

## *Electronic Supplementary Information (ESI)*

### **Design, synthesis and biological evaluation of a hybrid compound berberine and magnolol for improvement of glucose and lipid metabolism**

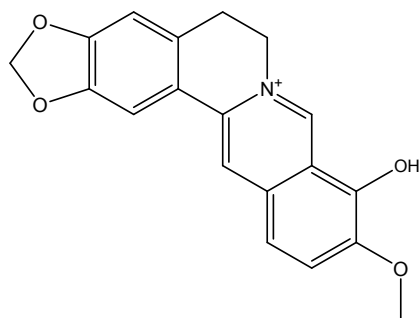
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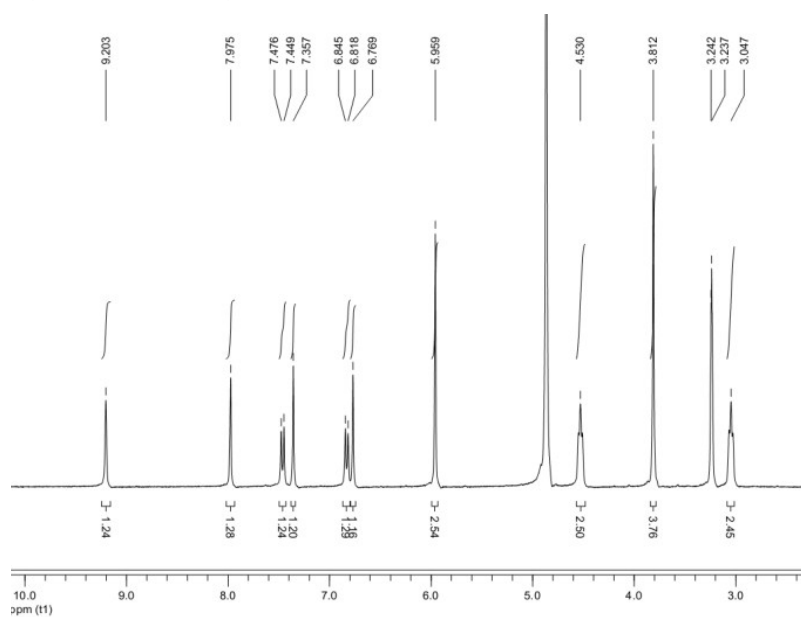
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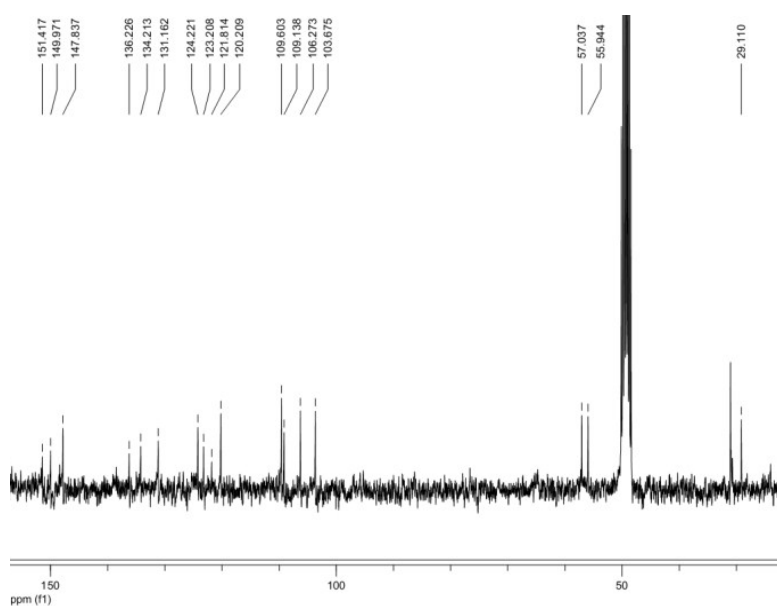
# 1. <sup>1</sup>H NMR, <sup>13</sup>C NMR and HRMS spectra for Berberrubine 1



