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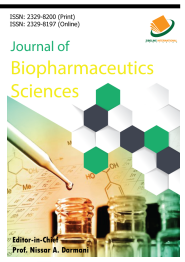

INDEX COMPOSITION CHANGE AND FINGER-PRINT CHROMATOGRAPHY ESTABLISHMENT IN THE HONEYSUCKLE PROCESSING COURSE

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ABSTRACT

In order to establish the quality control and evaluation system of honeysuckle, in this paper, HPLC and differential analysis methods SPSS are used to research on the dynamic condition of index composition change of Fengqiu great Mullein and the chemical fingerprint chromatography of Henan geo-authentic honeysuckle with different processing methods, grades, preparing methods and drying temperatures. The results show that the index composition change difference of Fengqiu great Mullein with different processing methods, grades, preparing methods and drying temperatures is significant. The color and index composition of honeysuckle dried by electricity is rather good; the shape and index composition of first-level honeysuckle medicinal materials is rather good; the index composition of light-fried honeysuckle reaches the highest level; the temperature and index composition are positively correlated within the range of 60 ~ 130 ℃. There are 15 characteristic peaks in the chemical fingerprint chromatography of Henan Geo-authentic honeysuckle, which is of great significance to the preparing and processing technology of honeysuckle, the quality control of geo-authentic medicinal materials and the establishment of quality standards system.

KEYWORDS

Honeysuckle, HPLC, chlorogenic acid, galuteolin, finger-print chromatography

1. INTRODUCTION

Based on a study, honeysuckle is the dried bud or early-bloomed flower of *Lonicera japonica* Thunb, which has the efficacy of heat-clearing, detoxifying and cooling [1]. Due to its strong adaptability, honeysuckles are distributed in all provinces with exception of Heilongjiang, Inner Mongolia, Ningxia, Qinghai, Xinjiang, Hainan and Tibet. Study showed their commercial medicinal materials mainly come from cultivated varieties with the highest yield and best quality of Henan's "Southern Honeysuckle" or "Mi Honeysuckle" and Shandong's "East Honeysuckle" or "Ji Honeysuckle" [2,3]. Studies have shown that variety resources, harvesting period, preparing methods, habitat, place of origin, phenological period, storage time and other factors would affect the index composition content of honeysuckle [4-6].

Different processing methods are formed in the long-term preparing process of honeysuckle, which mainly include sun drying, coal drying and electricity drying. Dried honeysuckle raw materials have the heat-clearing and detoxifying effect with faint odor and are commonly used in wind-heat cold, warm-heat cold, lung-heat cough, pharyngitis, sore-carbuncle swell and other diseases. The cold property of honeysuckle raw materials is weakened after stir- frying and carbon-frying, its astringent property has hemostatic effect and the honeysuckle raw materials are commonly used for bloody dysentery and metrorrhagia. In the course of preparing, the temperature level has a significant impact on the index composition content of honeysuckle. The honeysuckle can be divided into four levels according to the color, size, and open bud number and leaf number.

In order to establish the quality control and evaluation system of honeysuckle, this paper takes the Fengqiu great Mullein with upright tree shape, stout branches, long bud, pest and disease resistance, strong adaptability, long flowering period and high yield as the experiment material. Through the comparative analysis of chlorogenic acid and luteolin content with different processing methods, grades, preparing methods and drying temperatures, it conducts research on the change trends of index composition content in the processing course and establish the chemical fingerprint chromatography of Henan Geo-authentic honeysuckle, which is of great significance to the preparing and processing technology of honeysuckle, the quality control of geo-authentic medicinal materials and the establishment of quality standards system.

2. MATERIALS AND METHODS

2.1 Instruments

Agilent 1200 series HPLC (Agilent technologies Co., Ltd. automatic sampler with automatic temperature control, with GI311 quaternary gradient pump, VWD detector, Agilent1100 LC chemical workstation and XDB-C18 chromatographic column), FA2204B electronic analytical balance (Shanghai Jinghai Instrument Co., Ltd.).

2.2 Materials

Dried honeysuckle bud materials with different processing methods are first crop flowers provided by Henan Fengqiu Jia Village Honeysuckle Cooperatives. The processing methods are shown in the Table 5.

