

## Supporting Information

# Lanostane Triterpenoids and Ergostane Steroids from *Ganoderma luteomarginatum* and Their Cytotoxicity

Qingyun Ma <sup>1,†</sup>, Shuangshuang Zhang <sup>2,†</sup>, Li Yang <sup>1</sup>, Qingyi Xie <sup>1</sup>, Haofu Dai <sup>1</sup>, Zhifang Yu <sup>3,\*</sup> and Youxing Zhao <sup>1,\*</sup>

<sup>1</sup> Haikou Key Laboratory for Research and Utilization of Tropical Natural Products, Institute of Tropical Bioscience and Biotechnology, Chinese Academy of Tropical Agricultural Sciences & Hainan Key Laboratory for Protection and Utilization of Tropical Bioresources, Hainan Academy of Tropical Agricultural Resource, Haikou 571101, China

<sup>2</sup> Jiangsu Food&Pharmaceutical Science College, Huaian 223003, China

<sup>3</sup> College of Food Science and Technology, Nanjing Agricultural University, Nanjing 210095, China

\* Correspondence: yuzhifang@njau.edu.cn (Z.Y.); zhaoyouxing@itbb.org.cn (Y.Z.)

† These authors contributed equally to this work.

**Figure S1-1**  $^1\text{H}$  NMR spectrum of compound **1**

**Figure S1-2**  $^{13}\text{C}$  NMR spectrum of compound **1**

**Figure S1-3** HSQC spectrum of compound **1**

**Figure S1-4**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of  
compound **1**

**Figure S1-5** HMBC spectrum of compound **1**

**Figure S1-6** ROESY spectrum of compound **1**

**Figure S1-7** HRESIMS Data of compound **1**

**Figure S2-1**  $^1\text{H}$  NMR spectrum of compound **2**

**Figure S2-2**  $^{13}\text{C}$  NMR spectrum of compound **2**

**Figure S2-3** HSQC spectrum of compound **2**

**Figure S2-4**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of  
compound **2**

**Figure S2-5** HMBC spectrum of compound **2**

**Figure S2-6** ROESY spectrum of compound **2**

**Figure S2-7** HRESIMS Data of compound **2**

**Figure S3-1**  $^1\text{H}$  NMR spectrum of compound **3**

**Figure S3-2**  $^{13}\text{C}$  NMR spectrum of compound **3**

**Figure S3-3** HSQC spectrum of compound **3**

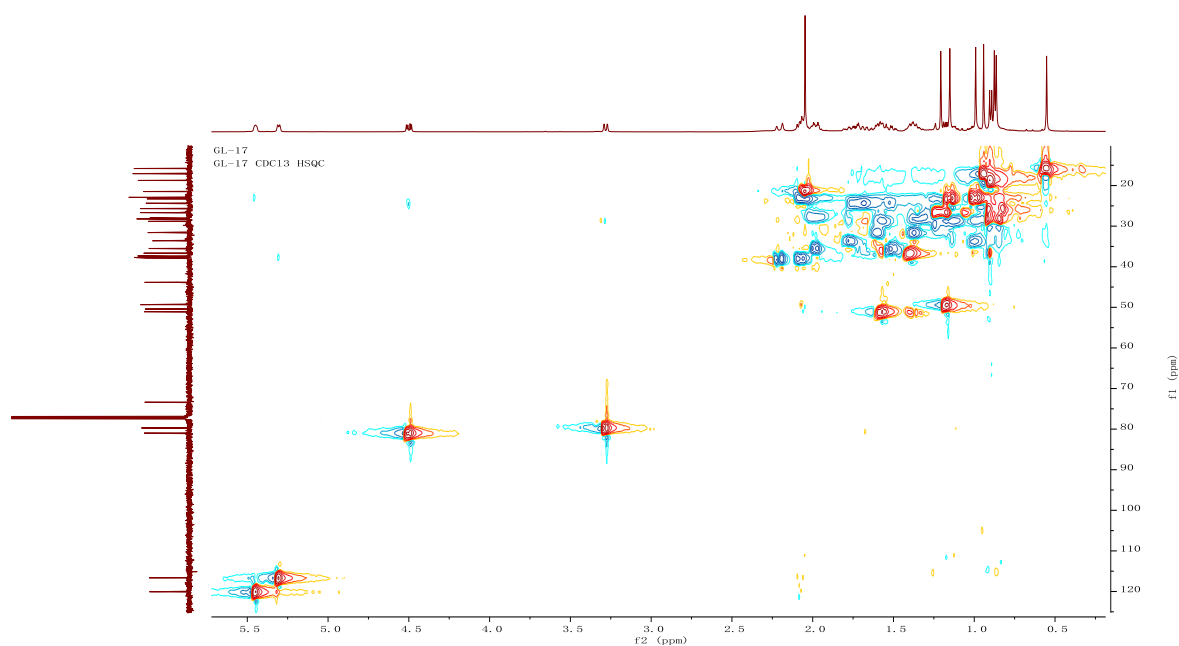
**Figure S3-4**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of  
compound **3**