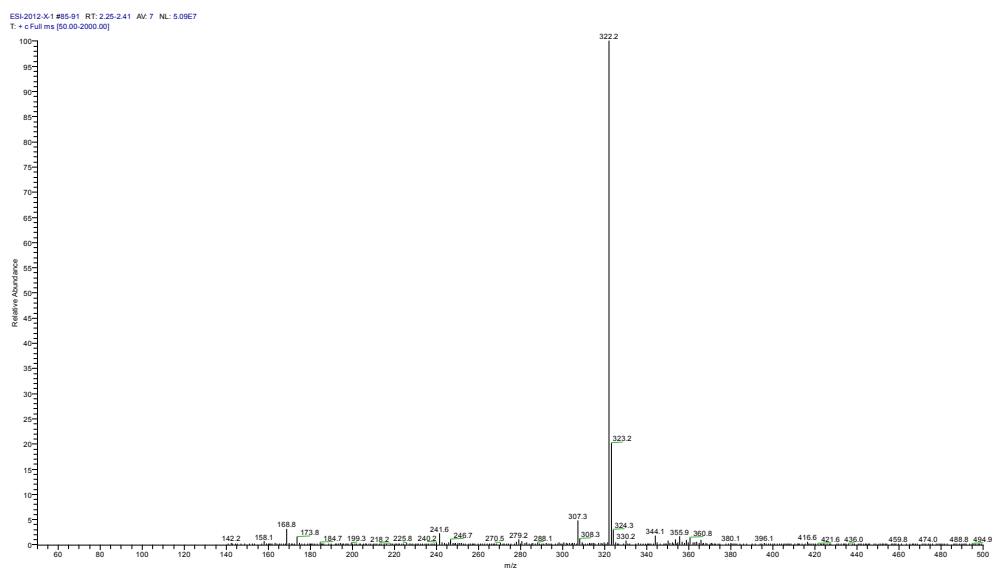
## <sup>1</sup>H NMR (300MHz, CDCl<sub>3</sub>)



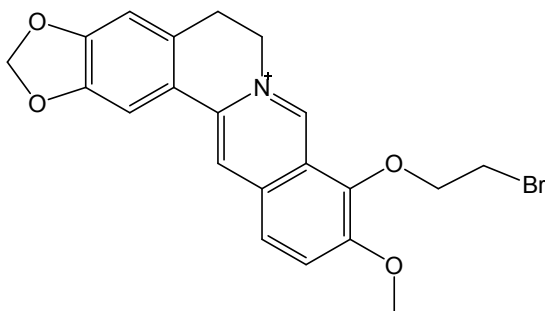
## <sup>13</sup>C NMR (300MHz, CDCl<sub>3</sub>)