Dried honeysuckle bud materials with different levels are first crop flowers provided by Henan Fengqiu Jia Village Honeysuckle Cooperatives. The level standards are shown in the Table 6.

Fresh honeysuckle bud materials with different preparing methods are first crop flowers with tree age of 3 years and collecting time of 2013-05-15 provided by Henan Fengqiu Jia Village honeysuckle demonstration farm. The preparing methods are shown in the Table 8.

Fresh honeysuckle bud materials with different drying temperatures are first crop flowers with tree age of 3 years and collecting time of 2013-05-15 provided by Henan Fengqiu Jia Village honeysuckle demonstration farm. They are dried to 90% by stages according to the conditions of Table 1 and dried to 100% by stages according to the conditions of Table 8.

The sample materials to establish chemical fingerprint chromatography of Henan geo-authentic honeysuckle are collected in Mi County and Fengqiu of Henan Province. Mi County is the old producing area and has wide type of honeysuckle, while the Fengqiu is new producing area and its honeysuckle is introduced from Mi County. The sample materials can be seen in Table 2.

Table 1: The drying conditions of honeysuckle bud

Temperature/℃	Time/min
38~40	10
40	120
40~45	10
45	120
45~50	10
50	300
50~60	30
60	150

The medicinal material samples are authenticated as L. japonica by Associate Professor Faqi LI, who is a botany expert of Henan Normal University. All the dried bud materials are smashed and sieved through No.4 sieve [with aperture of (250±9) μm].

2.3 Reagents

Methanol, ethanol and acetonitrile are hromatographical pure, phosphoric acid is analytical pure and the water is ultra-pure water. Study showed chlorogenic acid reference substance and galuteolin reference substance are hromatographical pure, which are purchased from Chinese Medicines and Biological Products Verification Institute [7-9].

2.4 Determination Method of Chlorogenic Acid Content

1) Chromatographic Condition

Chromatographic column filler: octadecylsilane chemically bonded silica; determined wavelength of 327 nm; sample size of 10 μL; mobile phase: acetonitrile — phosphoric acid solution with 0.4% concentration (13:87), flow rate of 1.0 mL/min.

2) Solution Preparation of Reference Substance

Weight moderate reference substance of chlorogenic acid precisely, place in the brown measuring flask and prepare solution with 40 mg in 1 mL by adding methanol with 50% concentration.

3) Solution Preparation of Honeysuckle Chlorogenic Acid Sample

Weight 0.5000 g powder of Fengqiu great Mullein with different flowering period precisely, place in the stopper conical flasks, add methanol with 50% concentration precisely, weight, process by ultrasound (with power of 250 W and frequency of 35 kHz) for 30 minutes, chill, weight again, add methanol with 50% concentration to complement the lost weight, shake up, filtrate, get 5 mL solution precisely, place in the brown measuring flask of 25 mL, add methanol with 50% concentration to the scale, shake up and the solution is obtained.

Table 2: Summary of Henan geo-authentic honeysuckle samples.

Number	Producing area	Color	Length of flower bud(cm)	Dry method
S1	Du Village	yellow-green	2.5~3.3	drying
S2	Qi Village	yellow-green	2.6~3.4	drying
S3	Jia Village	yellow-green	2.7~3.4	drying
S4	Sizhai Village	green	2.2~3.1	microwave drying
S5	Small Stone Bridge	yellow-white	2.4~3.2	drying
S6	Big Stone Bridge	yellow-green	2.4~3.1	drying
S7	Wang Village	yellow-green	2.3~3.5	drying
S8	Sizhuang Village	yellow-green	2.3~3.5	drying on the heatable adobe sleeping platform
S9	He Village	yellow-green	2.2~3.3	drying
S10	Mainly planted by Mi County	yellow-white	2.4~3.5	drying
S11	Wild type of Mi County	yellow-white	2.3~3.4	Sun drying
S12	Longchi of Dengfeng City	yellow-green	2.3~3.3	drying

Table 3: The Gradient Elution Condition of Determining Galuteolin by HPLC.

