

Herb Identification, Safety & Processing:

What every practitioner needs
to know

中藥鑑定，污染與安全： 從業者所需知

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RIVER HERBS

www.riverherbs.ca

FB: RiverHerbs

Conflict of Interest Declaration 利益衝突聲明

- PC has been using lab-tested herbs since 2005.
- Owned and operated River Clinic since 2010, providing only lab-tested herbs from NuHerbs since opening.
- Owned and operated River Herbs 長江中藥有限公司 since 2013. Sourcing from NuHerbs (德興行) and SpringWind (春風) in California 加州.
- Eastern Canada Distributor for NuHerb lab-tested & organic herbs since 2014 .德興行實驗室測試和有機中藥加拿大東部 總代理

Learning Objectives: 學習目標:

- Understand the prevalence of misidentified species
了解有關誤鑑定的中藥種類
- Understand the effect of heavy metal & pesticides
了解有關重金屬及農藥的影響與後果
- Understand the effect of sulfur fumigation
了解有關硫磺熏蒸的影響和後果
- Understand wild-crafted, lab-tested & organic herbs
了解野生, 實驗室測試及有機草藥的區別
- Understand the importance of PaoZhi (processing)
了解炮製對於治療結果的重要性

Authentication 鑑定

- Geo-authenticity (Dao Di 道地)
 - From indigenous plant habitat 植物生境
 - From habitat that yield the highest potency 效力產量
 - From area with expert processing 專家處理
- Species authenticity 物種鑑定
 - Genetic authentication 分子遺傳學
 - Microscopic authentication 微觀分析
 - Macroscopic authentication 宏觀分析

She Gan 射干



Belamcandae Rhizoma



Belamcandae Herba

Shan Ci Gu 山慈菇



Pseudobullabus Cremastreae
Seupleiones



Bulbus Tulipae Edulis
Guang Ci Gu 光慈菇

Ge Gen 葛根



Puerariae Thomsonii Radix



Puerariae Lobatae Radix
Fen Ge 粉葛

Kun Bu 昆布



Eckloniae Thallus

Ulvae Lactucae Alga
Guang Kun Bu 廣昆布

Huang Bai 黃柏



Phellodendri Amurensis Cortex



Phellodendri Chinensis Cortex
Guang Huang Bai 廣黃柏

Sheng Ma 升麻



Cimicifugae Rhizoma



Serratulae Chinenesis Radix
Guang Sheng Ma 廣升麻

Bai Tou Weng 白頭翁



Pulsatillae Radix



Polycarpaeae Corymbosae Herba
Sheng Se Cao 聲色草

Ce Bai Ye 側柏葉



Platycladi Cacumen



Podocarpi Caulis et Folium
Luo Han Song Ye 羅漢松葉

Jin Qian Cao 金錢草



Lysimachiae Herba



Desmodii Styracifolii Herba
Guang Jin Qian Cao 廣金錢草

Wu Jia Pi 五加皮

Acanthopanax Cortex



Hedyotidis Hedyotideae Caulis
Niu Bai Teng 牛白藤



Zi Cao 紫草



Arnebiae Radix

Potentilla chinensis 北紫草

Pu Huang 蒲黃



Typhae Pollen

Typhae Pollen cum Nema

Wang Bu Liu Xing 王不留行



Vaccariae Semen

Receptaculum Fici Pumilae
Guang Dong Wang Bu Liu Xing
廣東王不留行

Heavy Metal and Pesticide Content in Commonly Prescribed Individual Raw Chinese Herbal Medicines

Eric S. J. HARRIS^{a,b,*}, Shugeng CAO^a, Bruce A. LITTLEFIELD^{a,b}, Jane A. CRAYCROFT^b, Robert SCHOLTEN^b, Ted KAPTCHUK^{b,g}, Yanling FU^c, Wenquan WANG^d, Yong LIU^d, Hubiao CHEN^e, Zhongzhen ZHAO^e, Jon CLARDY^a, Alan D. WOOLF^f, and David M. EISENBERG^{b,h}