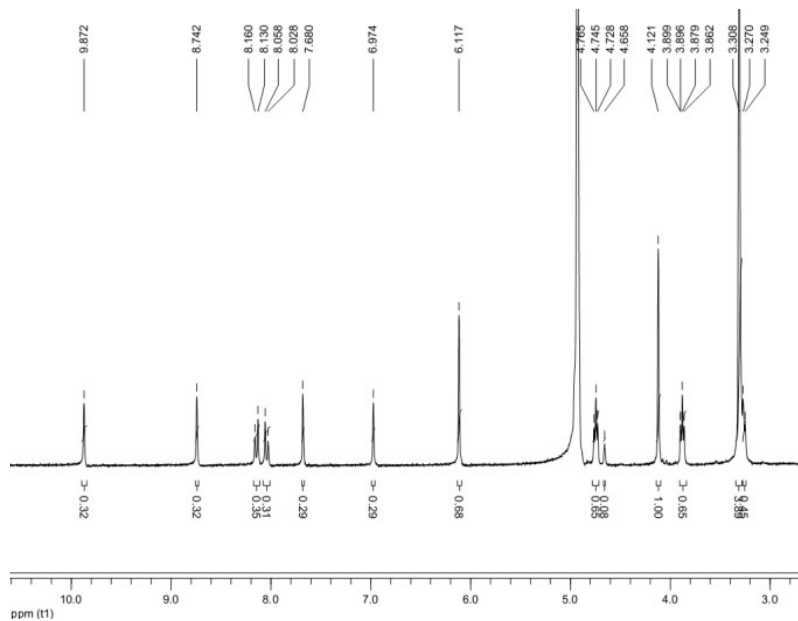
## HRMS



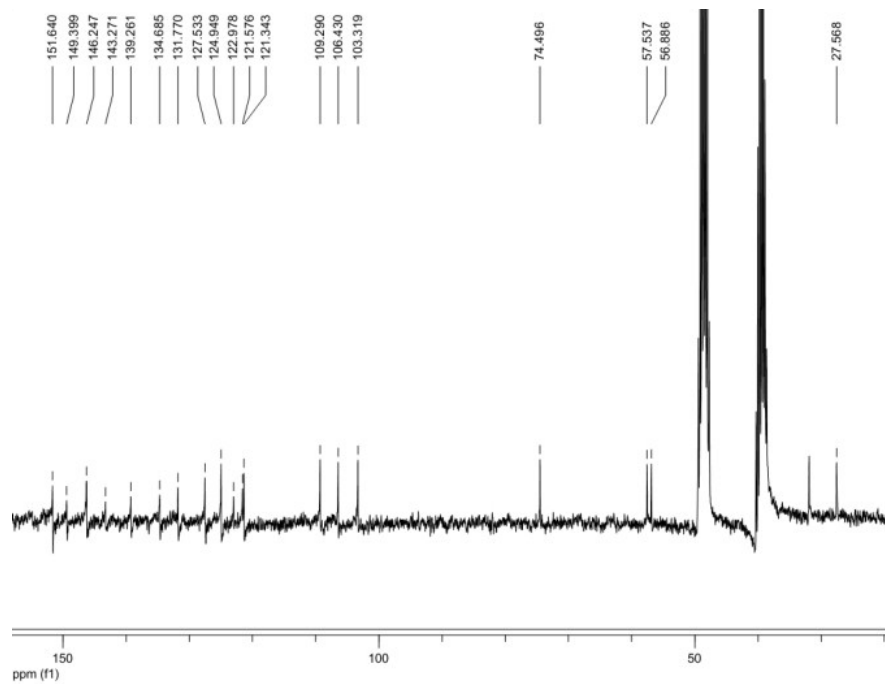
## 2. $^1\text{H}$ NMR, $^{13}\text{C}$ NMR and HRMS spectra for 9-(2-ethyl bromide) berberine hydrochloride 2