Time/min	Mobile phase A/%	Mobile phase B/%
0~15	10→20	90→80
15~30	20	80
30~35	20→10	80→90
35~40	10	90

2.5 Determination Method of Galuteolin Content

1) Chromatographic Condition

Chromatographic column filler: octadecylsilane chemically bonded silica; determined wavelength of 350 nm; sample size of 10 μL; mobile phase: acetonitrile is mobile phase A, glacial acetic acid with 0.5% concentration is mobile phase B, flow rate of 1.0 mL/min and gradient elution should be done according to Table 3.

2) Solution Preparation of Reference Substance

Weight moderate reference substance of galuteolin precisely and prepare solution with 40 mg in 1 mL by adding alcohol with 70% concentration.

3) Solution Preparation of Honeysuckle Galuteolin Sample

Weight 2.000 g powder of Fengqiu great Mullein with different flowering period precisely, place in the stopper conical flasks, add 50 mL alcohol with 70% concentration precisely, weight, process by ultrasound (with power of 250 W and frequency of 35 kHz) for an hour, chill, weight again, add alcohol with 70% concentration to complement the lost weight, shake up, filtrate, get 10 mL solution precisely, recover the solvent, dissolve the residues by alcohol with 70% concentration, place in the measuring flask of 5 mL, add alcohol with 70% concentration to the scale, shake up and the solution is obtained.

2.5 Establishment of Geo-authentic Finger-print Chromatography

1) Chromatographic Condition

Chromatographic column filler: octadecylsilane chemically bonded silica; determined wavelength of 265 nm; sample size of 10 μL; mobile phase: mobile phase A is acetonitrile, mobile phase B is acetic acid water solution with 1% concentration, flow rate of 0.8 mL/min and gradient elution should be done according to Table 4.

Table 4: The Gradient Elution Condition of Determining Chemical Finger-Print Chromatography by HPLC.

Time/min	Mobile phase A/%	Mobile phase B/%
0~10	5→10	95→90
10~45	10→18	90→82
45~55	18→28	82→72
55~70	28→100	72→0

2) Solution Preparation of Reference Substance

Weight moderate standard substance of galuteolin and chlorogenic acid precisely, add 100 mL methanol solution with 50%concentration and prepare mixed standard substance solution of galuteolin and chlorogenic acid.

3) Sample Solution Preparation

Weight 1 g powder of 12 medicinal materials precisely, place in the stopper triangular flasks of 100 mL, add 50 mL methanol with 50% concentration precisely, weight, process by ultrasound (with power of 250 W and frequency of 35 kHz) for 60 minutes, chill, weight again, add to complement the lost weight, shake up, filtrate and get the solution for back-up.

3. RESULTS AND ANALYSIS

3.1 Comparision of Index Composition Content of Honeysuckle with Different Processing Methods

The determination results on chlorogenic acid and galuteolin of Fengqiu great Mullein's index composition content with different processing methods can be seen in Table 5.

Table 5: Index Composition Content of Honeysuckle with Different Processing Methods.

Processing method	Chlorogenic acid content /%	Galuteolin content /%
Electricity drying	3.3779±0.7269aA	0.2483±0.0036aA
Sun drying	2.8559±0.5382bB	0.1751±0.0062bB
Coal drying	2.9940±0.3990bB	0.1113±0.0006cC

Note: different letter size in the same data column refers to the significant difference of different processing methods($P<0.01$, $P<0.05$)

Table 5 shows that: the chlorogenic acid content of Fengqiu great Mullein by different processing methods is 2.8559 ~ 3.3779%, the highest content of electricity-dried chlorogenic acid is 3.3779%, coal-dried chlorogenic acid takes the second place and sun- dried chlorogenic acid takes the minimum of 2.8559%; the galuteolin content of Fengqiu great Mullein with different processing methods is 0.1113 ~ 0.2483%, the highest content of electricity-dried galuteolin is 0.2483%, sun-dried galuteolin takes the second place and coal-dried galuteolin takes the minimum of 0.1113%. Through the difference analysis on the index composition content of Fengqiu great Mullein with different processing methods by SPSS analysis method, it can be seen that the chlorogenic acid and galuteolin content in the Fengqiu great Mullein by different processing methods is significant [10-12]. The results show that the color and quality of electricity- dried honeysuckle are good, while the color of sun- dried honeysuckle is bad and coal-dried honeysuckle has dusts and sulfur pollutions and the latter methods are not ideal choices.