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^eSchool of Chinese Medicine, Hong Kong Baptist University, 7 Baptist University Road, Kowloon Tong, Hong Kong Special Administrative Region, PR China

^fChildren's Hospital Boston, 300 Longwood Ave and Department of Pediatrics, Harvard Medical,

Study Design

- 334 total samples representing 126 species. 210 samples were cultivated (62.9%), 124 samples were from the wild (37.1%).
- All 334 samples were tested for heavy metals (mercury, lead, cadmium, arsenic & chromium). 汞, 鉛, 鎘, 砷 & 鉻
- 294 samples (out of 334), representing 112 species were tested for 162 different pesticides.

Results

- All 334 samples had at least one metal detected, 34 % (115) had all 5 metals detected.
- 36.7 % (108/294) samples tested for pesticide had pesticides detected per sample (range 1-9 pesticides).
- Mercury was within acceptable levels in all samples.
- Chlophyrifos (insecticide) was detected in 1 out of 4 samples. (Not currently monitored in Chinese Pharmacopoeia 2005)

Interpretation and Conclusion

- Wild harvested herbs had higher heavy metal and pesticide than cultivated herbs (note: more cultivated samples were tested than wild samples)
- 野生收穫藥材比栽培藥草有較高的重金屬和農藥.
- Based on the likely mode of consumption of raw herbs, 5% (1 in 20) of herbs tested in this study had levels of metals and pesticides that were significant to health.
- 基於使用飲片的可能模式, 在本研究中測試草藥有 5% (1 比 20) 含有超標金屬和農藥.

Heavy Metals

- Health effect of Heavy Metals

Arsenic 砷 is a carcinogen 致癌物, low levels cause n/v, decreased red/white cell production, damage to blood vessel, “pins & needles” feeling.

Cadmium 鎘 is a carcinogen 致癌物. Damage to kidney, lung and bones.

Lead 鉛 is poisonous to the nervous system, effecting cognitive function. Also impedes fertility. 神經系統毒素

Mercury 汞 is toxic to the nervous system 神經系統毒素

- Cut offs based on European Pharmacopeia standards

歐洲藥典標杆

Lead鉛 <5ppm

Arsenic砷 <2ppm

Cadmium鎘 <0.2ppm

Mercury 汞 <0.1ppm

Heavy metals are more common in root/rhizome herbs than leaves/fruit/flower portion of herbs.

重金屬在根/根莖藥材比葉/果/花部分較為常見。

Pesticide 農藥

- Definition:

A substance used for destroying insects or other organisms harmful to cultivated plants or to animals.

- Common pesticides include organophosphates, carbamates, organochlorine, pyrethroid. 有機磷, 氨基甲酸酯類, 有機氯, 擬除蟲菊酯。
- All toxic to the nervous system. 神經系統毒素



- According to the 2010 Pharmacopoeia of PRC 中國藥典, 175 out of 490 plant and fungi based herbs are cultivated (36%). Most do not require pesticide.
- 14 required prolonged, multiple high dose pesticides.
14種草藥需要長期多種高劑量的農藥
- 35 herbs commonly require frequent use of pesticides.
- 35種草藥需要頻繁地使用農藥
- Overall 10% of the plant-based herb require pesticide.
10% 基於植物的中藥需要的農藥。
- Pesticides use is highest in fruit based herbs and common culinary food-herbs.水果和烹飪藥材，農藥的使用是最高的。

Herbs requiring multiple high dose pesticides 需要長期多種高劑量的農藥

1. Bai Zhu 白朮
2. Chen Pi 陳皮
3. Dang Gui 當歸
4. Da Suan 大蒜
5. Gou Qi Zi 枸杞子
6. Hei Zhi Ma 黑芝麻
7. Jin Yin Hua 金銀花
8. Jiu Cai Zi 韭菜子
9. Qing Pi 青皮
10. Ren Shen 人蔘
11. Ren Shen Ye 人蔘葉
12. San Qi 三七
13. Shan Zha 山楂
14. Shan Zha Ye 山楂葉