### $^1\text{H}$ NMR (300MHz, $\text{CDCl}_3$ )

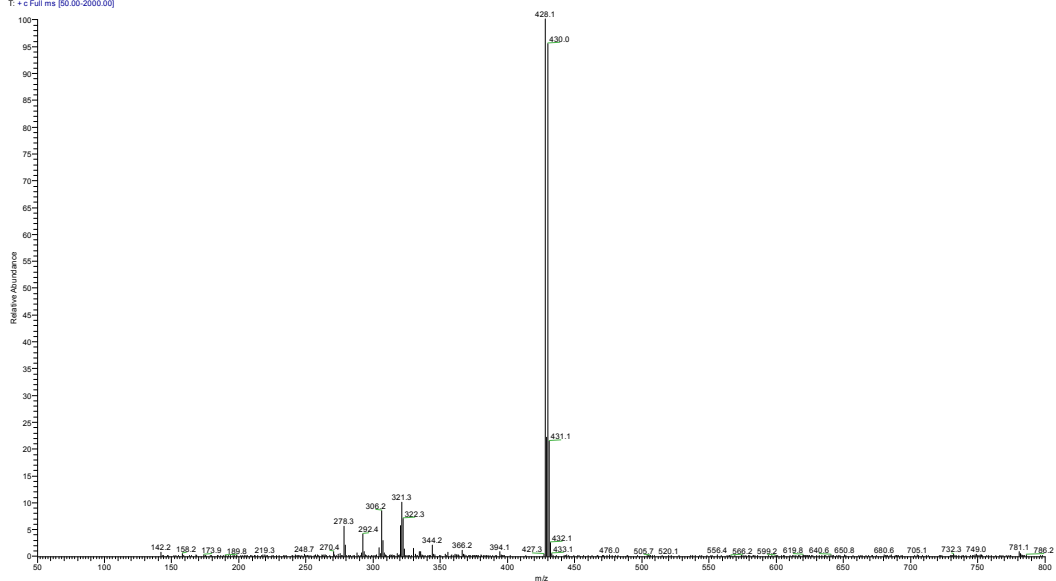


### <sup>13</sup>C NMR (300MHz, CDCl<sub>3</sub>)

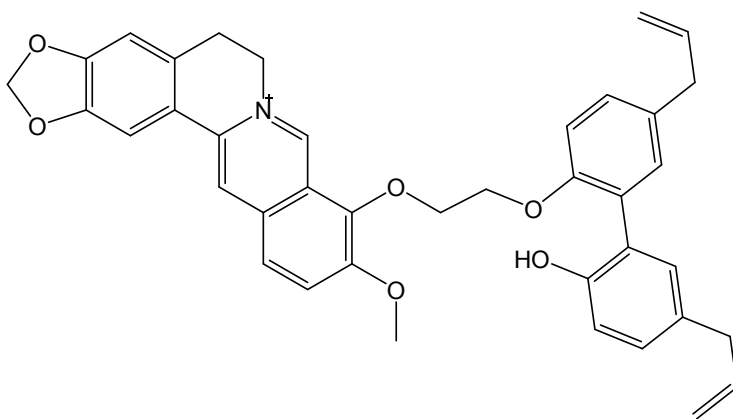


### HRMS

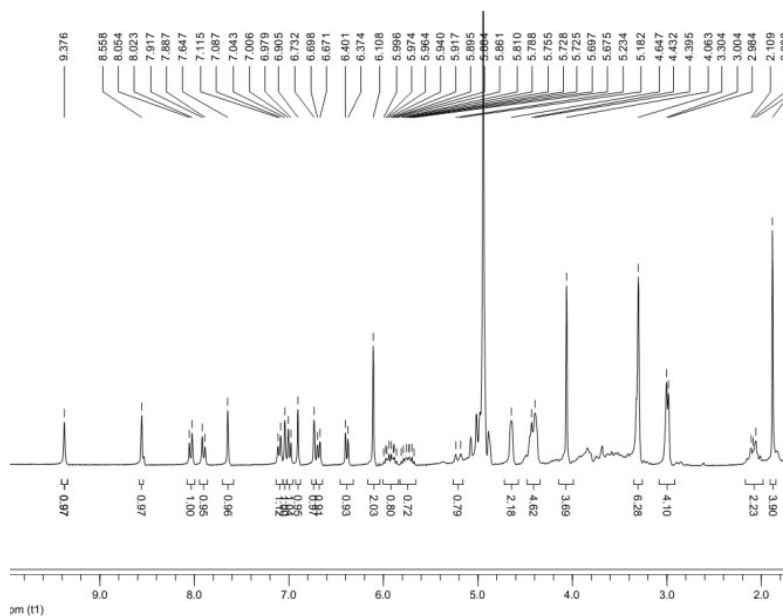
ESI 2012-X2 #99-101 RT: 2.62-2.67 AV: 3 NL: 6.17E7  
T: +c Full ms [50.00-2000.00]



