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A New Acylated Flavonoid from *Anaphalis aureo-punctata*

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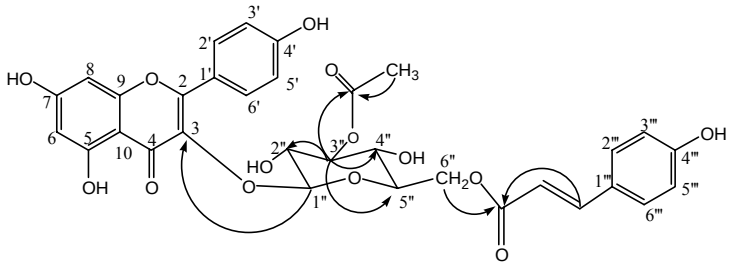
Abstract: A new acylated flavonoid glycoside, 3-O-kaempferol-3-O-acetyl-6-O-(*p*-coumaroyl)-β-D-glucopyranoside **1** was isolated from the whole plant of *Anaphalis aureo-punctata*. The structure was established by spectral methods.

Keywords: *Anaphalis aureo-punctata*, flavonoid, 3-O-kaempferol-3-O-acetyl-6-O-(*p*-coumaroyl)-β-D-glucopyranoside.

The genus *Anaphalis* (Compositae) consists of about 80 species distributed throughout the world. Among them, *Anaphalis morrisonicola* showed significant antitumor activity[1]. In order to find active constituents, phytochemical studies on *Anaphalis aureo-punctata* were carried out and a new acylated flavonoid **1** was isolated from the alcoholic extract of the whole plant. In this paper, we report the structural elucidation of the compound **1**.

Figure 1 The key correlation of **1** in HMBC (H→C)



Compound **1** was obtained as a yellow crystalline powder, $[\alpha]_D^{21}$ -53.0 (c, 2.3, CH_3OH). It was established to have a molecular formula $C_{32}H_{28}O_{14,}$ which was deduced by FAB-MS (*m/z* 659 $[M+Na]^+$, 643 $[M+Li]^+$) and ^{13}C NMR data including DEPT technique. The analysis of ^1H and ^{13}C NMR spectra (**Table 1**) suggested that **1** was a kaempferol *(p*-coumaroyl)glycoside[2]. The singlet at δ 2.03 (3H) indicated the presence of an acetyl group in this compound. The large coupling constant between the H-α and H-β (J=16.0 Hz) showed the E-configuration for the double

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bond.

The HMBC cross peak at δ 5.53/133.0 (H-1" /C-3) revealed the connection point between the sugar moiety and aglycone to be at C-3. The correlations from the acetyl protons (δ 2.03) and H-3" (δ 4.71) to the acetyl carbonyl (δ 169.8), from H-β (δ 7.37) and H-6" (δ 4.00) to the coumaroyl carbonyl (δ 166.0) suggested the acetoxy group at C-3" and the *p*-coumaroyloxy group at C-6"[3]. The key correlations of HMBC were showed in **Figure 1**. Consequently, the structure of **1** was established.

Table 1 ^{1}H (400 MHz) and ^{13}C (100.6 MHz)NMR data of compound **1** (DMSO-d_6 , TMS, δ ppm)

No.	δ_H (J Hz)	δ_C	DEPT	No.	δ_H (J Hz)	δ_C	DEPT
2		156.8	C	3"	4.71 d (9.2, 9.0)	70.9	CH
3		133.0	C	4"	3.55 d (9.0, 9.0)	71.5	CH
4		177.4	C	5"	3.70 m	74.2	CH
5		161.3	C	6"	4.00 d (5.0)	62.0	CH_2
6	6.17 d (1.8)	98.9	CH	coumaroyl			
7		164.3	C	COO		166.0	C
8	6.39 d (1.8)	93.8	CH	α	6.10 d (16.0)	113.5	CH
9		156.5	C	β	7.37 d (16.0)	144.9	CH
10		104.0	C	1"'		125.0	C
1'		120.8	C	2"', 6"'	7.38 d (8.4)	130.2	CH
2' 6'	8.00 d (8.8)	130.9	CH	3"', 5"'	6.80 d (8.4)	115.9	CH
3' 5'	6.89 d (8.8)	115.2	CH	4"'		159.9	C
4'		160.1	C	3"-Acetyl			
glu				COO		169.8	C
1"	5.53 d (7.8)	101.0	CH	CH_3	2.03 s	20.9	CH_3
2"	3.37 d (7.8, 9.2)	73.5	CH				

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