**Figure S3-5** HMBC spectrum of compound **3**

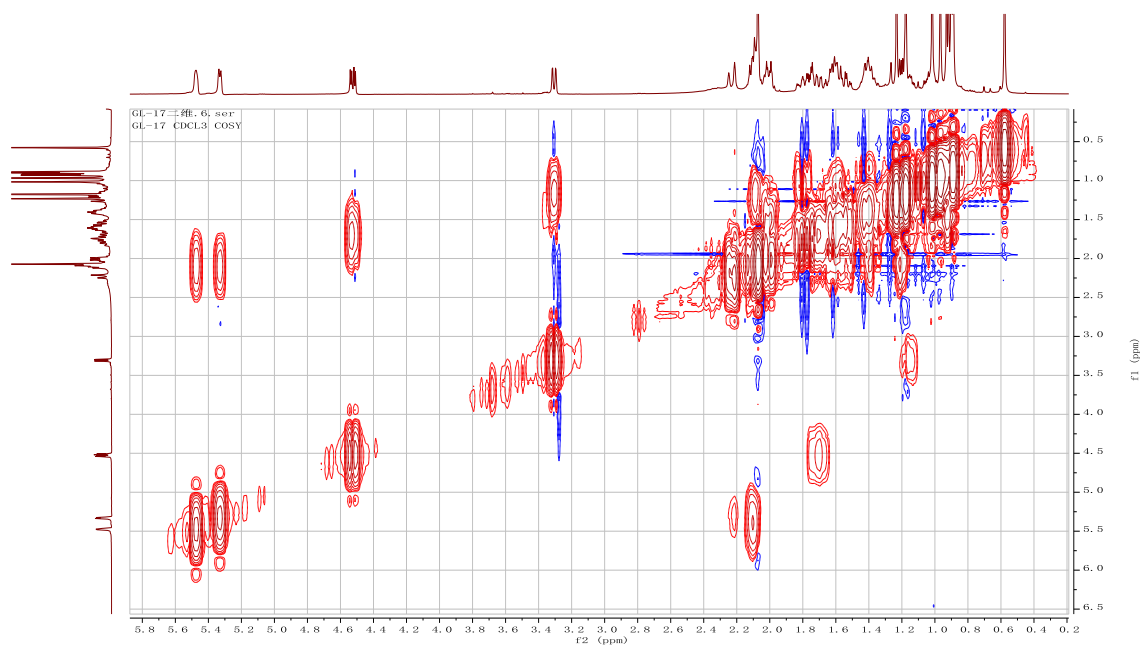
**Figure S3-6** ROESY spectrum of compound **3**