Herbs requiring frequent use of pesticides

需要頻繁使用農藥

2010 Pharmacopoeia of PRC

2010 中華人民共和國藥典

- 
1. Bai Bian Dou 白扁豆
 2. Bai He 百合
 3. Bai Shao 白芍
 4. Bai Zhi 白芷
 5. Ban Lan Gen 板藍根
 6. Bei Sha Shen 北沙參
 7. Bu Gu Zhi 補骨脂
 8. Da Qing Ye 大青葉
 9. Dang Shen 黨參
 10. Gan Jiang 乾薑
 11. Gao Liang Jiang 高良姜
 12. Hei Dou Yi 黑豆衣
 13. Hua Ju Hong 化橘紅
 14. Huang Lian 黃蓮
 15. Huang Qi 黃芪
 16. Jie Geng 桔梗
 17. Ju He 橘核
 18. Ju Hong 橘紅
 19. Ju Hua 菊花
 20. Long Yan Rou 龍眼肉
 21. Mu Dan Pi 牡丹皮
 22. Mu Gua 木瓜
 23. Niu Xi (Huai) 懷牛膝
 24. Pi Pa Ye 枇杷葉
 25. Ren Dong Teng 忍冬藤
 26. Sheng Di Huang 生地黃
 27. Sheng Jiang 生薑
 28. Shu Di Huang 熟地黃
 29. Tao Ren 桃仁
 30. Tian Nan Xing 天南星

Sulfur Fumigation 硫磺熏蒸



HangZhou Food & Drug Administration 杭州市食品藥品監督管理局 reported 60-70% of herbs currently on the market have been fumigated with sulfur (Oct, 2011).

Chinese herb dealers speculate more than 90% have been fumigated.

中藥經銷商猜測的90%以上已被熏蒸。



Purpose of sulfur fumigation (Sulfur dioxide)

硫磺熏蒸目的(二氧化硫)

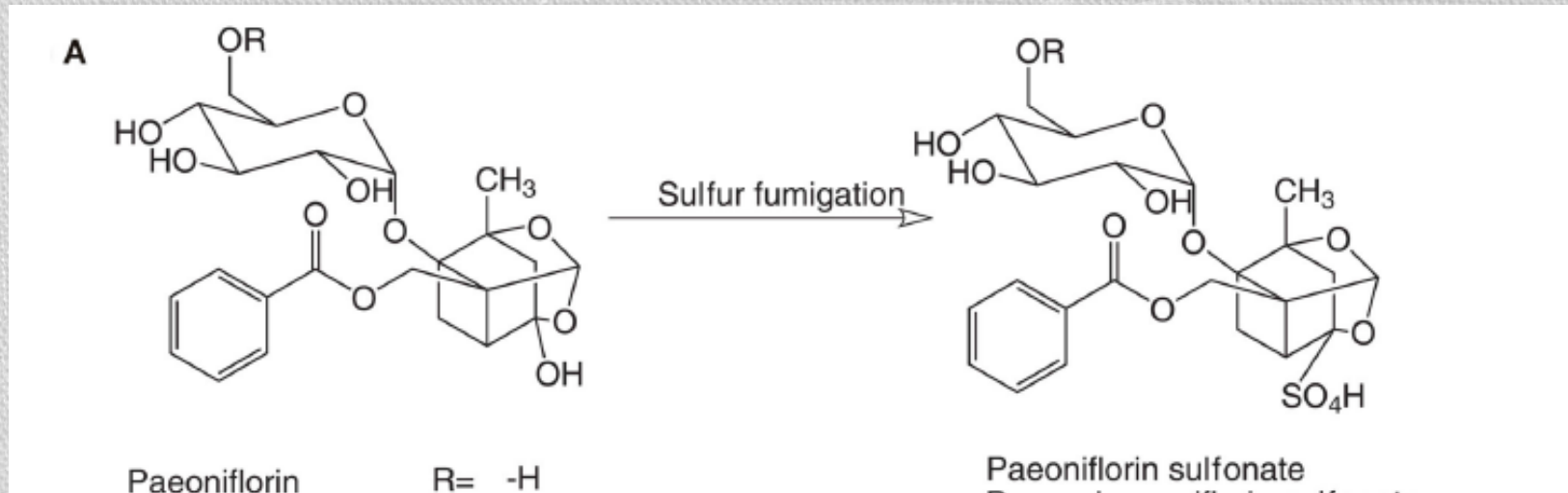
- faster drying compared to sun drying
 - ward off insect
 - reduce mold & microbial contamination
 - enhance whitish appearance
- Herbs can also be treated with sulfiting agents e.g. Sodium Sulfite, Potassium Sulfite, Bisulfite to preserve its moist fresh appearance and color.
亞硫酸鈉, 亞硫酸鉀, 亞硫酸氫鹽