3.2 Comparison of Chlorogenic Acid and Galuteolin Content of Honeysuckle with Different Levels

The quality level standards of dried honeysuckle with different levels are shown in Table 6.

The determination results on chlorogenic acid and galuteolin content of Fengqiu great Mullein with different levels can be seen in Table 7.

Table 7 shows that: the chlorogenic acid content of Fengqiu great Mullein with different levels is 2.2511~3.5193%, its highest content is in level 1, reduce gradually in level 2 and level 3 and rise in level 4; the galuteolin content of Fengqiu great Mullein with different levels is 0.1236~0.1839%, its highest content is in level 4, level 1 and level 3 take the second place ,its lowest content is in level 2; Through the difference analysis on the index composition content of Fengqiu great Mullein with different levels by SPSS analysis method, it can be seen that the chlorogenic acid content in the Fengqiu

Table 6: The quality level standards of dried honeysuckle with different levels.

Level	Shape	Color	Odor	Impurity content
Level 1	Virgate bud, stout and strong, tapering shape and curved slightly	Yellow, and cyan	white	Faint odor, slightly sweet and taste bitter	blooming flowers are not more than 5%, no thin bud, blackhead, branch and leaf, impurity, damage by worms or mildew
Level 2	Virgate bud, slim, tapering shape and curved slightly	Yellow, and cyan	white	Faint odor, slightly sweet and taste bitter	Blooming flowers not more than 15%, blackhead not more than 5%, no branch and leaf, impurity, damage by worms or mildew.
Level 3	Virgate bud, slim, tapering shape and curved slightly	Yellow, and cyan	white	Faint odor, slightly sweet and taste bitter	Blooming flowers not more than 25%, blackhead not more than 5%, branch and leaf not more than 1%, no impurity, damage by worms or mildew.
Level 4				Buds and blooming flowers are associated. No requirements on bud size and color. Branch and leaf not more than 3%. No impurity, damage by worms or mildew.

Table 7: Index composition content of Fengqiu great mullein with different levels.

Different level	Chlorogenic acid content /%	Galuteolin content /%
Level 1	3.5193±0.0099aA	0.1799±0. 0023aA
Level 2	2.5284±0.2468bB	0.1236±0.0167bB
Level 3	2.2511±0.1225bB	0.1699±0.0017aA
Level 4	2.6272±0.0496bB	0.1839±0.1839aA

Note: different letter size in the same data column refers to the significant difference of different levels (P<0. 01, P<0. 05)

great Mullein in level 1 and other levels is significant; the galuteolin content difference in the Fengqiu great Mullein in level 4 and level 2 is significant [13]. Because the leaves in the buds are much more and the galuteolin content in leaves is higher than that in buds, so the galuteolin content in level 4 is much higher than level 1, level 2 and level 3. In overall consideration of medical shape and index composition content, the honeysuckle of level 1 is the best.

3.3 Comparison of Chlorogenic Acid and Galuteolin Content of Honeysuckle with Different Preparing Methods

The determination results on chlorogenic acid and galuteolin content of Fengqiu great Mullein with different preparing methods can be seen in Table 8.

Table 8: Index composition content of Fengqiu great mullein with different preparing methods.

Preparing method	Chlorogenic acid content /%	Galuteolin content /%
Drying by stages	2.037±0.049bA	0.113±0.043bcA
Light frying	3.547±0.200aA	0.145±0.022aA
Middle frying	3.533±0.247aA	0.134±0.0 00abA
Hard frying	1.753±0.143cB	0.079±0.003cA

Note: different letter size in the same data column refers to the significant difference of different preparing methods(P<0. 01, P<0. 05)