**Figure S3-7** HRESIMS Data of compound **3**





**Figure S1-3 HSQC spectrum of compound 1**

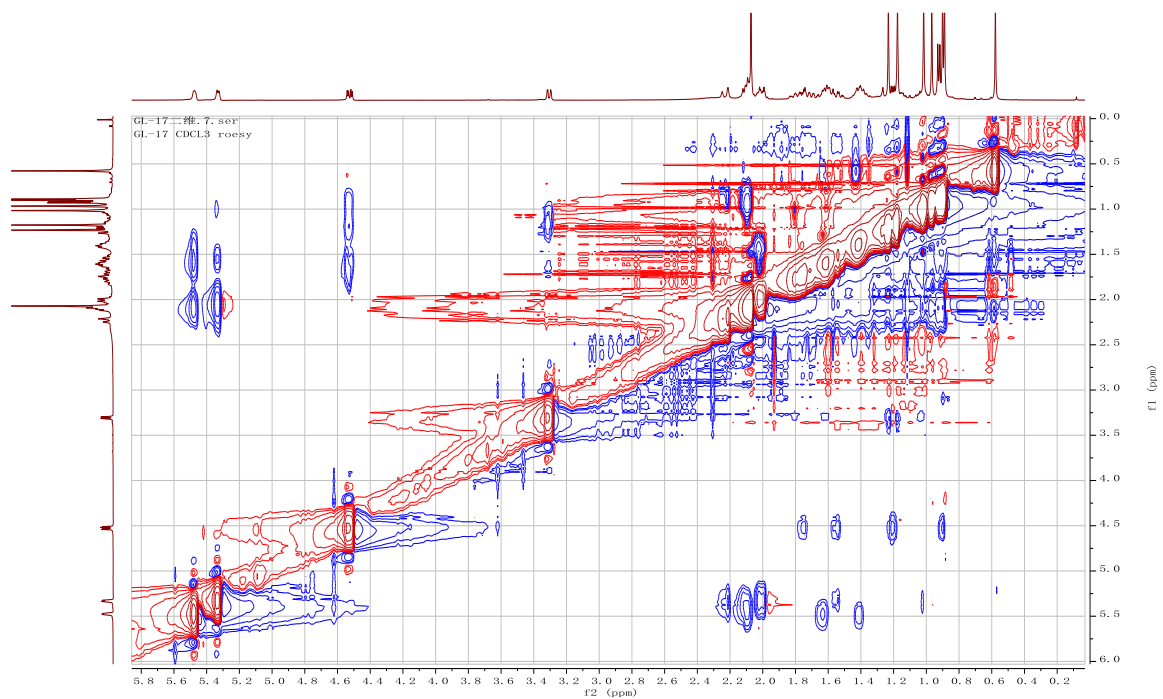


**Figure S1-4 <sup>1</sup>H-<sup>1</sup>H COSY spectrum of compound 1**





**Figure S1-5** HMBC spectrum of compound **1**

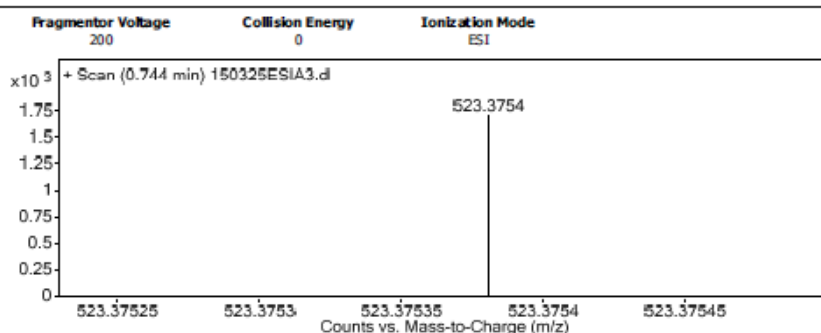


**Figure S1-6** ROESY spectrum of compound **1**

## Qualitative Analysis Report

Data Filename	150325ESIA3.d	Sample Name	GL-17
Sample Type	Sample	Position	
Instrument Name	Agilent G6230 TOF MS	User Name	KIB
Acq Method	ESL.m	Acquired Time	3/25/2015 10:54:28 AM
IRM Calibration Status	Success	DA Method	ESL.m
Comment			
Sample Group		Info.	
Acquisition SW	6200 series TOF/6500 series		
Version	Q-TOF B.05.01 (B5125.2)		

### User Spectra



### Peak List

m/z	z	Abund
121.0509	1	191469.42
122.0528	1	12813.9
262.1798	1	4608.68
293.1737	1	3099.72
922.0098	1	315940.16
923.0118	1	51887.3
924.0131	1	6379.29
1821.9488	1	18045.1
1822.9516	1	6501.32
1941.9922	1	4096.13

### Formula Calculator Element Limits

Element	Min	Max
C	0	200
H	0	400
O	0	12
Na	1	1

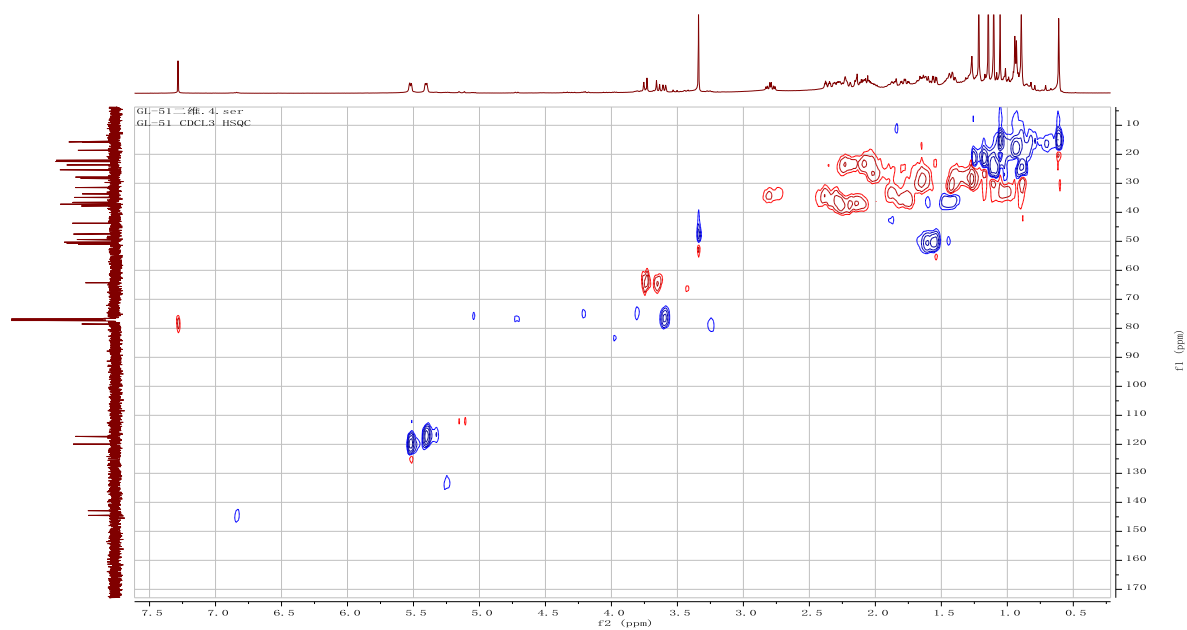
### Formula Calculator Results

Formula	CalculatedMass	CalculatedMz	Mz	Diff. (mDa)	Diff. (ppm)	DBE
C32 H52 Na O4	523.3763	523.3758	523.3754	1.7	3.3	6.5000