Pathophysiological effect of Sulfur 硫的病理作用

- Sulfur dioxide 二氧化硫 becomes sulfuric acid 硫酸 when in contact with mucous membrane.
- Irritation of mucous membrane induces mild bronchoconstriction, reduce pulmonary function 降低肺功能 especially in asthmatic demographic 哮喘人口
- Dermatological: urticaria, angioedema, swelling. 蕁麻疹, 血管神經性水腫, 腫脹。
- Gastrointestinal: n/v, diarrhea 噁心, 嘔吐, 腹瀉
- Other: Hypotension, seizure, syncope & death 低血壓, 癲癇發作, 暈厥及死亡

Bioactive alteration by sulfur 硫磺改變有效成分

- 1 hour of SO₂ exposure reduced peoniflorin 芍藥苷 (a marker of BaiShao quality) by 40%, forming new peoniflorin sulfonate derivatives 芍藥苷磺酸鹽衍生物。



Wang et al (2005) Simultaneous LC determination of major constituents in red and white peony root. Chromatographic 62, 581-588

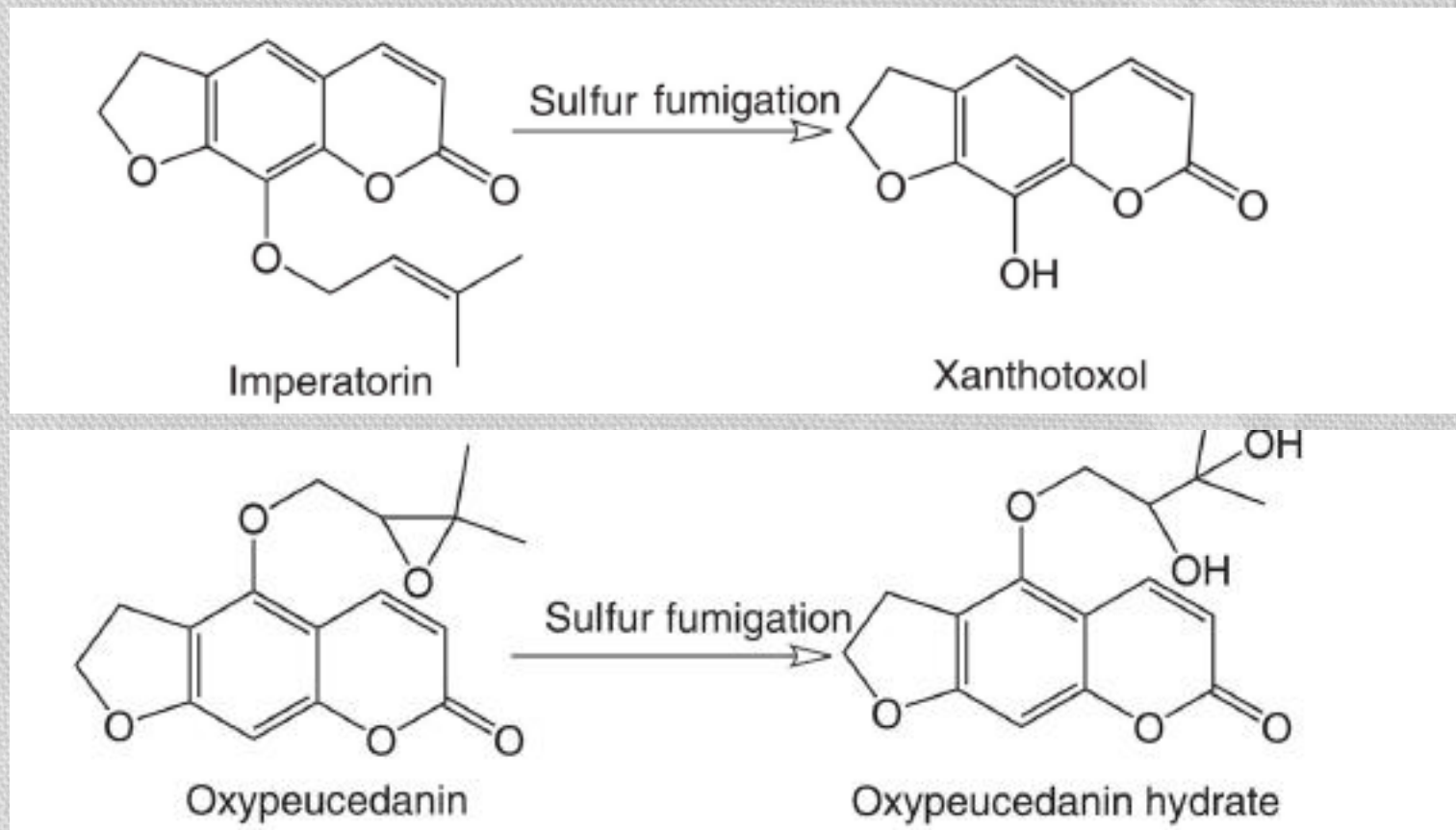
Bai Shao 白芍



Unsulfured, unbleached.
未硫磺, 未漂白

Local Wholesaler
本地批發商

- As compared to sun dried Bai Zhi 白芷 expected of Good Agricultural Practice (GAP), fumigated BaiZhi had 60% loss of imperatorin and almost total loss of oxypeucedanin 氧化前胡素 (key bioactive compounds)