Table 8 shows that: the chlorogenic acid content of Fengqiu great Mullein with different preparing methods is 1.753~3.547%, the light frying content is the highest, middle-frying and drying by stages take the second place and the hard-frying content is the lowest; the galuteolin content of Fengqiu great Mullein with different preparing methods is 0.079~0.145%, the light frying content is the highest, middle-frying and drying by stages take the second place and the hard-frying content is the lowest; Through the difference analysis on the index composition content of Fengqiu great Mullein with different levels by SPSS analysis method, it can be seen that the difference of chlorogenic acid content in the Fengqiu great Mullein between the light-frying and middle-frying is not significant, the difference between the light-frying and drying by stages is significant and the difference between the light-frying and hard-frying is extremely significant; There's no significant galuteolin content difference between the light-frying and middle-frying, but the difference between the light-frying and hard-frying , drying by stage is significant. The light-fried chlorogenic acid and galuteolin content of honeysuckle are higher than drying by stages, middle-fried and hard-fried content are reduced. The latter is probably because the much high temperature in the frying process leads to pyrogenation and lower the chlorogenic acid and galuteolin content. Honeysuckle has the heat-clearing, detoxifying and cooling effect. However, its cold property makes it inappropriate for long-term tea drinking and light-frying could weaken the cold property of honeysuckle.

3.4 Comparison of Index Composition Content of Honeysuckle with Different Drying Temperatures

The determination results on chlorogenic acid and galuteolin content of Fengqiu great Mullein with different drying temperatures can be seen in Table 9.

Table 9 shows that: the chlorogenic acid content of Fengqiu great Mullein with different drying temperatures is 2.037~3.537%, the lowest content appears at the temperature of 60℃, the content rises as temperature rises and reaches the highest level at the temperature of 130℃; the galuteolin content of Fengqiu great Mullein with different drying temperatures is 0.099~0.144%, the lowest content appears at the temperature of 60℃, the content rises

Table 9: Index composition content of Honeysuckle with different drying temperatures.

Different temperature/℃	Drying time/min	Chlorogenic acid content /%	Galuteolin content /%
60	150	2.037±0.049eD	0.099±0.003fC
72	90	2.366±0.037dC	0.102±0.001efC
80	60	2.609±0.046cB	0.104±0.005efC
90	40	2.659±0.053bcB	0.114±0.004deBC
100	30	2.733±0.018bB	0.118±0.015cdBC
110	20	3.451±0.003aA	0.128±0.002bcAB
120	15	3.470±0.073aA	0.140±0.00 2abA
130	3	3.537±0.010aA	0.144±0.003aA

Note: different letter size in the same data column refers to the significant difference of different drying temperature (P<0. 01, P<0. 05)

as temperature rises and reaches the highest level at the temperature of 130 ℃ . Through the difference analysis on the index composition content of Fengqiu great Mullein with different levels by SPSS analysis method, it can be seen that the difference of chlorogenic acid content between the temperature of 130℃ and 120℃, 110℃ is not significant, but the difference of chlorogenic acid content between the temperature of 130 ℃ and other temperatures is extremely significant and the difference of chlorogenic acid content between the temperature of 60℃ and other temperatures is extremely significant; the difference of galuteolin content between the temperature of 130℃ and 120℃ is not significant, the difference of galuteolin content between the temperature of 130℃ and 110℃ is significant, the difference of galuteolin content between the temperature of 130 ℃ and other temperatures is extremely significant, the difference of galuteolin

content between the temperature of 60 ℃ and 72 ℃ ,80 ℃ is not significant, the difference of galuteolin contentbetween the temperature of 60 ℃ and 90℃, 100℃ is significant and the difference of galuteolin content between the temperature of 60℃ and other temperatures is extremely significant. The results show that the index composition and temperature are positively correlated within the drying temperature of 60℃~130℃.

3.5 Establishment of Henan Geo-Authentic Finger- Print Chromatography

Analyze the mixed solution of standard substance according to the chromatographic conditions of "1.6 Establishment of Henan Geo-authentic Finger-print" and determine the position of chlorogenic acid and galuteolin, which is shown in Figure 1.