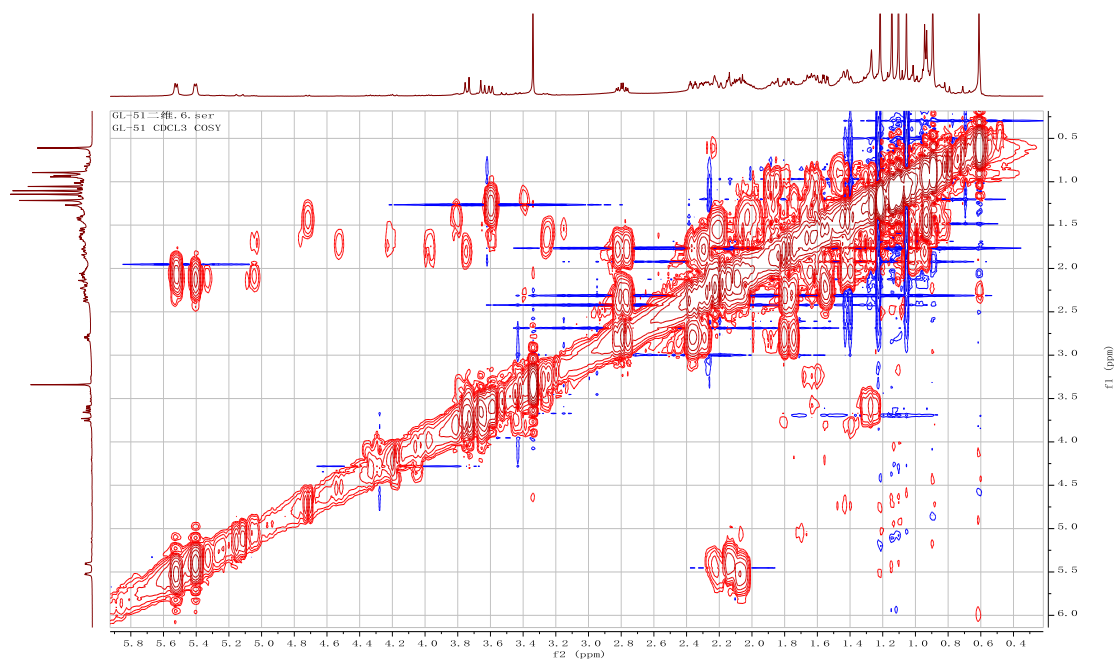
--- End Of Report ---

**Figure S1-7 HRESIMS Data of compound 1**

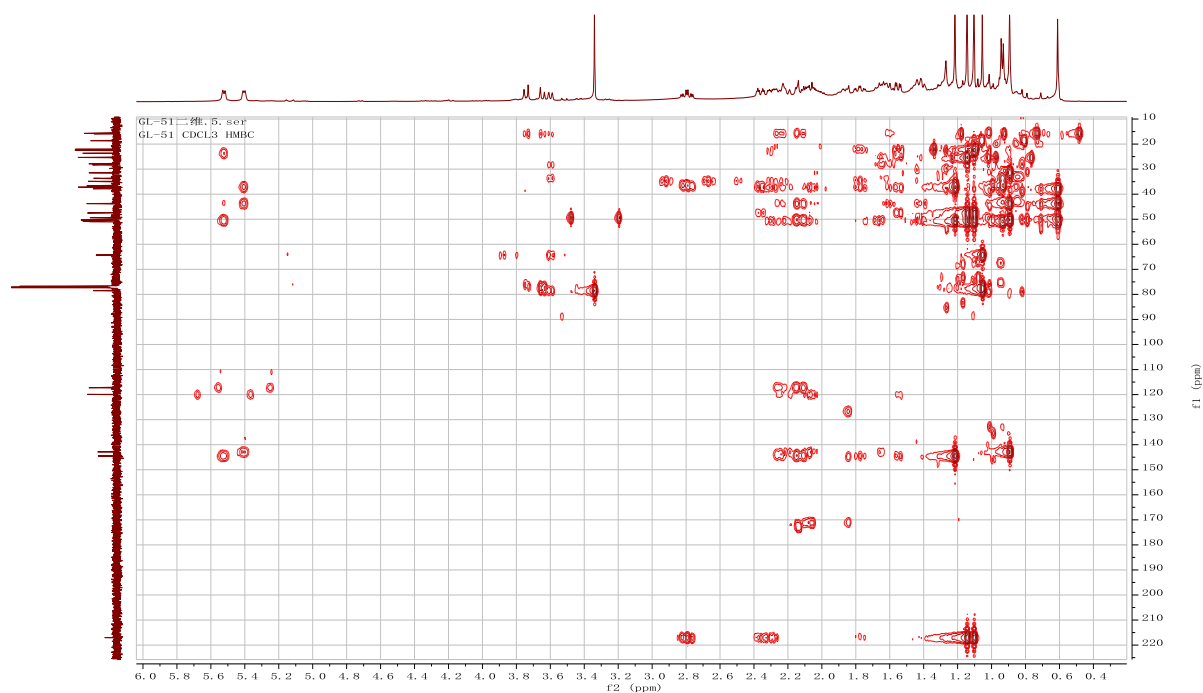




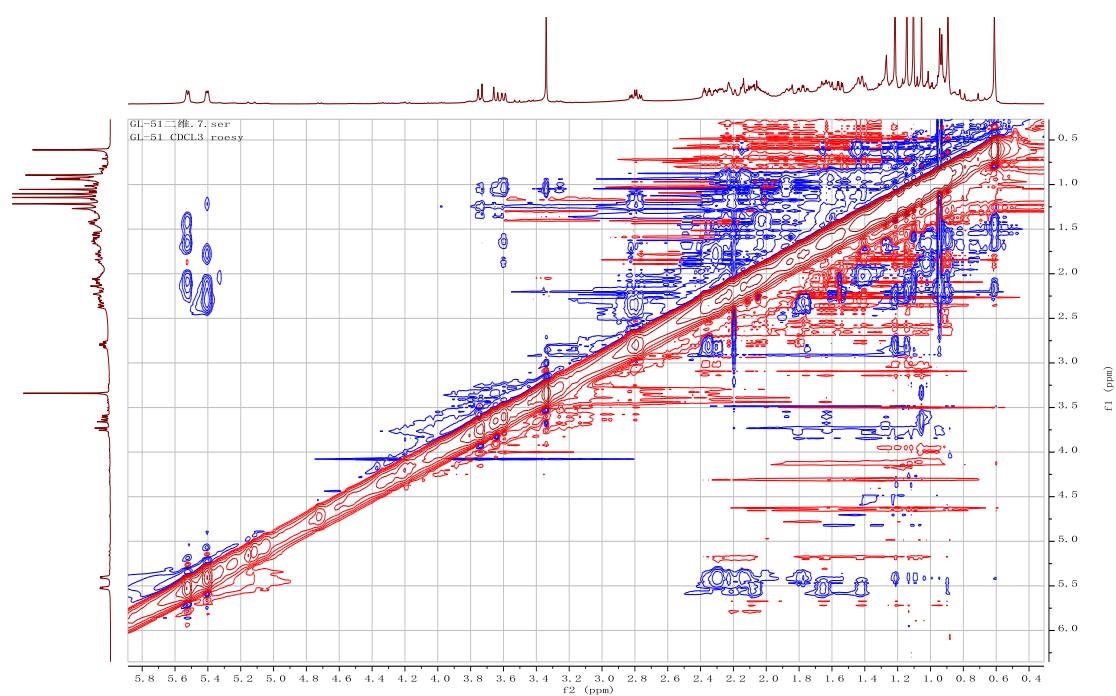
**Figure S2-3** HSQC spectrum of compound **2**



**Figure S2-4**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of compound **2**



**Figure S2-5** HMBC spectrum of compound **2**



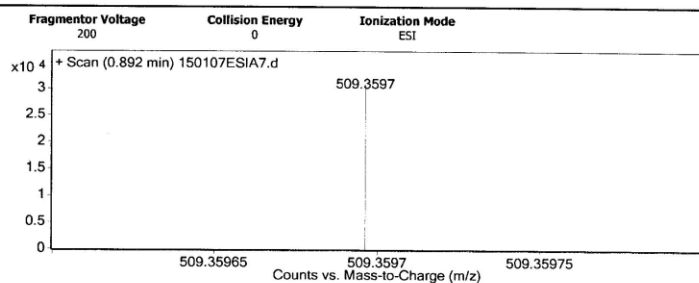
**Figure S2-6** ROESY spectrum of compound **2**

## Qualitative Analysis Report

Data Filename	150107ESIA7.d	Sample Name	GL-51
Sample Type	Sample	Position	
Instrument Name	Agilent G6230 TOF MS	User Name	KIB
