction (Ilham et al., 1995) has been reported. In this research we report the compound 1 is tetraoxygenated xanthon type, namely cowanin based on spectroscopic data including UV, IR, ¹H and ¹³C NMR.

EXPERIMENTAL SECTION

General experimental procedures

Melting points were determined on a FISHER-Johns melting point apparatus. The UV and IR spectrum were run on a Beckman DU-700 and Shimadzu FTIR 8400. ¹H and ¹³C NMR spectrum were recorded on a JEOL JNM A-500 and using TMS as internal standard. Chromatography coloum was performed on silica gel Merck 60 GF₂₅₄ (230-400 mesh). TLC and precoated TLC on silica gel Merck 60 GF₂₅₄ (70 -230 mesh).

Plant materials

The stem bark of *G. cowa* were collected from forests Harau West Sumatra in April 2006. A voucher specimen of this plant is deposited at the Herbarium ANDA, Andalas, University.

Tabel ¹HNMR and ¹³CNMR spectroscopic data for cowanin

<table>
<thead>
<tr>
<th>Position</th>
<th>δ_H (ppm)</th>
<th>δ_C (ppm)</th>
<th>HMBC correlation</th>
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<tr>
<td>1-1OH</td>
<td>13,81</td>
<td>160,79</td>
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<tr>
<td>2-1OH</td>
<td>108,58</td>
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<td>3-1OH</td>
<td>161,79</td>
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<td>6,19</td>
<td>103,8</td>
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<td>112,42</td>
<td>142,73;155,95</td>
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<td>154,67</td>
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<td>142,74</td>
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<td>9a-1OH</td>
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<td>9b-1OH</td>
<td>103,80</td>
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<td>24-1OH</td>
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¹H and ¹³C NMR spectrum were recorded on a JEOL JNM A-500 and using TMS as internal standard. Chromatography coloum was performed on silica gel Merck 60 GF₂₅₄ (230-400 mesh). TLC and precoated TLC on silica gel Merck 60 GF₂₅₄ (70 -230 mesh).
Extraction and isolation

The stem bark of *G. cowa* (2kg) were meserased with hexane, dichlorometane and methanol, three times, respectively. The resulted hexane(20g), dichlorometane (20 g) and methanol (30 g) crude extracts. The crude extrarcts hexane was subjected to silica gel chromatography column vacuum (silica gel 60 g) with a gradient of n-hexane –etoac from 100 -10 % to give 5 fraction (A1 – A5) Fraction A1 was further separated with liquid chromatography column opened with silica gel Merck G60 (70-230 mesh) with a gradient of n-hexane-etoac.

From 100 – 70 % to give 4 fraction B1-B4.Fraction B 2 was purified by n-hexane to give compound 1 (7 mg).

**Compound 1.** Yellow gum, m.p.106° -107°. The molecular formula was determined to be C_{29}H_{34}O_{6}.

UV (MeOH) \( \lambda_{\text{max}} \) nm 243-246 (s), 258-268 (m) and 315-387 (w), IR (KBr) \( \nu_{\text{max}} \) cm\(^{-1}\) 341 and 1643, \(^1\)HNMR (CDCl\(_3\)) \( \delta \) ppm spectrum (Tabel 1).

RESULT AND DISCUSSION

The crude extracts hexane from the stem bark of *G. cowa* was subjected to silica gel chromatography purification to yield tetraoxygenated xanthon types (compound 1). The IR absorption band at 3421 , 16,43 ,1608.2581 and 1461 cm\(^{-1}\), for hydroxyl group, carbonyl chelated, benzene derivated, respectively. The UV absorption bands at \( \lambda_{\text{max}} \) nm 243-315(s), it is characteristic for derivated xanthones compound. In the \(^1\)HNMR spectrum of compound 1 showed a singlet proton at \( \delta \)H 13,79 revealed the presence of a hydroxyl group at C-1, chelated to carbonyl group of the xanthones and supported with signal carbonyl at 182,19 ppm , suggesting at \( \delta \)C 60,79 cross-peaks with hydroxyl group. A singlet signal at \( \delta \)C 6,19; 6,29; is two phenol protons and 6,34 ; 6,83 is two aromatic proton uncoupled, that mean the protons showed long-range connective. A signal at \( \delta \)C 3,81 is proton of one methoxyl group supported with specific signal carbon at \( \delta \)C 62,26 ppm and cross peak with , \( \delta \)C 142,74. A signal at \( \delta \)C5,02 (1H, t, J=7,4) is methine coupled with methylene proton at \( \delta \)H 4,09 and \( \delta \)C5,28 (2H,m) suggesting two proton from two methine group coupled with methylene group at \( \delta \)H 3,45. A signal at \( \delta \)H 1,99 and 2,04 (2H,m) are two methylene group coupled with 1,54; 1,77; 1,82; 1,85 (3H,s) , which was signal four methyl proton suggesting from prenyl group .Therefore, these compound namely cowanin or 1,3,6-trihydroxy-7-metho-xi-2-3(3-methyl-2-buthenyl)-8-3,7 di 3,7 oktedien xanthone.

CONCLUSION

Tetraoxygenated xanthone was isolated from the crude hexane extract of the stem bark of *Garcinia cowa* with namely cowanin and the structures follow

ACKNOWLEDGEMENT

Research Center for Chemistry, Indonesian Institute of Sciences (LIPI), Puspitek Serpong for \(^1\)H and \(^{13}\)CNMR spectrum and Education Indonesian University (UPI) for IR , UV spectrum.

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