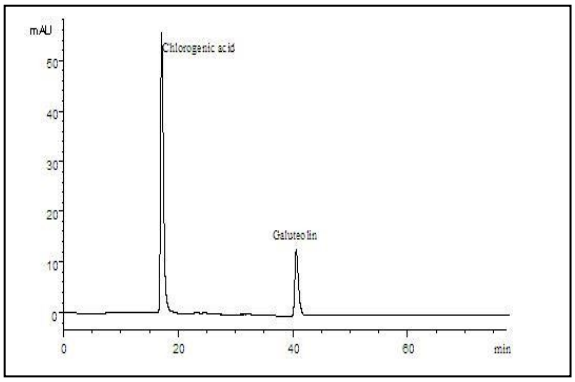

Figure 1: Mixed solution of standard substance.

Get the HPLC chromatography by analyzing the chromatographic conditions of 12 sample solutions and get the HPLC matching chromatography through matching analysis and similarity analysis by The Similarity Evaluation System of Traditional Chinese Medicine Finger-print Chromatography, Version 2004A. Details can be seen in Figure 2.

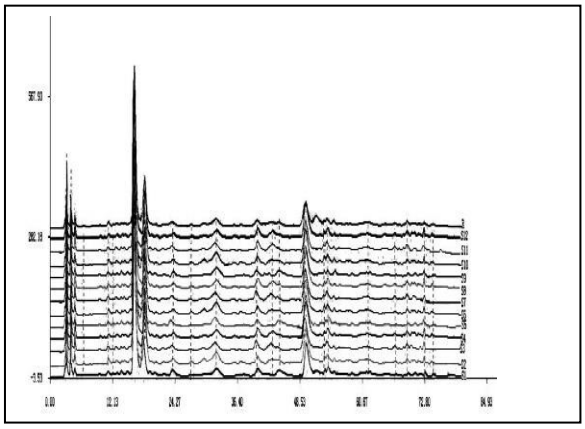

Figure 2: HPLC Matching Chromatography of Henan Honeysuckle.

It can be seen from the Finger-print Chromatography Matching Analysis of 12 kinds of honeysuckle that the similarity of finger-print peaks among various samples is pretty good. However, some finger-print peaks only belong to few samples. The finger-print peaks are many and small from 36 minute to 48 minute and the difference among various samples is much large

There are 15 finger-print peaks with high-level similarity and good separation degree in the standard chemical finger-print chromatography of marked Henan geo-authentic honeysuckle, which can be seen in Figure 3. Peak 7 is chlorogenic acid and peak 11 is galuteolin. The obtained standard chemical finger- print chromatography of honeysuckle can be used as the quality determination standard of Henan geo- authentic honeysuckle.

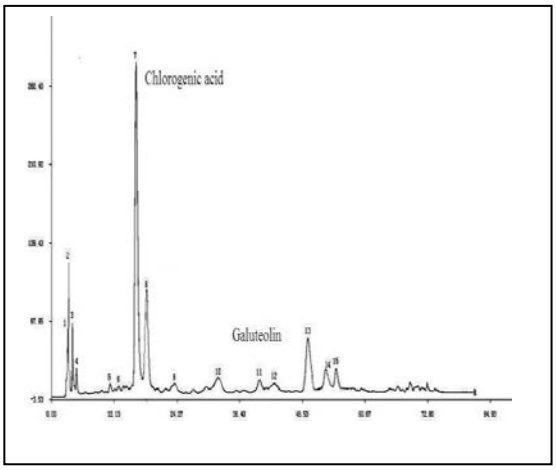

Figure 3: The Marked Finger-print Chart of Common Features of Henan Geo-authentic Honeysuckle.

According to the The Similarity Evaluation System of Traditional Chinese Medicine Finger-print Chromatography, (Scientific Research Version 2004A),the honeysuckle samples in Henan producing area are conducted analysis and comparison and calculation of chromatography similarity. The results can be seen in the Table 10.

S1-S9 are honeysuckle samples in Fengqiu producing area, S10 and S11 are honeysuckle samples in Mi County producing area and S12 are honeysuckle samples in Dengfeng producing area. It can be seen from Table 10 that the similarity of first 9 samples is much higher, while the similarity of samples of S10, S11, S12 and Fengqiu area is much lower. The similarity of honeysuckle samples with near geographic position is much higher, which indicates the honeysuckle compositions have relation with its growing environment. There's certain difference among samples in different producing areas in spite of their co-owned finger-print peaks

Table 10: Similarity evaluation of Henan honeysuckle.