Acq Method	ESI.m	Acquired Time	1/7/2015 8:45:29 AM
IRM Calibration Status	Success	DA Method	ESI.m
Comment			

Sample Group		Info.	
Acquisition SW	6200 series TOF/6500 series		
Version	Q-TOF B.05.01 (B5125.2)		

### User Spectra



### Peak List

m/z	z	Abund	Formula	Ion
121.0509	1	48950.69		
481.2925	1	11706.12		
509.3597	1	30718.59	C31 H50 Na O4	M+
510.3619	1	10323.14	C31 H50 Na O4	M+
922.0098	1	85934.12		
923.0115	1	14322.79		
995.7264	1	21669.21		
996.7311	1	13986.23		
1023.7229	1	18231.22		
1024.7269	1	11303.9		

### Formula Calculator Element Limits

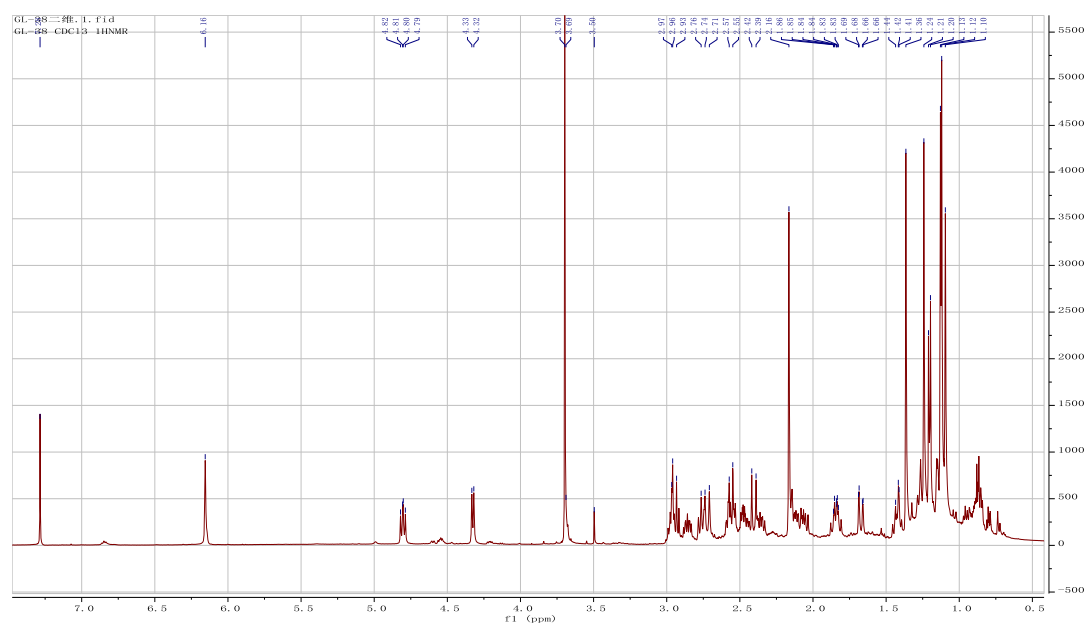
Element	Min	Max
C	0	200
H	0	400
O	0	9
Na	1	1