Bai Zhi 白芷



Unsulfured, unbleached.
未硫磺, 未漂白

Local Wholesaler
本地批發商

- In 2011 the State Food & Drug Admin 中國國家食品藥品監督管理 prohibits sulfur fumigation for bleaching and processing of herbs with the exception of 11 herbs permitted to have SO_2 residual less than 400 ppm.
- (Huai) Niu Xi, Tian Men Dong, Bai Zhu, Bai Ji, Dang Shen, Shan Yao, Tian Ma, Gan Sui, Bai Shao, Fen Ge, Tian Hua Fen 懷牛膝, 天門冬, 白朮, 白芨, 黨參, 山藥, 天麻, 甘遂, 白芍, 粉葛, 天花粉
- All other non-fumigated herbs is permitted 150ppm.
- CFIA 加拿大食品檢驗局 labels requires declaration of >10 ppm of sulphite
- There is no enforcement of this law.

Detection of Sulfur-Fumigated *Paeoniae Alba Radix* in Complex Preparations by High Performance Liquid Chromatography Tandem Mass Spectrometry

Jie Wu ¹, Hong Shen ¹, Jun Xu ¹, Ling-Ying Zhu ¹, Xiao-Bin Jia ² and Song-Lin Li ^{1,*}

¹ Department of Pharmaceutical Analysis and Metabolomics,
Jiangsu Province Academy of Traditional Chinese Medicine, Nanjing 210028, China