No.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	R
S1	1	0.998	0.996	0.987	0.995	0.993	0.994	0.989	0.992	0.958	0.949	0.943	0.997
S2	0.998	1	0.995	0.982	0.997	0.991	0.987	0.992	0.993	0.956	0.951	0.959	0.994
S3	0.996	0.995	1	0.99	0.998	0.989	0.991	0.986	0.994	0.959	0.948	0.939	0.999
S4	0.987	0.982	0.99	1	0.992	0.985	0.991	0.979	0.986	0.945	0.944	0.928	0.993
S5	0.995	0.997	0.998	0.992	1	0.995	0.998	0.988	0.993	0.952	0.955	0.937	0.995
S6	0.993	0.991	0.989	0.985	0.995	1	0.996	0.995	0.997	0.947	0.949	0.951	0.998
S7	0.994	0.987	0.991	0.991	0.998	0.996	1	0.994	0.988	0.955	0.943	0.947	0.997
S8	0.989	0.992	0.986	0.979	0.988	0.995	0.994	1	0.985	0.956	0.955	0.95	0.99
S9	0.992	0.993	0.994	0.986	0.993	0.997	0.988	0.985	1	0.943	0.954	0.938	0.989
S10	0.958	0.956	0.959	0.945	0.952	0.947	0.955	0.956	0.943	1	0.988	0.992	0.978
S11	0.949	0.951	0.948	0.944	0.955	0.949	0.943	0.955	0.954	0.988	1	0.985	0.969
S12	0.943	0.959	0.939	0.928	0.937	0.951	0.947	0.95	0.938	0.992	0.985	1	0.981
R	0.997	0.994	0.999	0.993	0.995	0.998	0.997	0.99	0.989	0.978	0.969	0.981	1

4. CONCLUSIONS AND DISCUSSIONS

According to quantities of reports, the difference of honeysuckle index composition content is rather large, which is caused by its variety, habitat, different drying methods and other comprehensive factors. This paper collects honeysuckle samples with different processing methods, levels, preparing methods and drying temperatures under the same environment condition. In addition, on the basis of stipulated methods in 2010 edition of Chinese Pharmacopoeia and relevant literatures, this paper conducts composition determination by HPLC method to create the identical objective conditions as well as create an objective and real measuring result to reflect the differences of honeysuckle compositions in the processing course.

Among different drying methods, compared with traditional sun drying and coal drying, the color is much better and the index composition content is much higher in the honeysuckle dried by electricity.

Therefore, if possible, electricity drying technology can be promoted. Level 1 honeysuckle's medical shape is pretty good and its index composition content is much higher, which can be used for high-grade tea and provides theoretical support for the quality evaluation, market supervision and development and utilization of honeysuckle. The preparing quality of traditional Chinese Medicine directly affects the clinical efficacy. Stir- frying is a common method for traditional Chinese Medicine preparation with main purpose of enhancing the efficacy of the medicine digestion or reducing the irritation of medicines. After the traditional Chinese Medicine preparation, the external characters, internal compositions, odor and effect of medicines would change. The index composition content of honeysuckle by light-frying is higher than that by frying by stages and the former also tastes much better. The temperature and index composition are positively correlated within the range of 60 ~ 130 ℃. It provides theoretical and technical basis for honeysuckle raw materials, plain-frying and carbonizing pharmacy.

Traditional Chinese medicine finger-print is a comprehensive, macro and quantifiable identification method that can be used to identify the authenticity of traditional Chinese medicine and evaluate the quality of Chinese medicine. This experiment collects 12 great Mullein samples from Fengqiu and Mi County, establishes the chemical fingerprint chromatography of Henan geo-authentic honeysuckle by HPLC method, determines 15 spectrums with relatively large peak area as the characteristic peaks and obtain marked finger-print chart of common features of Henan geo-authentic honeysuckle to identify the authenticity of honeysuckle in Henan producing areas and conducts quality control. This research has a significant impact on the preparing and processing technology of honeysuckle, the quality control of geo-authentic medicines and the establishment of quality standard system.

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