### Formula Calculator Results

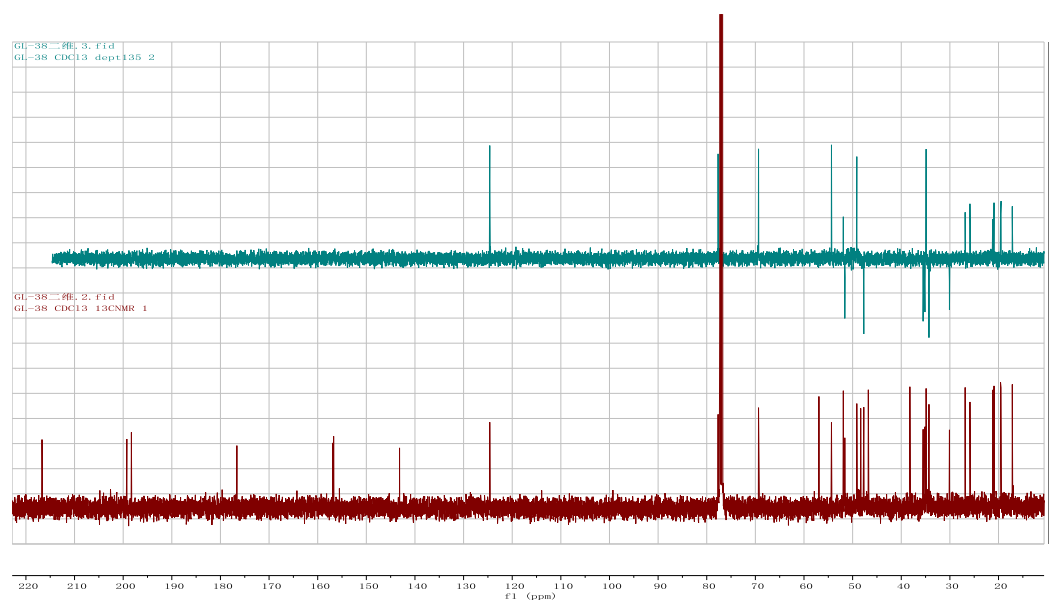
Formula	CalculatedMass	Mz	Diff.(mDa)	Diff. (ppm)	DBE
C31 H50 Na O4	509.3607	509.3597	1.0	1.9	6.5

