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1 2 1 2 1 2 1 2 1 2 1 2#

1 730000 2

L₉ 3⁴

HPLC

70 °C 2.5 h 3 cm

2015

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LI Yuefeng^{1 2} NIU Jiangtao^{1 2} CAO Rui^{1 2} SI Xinlei^{1 2} BIAN Tiantian^{1 2} YAN Xing Ke^{1 2#}

1 Gansu University of Chinese Medicine Gansu 730000 2 Gansu Provincial Key Laboratory of Standard and Quality of Chinese Medicine Research

To optimize the processing technology of honey baked *Hedysari Radix* so as to provide the experimental basis for the quality control of *Hedysari Radix* processed products and standardization of the processing. L₉ 3⁴ orthogonal design method was used and the mean content of calycosin and formononetin which were detected by HPLC with gradient elution were taken as the comprehensive evaluation indexes the processing technology was optimized. The optimum processing technology of honey baked *Hedysari Radix* was thickness of 3 cm at the temperature of 70 °C for 2.5 h.

Hedysari Radix baking processed products produced by the optimum technology met with the requirement of *Chinese Pharmacopoeia* 2015 Edition which was simple feasible and repeatable. The method would provide evidence for further research on optimum processing technology and for standardization of industrial production.

Hedysari Radix honey baked orthogonal design method

Hedysari Radix " "

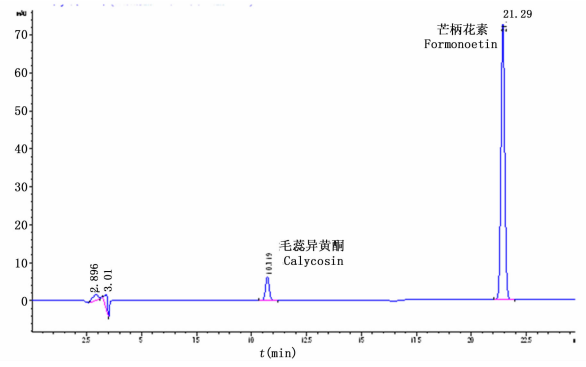
Hedysarum polybotrys Hand. -Mazz.