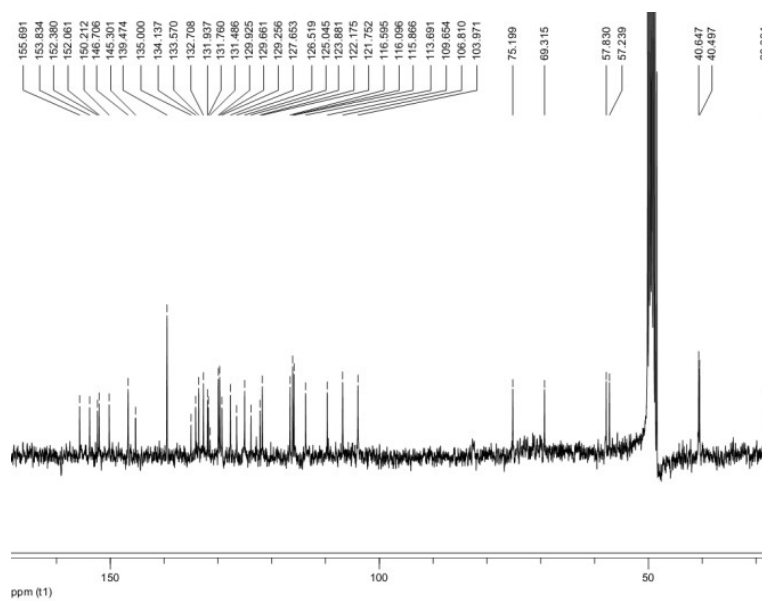
### 3. <sup>1</sup>H NMR and <sup>13</sup>C NMR spectra for berberine and magnolol hybrid compound (HHS) 3



<sup>1</sup>H NMR (500MHz, CDCl<sub>3</sub>)

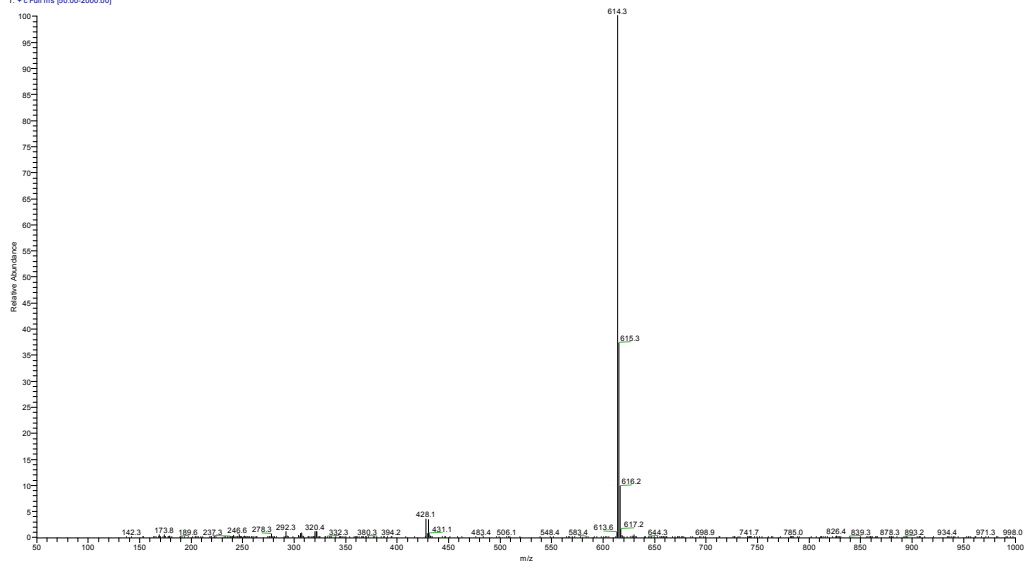


<sup>13</sup>C NMR (300MHz, CDCl<sub>3</sub>)