- Demonstrated both peoniflorin and peoniflorin sulfonate is detectable in water decoction.
- Demonstrated 16 out of 17 BaiShao samples from regional TCM pharmacies contained peoniflorin sulfonate
- All 7 extracted granule 提取顆粒 formulas tested containing BaiShao from 7 different Chinese manufacturers contained peoniflorin sulfonate 芍藥苷磺酸鹽.
- Granules are extracted for the same post-harvest fumigated herbs, do not assume they are safer than raw herbs. 顆粒提取相同的收穫後熏蒸藥材, 不要以為他們比原藥材更安全。

Testing & Certification

測試與認證

- Wild-crafted v.s. Lab-testing v.s. Organic
野生製作 v.s. 實驗室測試 v.s. 有機
- Wild-crafted 野生耕作: uncultivated (is not necessarily free from pesticide and heavy metal and sulfur)
非耕作 (不等於無農藥和重金屬和硫)
- Lab-tested 實驗室測試: undetected pesticide, heavy metal & sulfur (未檢測的農藥, 重金屬和硫)
- Organic 有機: use of organic farming methods. Expensive certification cost. Organic certification occurs in multiple stages from growing to packaging. 採用有機耕作方法。昂貴的認證費用。有機認證發生在多個階段從種植到包裝。

Dan Shen 丹蔘



Wild-crafted 野生耕作



Cultivated 種植耕作

CERTIFICATE OF ANALYSIS

Latin Name:	Radix Angelicae Sinensis	Pinyin Name:	Dang Gui
Botanical Source:	Angelica sinensis (Oliv.) Diels	Batch No.:	090201H003
Plant Part Used:	Root	Batch Quantity:	9700kg
MFTD Date:	Mar. 5, 2009	Issue Date:	May 9, 2009
Expiry Date:	Mar. 5, 2014		
Testing Reference:	Quality Standard of Radix Angelicae Sinensis		

Test				
Analysis	Specification	Results	Test Methods	Detection Limits
Identity	Macroscopical Complies	Complies	Visual & Organoleptic, CP2005	
	Microscopical Complies	Complies	CP2005	
	TLC Positive	Positive	TLC, CP2005	
Impurity	<1.0%	Complies	Appendix IX A, CP2005	
Water	<12.0%	11.35%	Appendix IX H, CP2005	
Total Ash	<7.0%	5.5%	Appendix IX K, CP2005	
Acid-insoluble ash	<2%	1.2%	Appendix IX K, CP2005	
Ethanol Extractives	>45.0%	57.6%	Appendix X A, CP2005	
Assay				
Ferulic acid (C ₁₀ H ₁₀ O ₄)	≥0.05%	0.14%	HPLC	
Heavy Metals				
Lead (Pb)	<5ppm	2.4ppm	AAS, Euro Pharm	0.05ppm
Cadmium (Cd)	<0.2ppm	<0.05ppm	AAS, Euro Pharm	0.01ppm
Mercury (Hg)	<0.1ppm	<0.01ppm	AAS, Euro Pharm	0.01ppm
Pesticides Residue				
Organophosphorpestizide	Euro Pharm	Negative	GC, Euro Pharm	4.0ppm
Organochlorpestizide	Euro Pharm	Negative	GC, Euro Pharm	3.0ppm
Pyrethroide	Euro Pharm	Negative	GC, Euro Pharm	3.0ppm
Piperonylbutoxid	Euro Pharm	Negative	GC, Euro Pharm	3.0ppm
Microbiological Tests				
Total Plate Count	<10 ⁷ fu/g	Complies	Appendix XIII C, CP2005	10cfu/g
Yeast & Mold	<10 ⁵ cfu/g	Complies	Appendix XIII C, CP2005	10cfu/g
E. Coli	<10 ³ cfu/g	Complies	Appendix XIII C, CP2005	10cfu/g
Salmonella	Negative	Negative	Appendix XIII C, CP2005	1cfu/25g
Conclusion	This product complies with specifications.			
Package	1pound/bag			
Storage	Preserve in a cool and dry place, protected from moisture and moth.			
Shelf Life	5 years when stored properly.			



CCOF
Certification Services, LLC

Client Profile

Spring Wind Herbs, Inc.