--- End Of Report ---

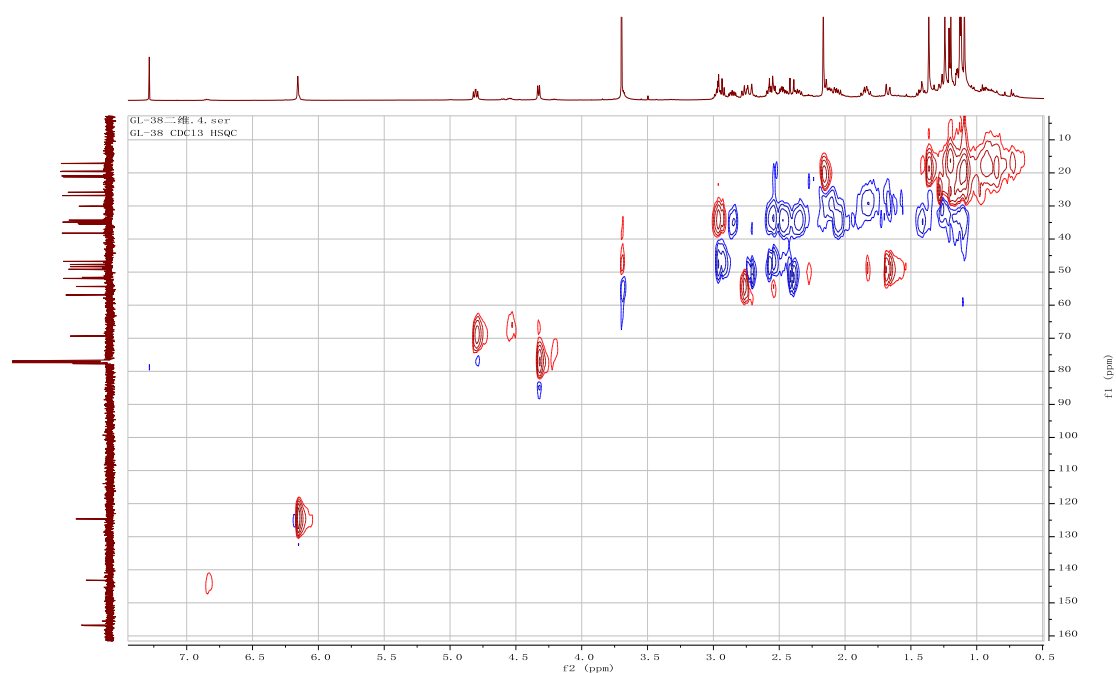
Figure S2-7 HRESIMS Data of compound 2



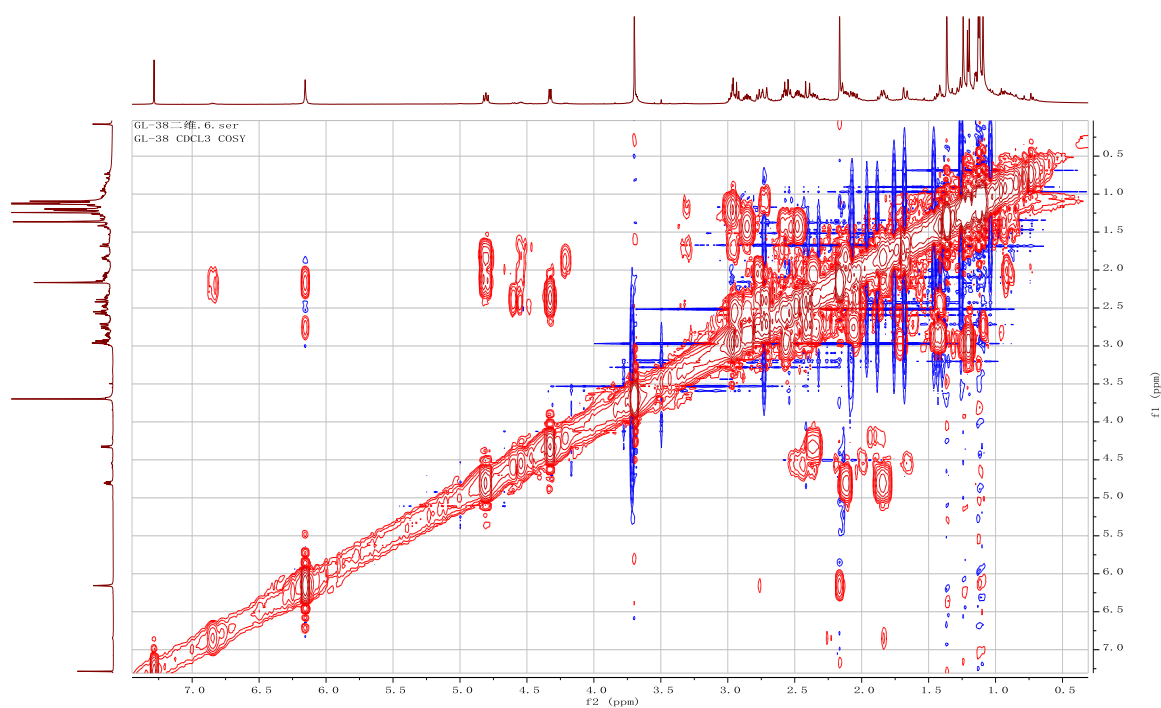
**Figure S3-1**  $^1\text{H}$  NMR spectrum of compound **3**