Hedysari Radix preparata cum melle

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1

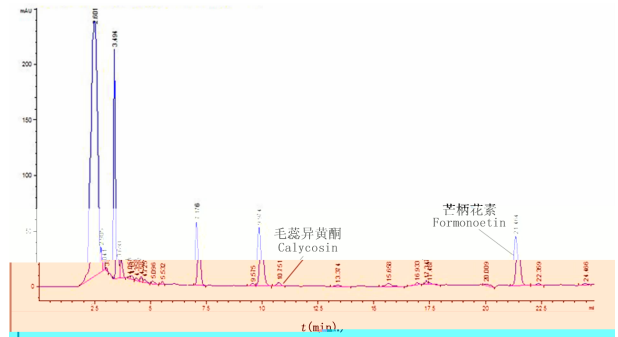


1.1

101-2A

AL104

Aglient1260
 BT125D
 SB - 5200 DTD
 2N-04A
 HHS11S
 SX₂-4-9



1.2

HPLC ≥ 98%

150419

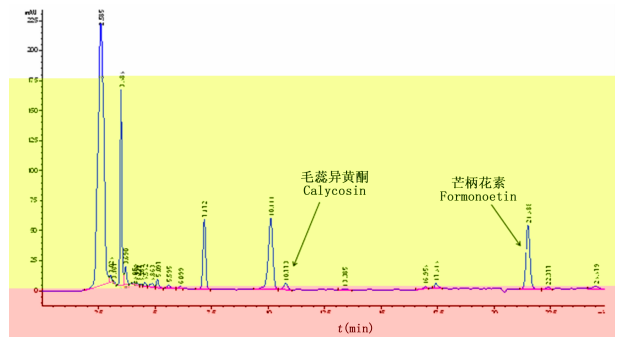
20151201

20160305

HPLC ≥ 98%

150629

20150707



20151202

2.1

Agilent HC-C₁₈ 4.6 mm × 250 mm 5

μm

-0.01%

0 ~ 12 min 30% ~ 33% 12 ~ 13 min

31% ~ 40% 13 ~ 25 min 40% 1.0

mL/min 248 nm 30 °C 10

μL² 1 2 3

2.2

2015

100 kg

25 kg

1 h

2.2.1

2.2.2

L₉ 3⁴

3-4

A

B

C

1

30 mL 75 °C 1 h 4 °C
 1 h 45 °C 10 mL
 0.45 μm

Level	Factor		
	A °C	B h	C cm
1	70	1.5	1
2	80	2.0	2
3	90	2.5	3

2.5

3.2 A B

6

5

0.242 5 0.485 0 0.727 5 0.970 0

2.3

1.455 0 1.940 0 mg/L 3.990

5.985 7.980 9.975 11.970 13.965 mg/L 10

0.97 mg 3.99 mg

10 mL

μL mg/L

10 mL

A B

2

2.4

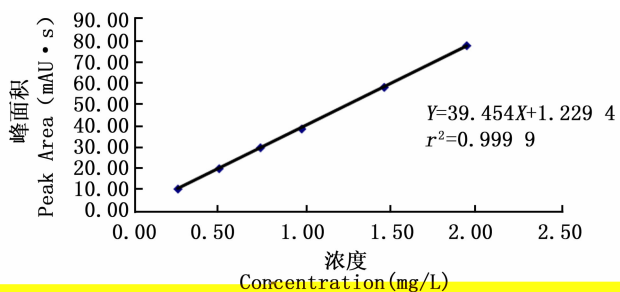
0.242 5 ~ 1.940 0 3.990 0 ~ 13.965 0

2.0 g 150 mL

mg/L

4 5

Component	Regression equation	r ²	Linear range mg/L
Calycosin	Y = 39.454X + 1.229 4	0.999 9	0.242 5 ~ 1.940 0
Formononotin	Y = 64.550X - 7.463 8	0.999 7	3.990 0 ~ 13.965 0



RSD

RSD 0.16% n = 6

RSD 0.77% n = 6

2.7

4 °C

0 4 8 12 20 24 h

2

RSD

RSD 1.56% n

= 6

RSD 0.55% n = 6

24 h

2.8

90 °C 2

h 1 cm 6

"3.3" 6

"3.1"

RSD

4.44 μg/g RSD 2.80% n = 6

39.91 μg/g RSD

0.40% n = 6

2.9

2.6

"3.2"

6

1.0 g

6

"3.1"

"3.3"

" 3. 1 "

3 4

Sample amount g	Content in sample µg	Added amount µg	Measured amount µg	Recovery %	Average recovery %	RSD %
1.000 3	2.533 8	2.425 0	4.899 7	97.56		
1.000 2	2.533 5	2.425 0	4.901 2	97.64		
1.000 3	2.533 8	2.425 0	4.866 0	96.17	96.31	0.89
1.000 2	2.533 5	2.425 0	4.856 7	95.80		
1.000 0	2.533 0	2.425 0	4.825 3	94.53		
1.000 1	2.533 3	2.425 0	4.864 4	96.13		

Sample amount g	Content in sample µg	Added amount µg	Measured amount µg	Recovery %	Average recovery %	RSD %
1.000 3	21.401 1	19.950 0	40.667 9	96.58		
1.000 2	21.399 0	19.950 0	40.301 8	94.75		
1.000 3	21.401 1	19.950 0	40.761 5	97.04	96.29	1.13
1.000 2	21.399 0	19.950 0	40.664 1	96.57		
1.000 0	21.394 7	19.950 0	40.386 3	95.20		
1.000 1	21.396 8	19.950 0	40.864 2	97.58		

2.10

" 3. 3 "

" 3. 1 "

Sample No.	Condition	Content of calycosin µg/g	Content of formononetin µg/g	Total content µg/g
1	A ₁ B ₁ C ₁	5.151 0	43.721 5	48.872 5
2	A ₁ B ₂ C ₂	5.244 8	45.121 6	50.366 4
3	A ₁ B ₃ C ₃	7.911 6	49.699 6	57.611 2
4	A ₂ B ₁ C ₂	4.711 0	42.277 0	46.988 0
5	A ₂ B ₂ C ₃	4.962 5	48.576 7	53.539 2
6	A ₂ B ₃ C ₁	5.369 5	40.727 1	46.096 6
7	A ₃ B ₁ C ₃	6.614 7	42.959 4	49.574 1
8	A ₃ B ₂ C ₁	4.475 5	39.865 1	44.340 5
9	A ₃ B ₃ C ₂	4.004 9	41.194 4	45.199 3
10	Baked	4.776 7	37.291 0	42.067 7
11	Crude	5.080 2	42.798 9	47.879 1

5 C
 6 7
 > A > B
 > >
 C P < 0.05
 A₁B₃C₃ 70
 °C 2.5 h 3 cm

248 nm

J . 2010 27 29 124 – 125.
5 .
J . 2014 16 10 796
– 799.

8 – 12

6 . HPLC 4
J . 2010 21 15 1385
– 1387.

70 °C

2.5 h 3 cm

7 .
J . 2012 35 2 202 – 203.
8 .
ACE ACE2 J .
2008 43 8 594 – 597.

9 .
J . 2010 35 22 3060 – 3063.
10 .
J . 2009 25
6 14 – 17.

1 . M .
2015 . 2015 152 – 153.

11 . 2
J .
2010 28 7 1516 – 1518.

2 . D .

12 .
J . 2014 25 15 1352
– 1354.

2015.

3 . D .

2003.

2016-10-11

4 .