2325 4th Street, Suite 6

Berkeley, CA 94710 US

Phone: 510-849-1820, Fax: 510-849-4886

swherbs@earthlink.net, www.springwind.com

Client Code: pr493

Date Issued: 07/17/2014

CCOF Certified Since: 4/12/2006

Type of Operation: Handling (04/12/2006)

This Client Profile lists the land, products, crops, livestock, brands and services enrolled in the CCOF certification program. This document is provided as a customer service only and does not constitute a certificate. Use MyCCOF Supplier Management to track current certification status and access certificates and client profiles directly. Visit ccof.org/myccof to sign up.

Products (100% Organic):

Product	Details	Brand Name	Date	Compliance
Chinese Herbs	Alisma Rhizome	Spring Wind Herbs	11/19/2009	NOP
Chinese Herbs	American Ginseng	Spring Wind Herbs	4/12/2006	NOP
Chinese Herbs	Angelica, Tang kuei	Spring Wind Herbs	3/19/2009	NOP
Chinese Herbs	Arctium Fruit	Spring Wind Herbs	7/25/2008	NOP
Chinese Herbs	Arisaema Rhizome, Jack-In-The-Pulpit	Spring Wind Herbs	5/15/2009	NOP
Chinese Herbs	Artemisia Annuae	Spring Wind Herbs	7/24/2008	NOP
Chinese Herbs	Astragalus	Spring Wind Herbs	10/14/2008	NOP
Chinese Herbs	Atractylodes Rhizome	Spring Wind Herbs	4/12/2006	NOP
Chinese Herbs	Atractylodes Rhizome, White	Spring Wind Herbs	11/19/2009	NOP
Chinese Herbs	Bupleurum	Spring Wind Herbs	4/12/2006	NOP
Chinese Herbs	Chinese Pulsatilla Root	Spring Wind Herbs	5/15/2009	NOP
Chinese Herbs	Chrysanthemum flower, oven-dried/sun-dried	Spring Wind Herbs	11/19/2009	NOP
Chinese Herbs	Cimicifuga, Bugbane Rhizome	Spring Wind Herbs	5/15/2009	NOP
Chinese Herbs	Clematis Root	Spring Wind Herbs	7/3/2014	NOP
Chinese Herbs	Codonopsis, Codonopsis Root	Spring Wind Herbs	4/12/2006	NOP

CCOF
Certification Services, LLC

hereby certifies that

SPRING WIND HERBS, INC.

2325 4th Street, Suite 6

Berkeley, CA 94710 US

Meets National Organic Standards established by the
USDA National Organic Program for:

Handling (04/12/2006)

Since the Date of:

April 12, 2006

Certification is valid until surrendered, suspended, or revoked per
USDA NOP section 205.404(c). Certified operations are required to
submit annual updates to CCOF by January 1 of each year.

Information regarding products, crops, parcels, etc.,
is available on the CCOF Client Profile.