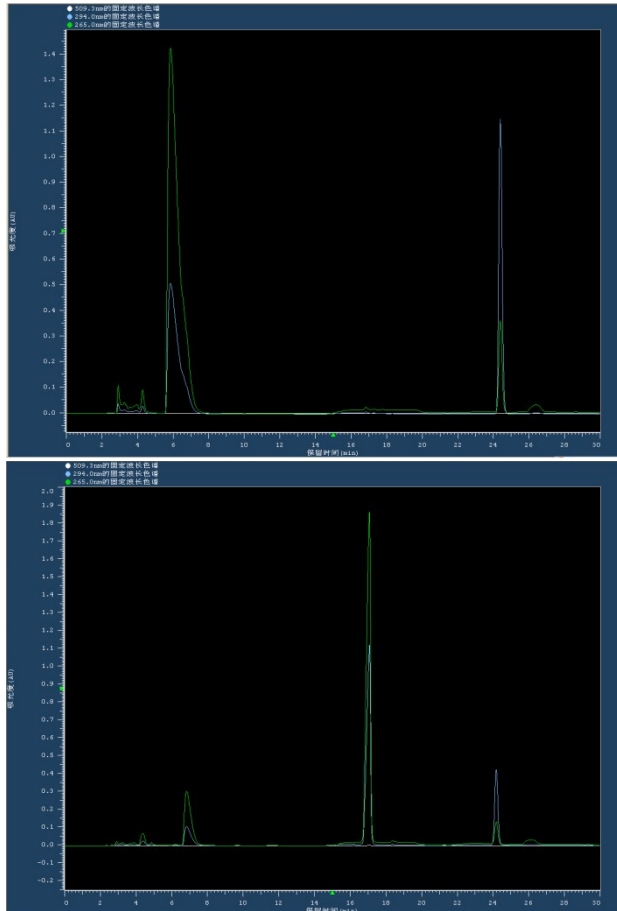
# HRMS

ESI 2012-X3 #59.44 RT: 1.45-1.57 AV: 6 NL: 1.67E8  
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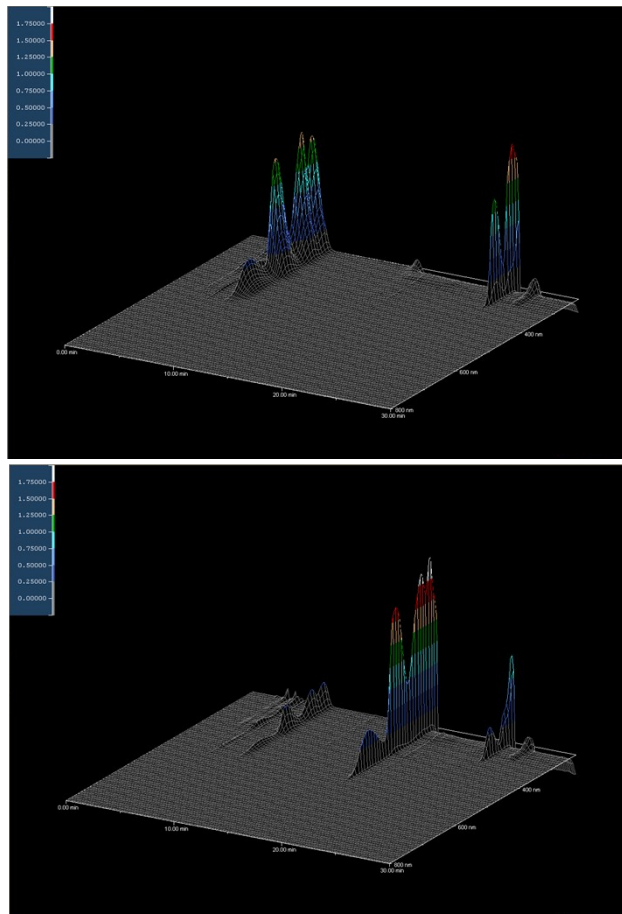


## 4. HPLC profile for HHS

### Dual wavelength HPLC (the spectra of before and after)



### Three Dimensional HPLC (the spectra of before and after )



### 5. The oligonucleotide primer sequence used for real-time PCR

Table 1 The oligonucleotide primer sequence used for real-time PCR.

Gene name	Accession No.	Forward primer	Reverse primer
$\beta$ -actin	NM_031144	GGAGATTACTGCCCTGGCTCCTA	GACTCATCGTACTCCTGCTTGCT G
PPAR $\gamma$ 2	NM_011146.3	GGAGCCTAAGTTTGAGTTTGCTGT G	TGCAGCAGGTTGTCTTGGATG
C/EBP $\alpha$	NM_007678.3	TTGAAGCACAAATCGATCCATCC	GCACACTGCCATTGCACAAG
UCP2	NM_011671.5	CTTCAGCACACAAGGGCACA	AGGCCAACTGACAGCATTCCCTA
FAS	NM_007988	TGCTGTTGGAAGTCAGCTATGAA	GATGCCTCTGAACCACTCACAC
Adiponectin	NM_009605.4	TTCTGTCTGTACGATTGTCAGTGG	GTCATCTTCGGCATGACTGG