**Figure S3-2**  $^{13}\text{C}$  NMR spectrum of compound **3**

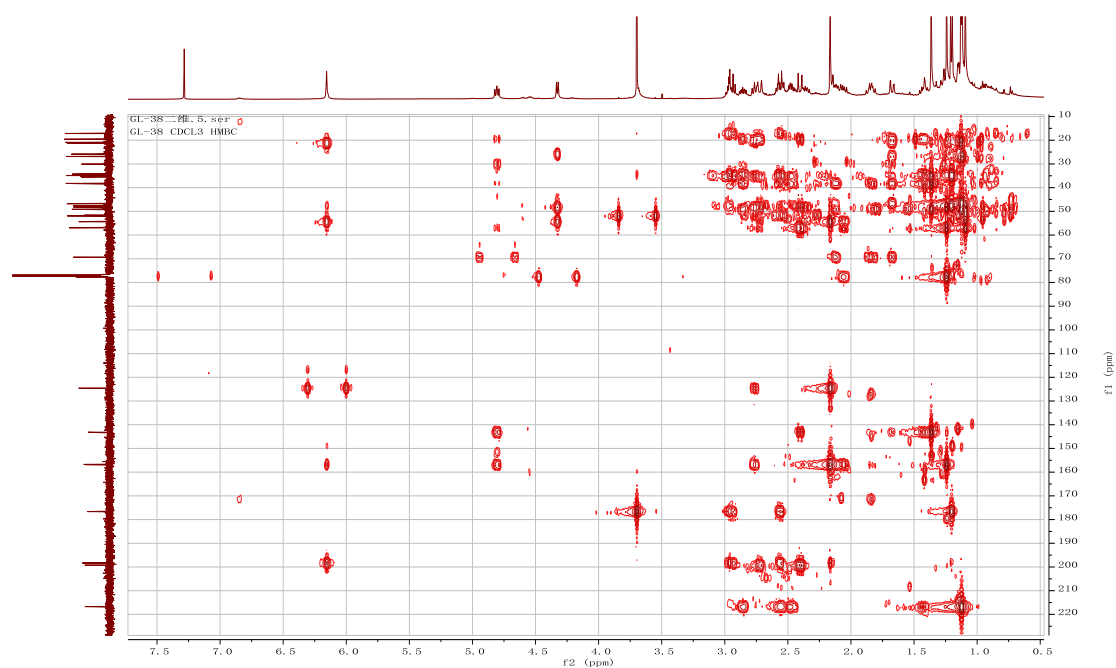


**Figure S3-3** HSQC spectrum of compound **3**

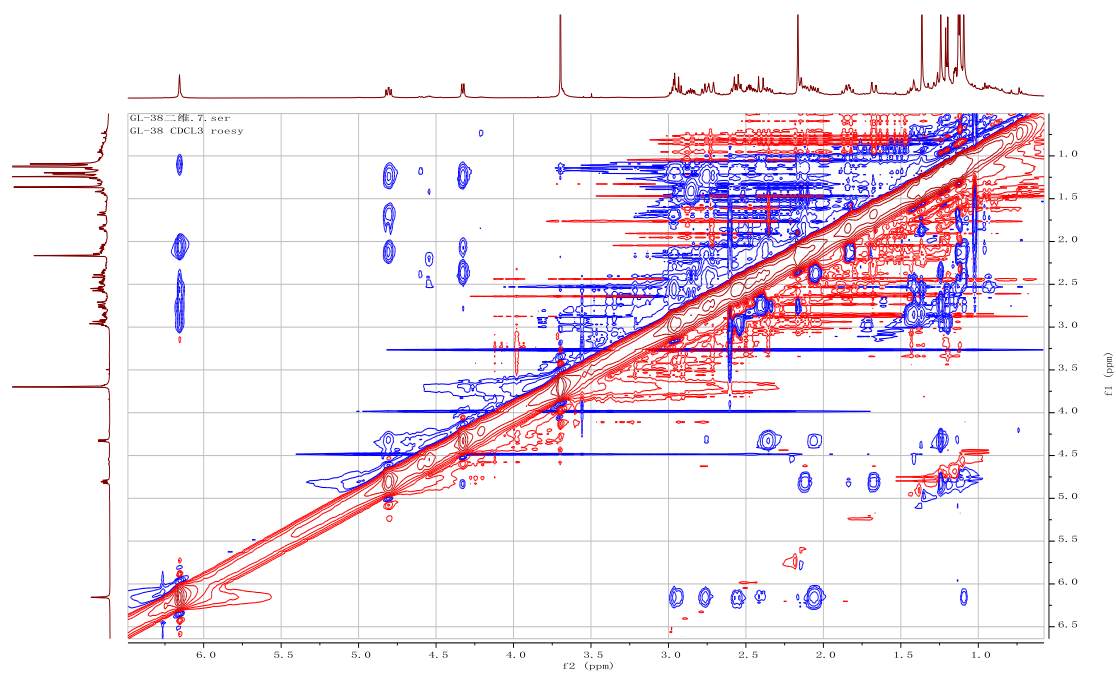


**Figure S3-4**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of compound **3**





**Figure S3-5** HMBC spectrum of compound **3**



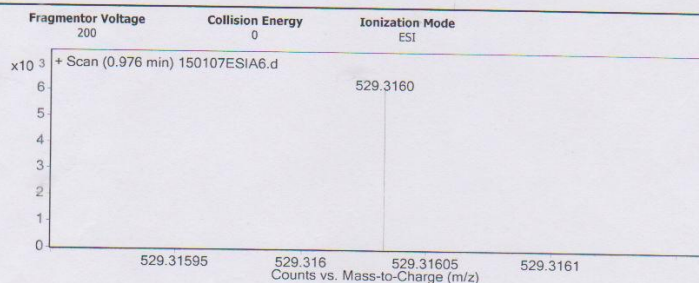
**Figure S3-6** ROESY spectrum of compound **3**

## Qualitative Analysis Report

Data Filename	150107ESIA6.d	Sample Name	GL-38
Sample Type	Sample	Position	
Instrument Name	Agilent G6230 TOF MS	User Name	KIB
Acq Method	ESI.m	Acquired Time	1/7/2015 8:43:52 AM
IRM Calibration Status	Success	DA Method	ESI.m
Comment			

Sample Group		Info.	
Acquisition SW	6200 series TOF/6500 series		
Version	Q-TOF B.05.01 (B5125.2)		

### User Spectra



### Peak List

m/z	z	Abund
121.0509	1	61042.15
182.0393		8911.58
215.0284		8792.27
232.1116		9777.82
284.3306	1	12744.35
312.3621		8034.82
383.1958	1	10188.46
551.3002	1	11822.61
922.0098	1	86749.96
923.0124	1	13980.35

### Formula Calculator Element Limits

Element	Min	Max
C	0	200
H	0	400
O	0	9

### Formula Calculator Results

Formula	CalculatedMass	Mz	Diff.(mDa)	Diff. (ppm)	DBE
C31 H45 O7	529.3165	529.3160	0.5	1.0	9.5

--- End Of Report ---

**Figure S3-7 HRESIMS Data of compound 3**