Client Code: pr493

CCOF certified since: 04/12/2006

Certificate issued: 07/17/2014



Jake Lewin

Jake Lewin
President

CCOF certified, USDA Accredited 美國農業部有機認可



- | | | |
|----------------------|----------------------|-------------------------|
| 1. Bai Guo Ye 白果葉 | 16. Fu Ling 茯苓 | 31. Mu Tong (Chuan) 川木通 |
| 2. Bai Ji Li 白蒺藜 | 17. Gan Jiang 乾薑 | 32. Mu Zei 木賊 |
| 3. Bai Jiang Cao 敗醬草 | 18. Gou Qi Zi 枸杞子 | 33. Nu Zhen Zi 女貞子 |
| 4. Bai Tou Weng 白頭翁 | 19. Guan Zhong 貫衆 | 34. Qing Hao 青蒿 |
| 5. Bai Xian Pi 白蘚皮 | 20. Han Fang Ji 漢防己 | 35. Rou Gui 肉桂 |
| 6. Cang Er Zi 蒼耳子 | 21. Hu Zhang 虎杖 | 36. Sang Ji Sheng 桑寄生 |
| 7. Cang Zhu 蒼朮 | 22. Huang Qin 黃芩 | 37. Sha Shen 沙參 |
| 8. Chai Hu 柴胡 | 23. Huang Qi 黃耆 | 38. Wei Ling Xian 威靈仙 |
| 9. Che Qian Cao 車前草 | 24. Jie Geng 桔梗 | 39. Wu Jia Shen 五加參 |
| 10. Che Qian Zi 車前子 | 25. Jing Jie 荊芥 | 40. Wu Wei Zi 五味子 |
| 11. Chi Shao 赤芍 | 26. Ku Shen 苦參 | 41. Xiao Mai 小麥 |
| 12. Chong Wei Zi 茺蔚子 | 27. Lian Qiao 連翹 | 42. Yi Mu Cao 益母草 |
| 13. Da Huang 大黃 | 28. Ling Zhi 靈芝 | 43. Yin Yang Huo 淫羊藿 |
| 14. Dang Shen 黨參 | 29. Long Dan Cao 龍膽草 | 44. Yu Zhu 玉竹 |
| 15. Di Yu 地榆 | 30. Lu Han Cao 鹿含草 | |

Long Dan Cao 龍膽草



Gentianna triflora

Organic 有機

Gentianna manshurica Radix

PaoZhi (processing) 炮製



Long Dan Xie Gan Tang 龍膽瀉肝湯

龍膽草 (酒炒) Long Dan Cao (Jiu Chao)

柴胡 Chai Hu

黃芩 (酒炒) Huang Qin (Jiu Chao)

梔子 (酒炒) Zhi Zi (Jiu Chao)

木通 Mu Tong

車前子 Che Qian Zi

澤瀉 Ze Xie

生地黃 (酒炒) Sheng Di Huang (Jiu Chao)

當歸 (酒炒) Dang Gui (Jiu Chao)

甘草 Gan Cao

Action: 瀉肝火而清利下焦濕熱。故治脅痛、口苦、目赤、耳聾等肝火上逆，亦治小便淋瀝，陰腫陰癢等濕熱下注之證。

Drain Liver Fire, drain DampHeat from Lower Jiao. Indicated for hypochondriacal pain, bitter taste, red eyes, ear deafness etc. Liver Fire upward reversal, also treat Lin-strangurea syndrome, DampHeat pouring downward pattern such as genital swelling, genital itching.





- Prescription & Dispensing is verified by R.TCMP.
- Cooking water meets USP (United States Pharmacopeia 美國藥典) purification standards.
- Heat-resistant BPA-free packaging is approved by CFIA.
- Herbs are decocted and packaged in a negative pressure environment to minimize contamination.
- Facility is YorkSafe compliant (York Region Public Health Inspection).





長江中藥有限公司

安全認證 精華萃取
905-305-6868 www.riverherbs.ca

備註：冰櫃裡冷藏可保存長達30天。

540. 前代諸
水感機代平
熟光器到費
入前在舍對
通用。和神
後飲用每幾
直。飲物如
包象子。白
廣紙其不
再入用者

如果出成鐵包模煉成鋼後

[illegible]

長江中藥有限公司

安全認證 精華萃取
905-305-6868 www.riverherbs.ca

本藥經冷藏可保存長達30天。

分打...
5-10...
光緒...
人往...
浸...
...
直...
包...
...
...
...

...是出產與包種茶或烏龍茶...

[illegible]



RIVER HERBS



Instantly automate your herbal medicine dispensing

River Herbs saves you time and space. Our pre-cooked and ready to drink herbal medicine is both convenient and easy for your patients. Give your patients the medicine they need, and let us prepare them for you. We offer practitioners and herbalists wholesale pricing, please register and try our unique River Ordering System (ROS). Our automated herbal dispensary can help you stay focused on your patients and ensure better compliance. If you are looking to take your practice to the next level, make sure you connect with River Herbs.

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