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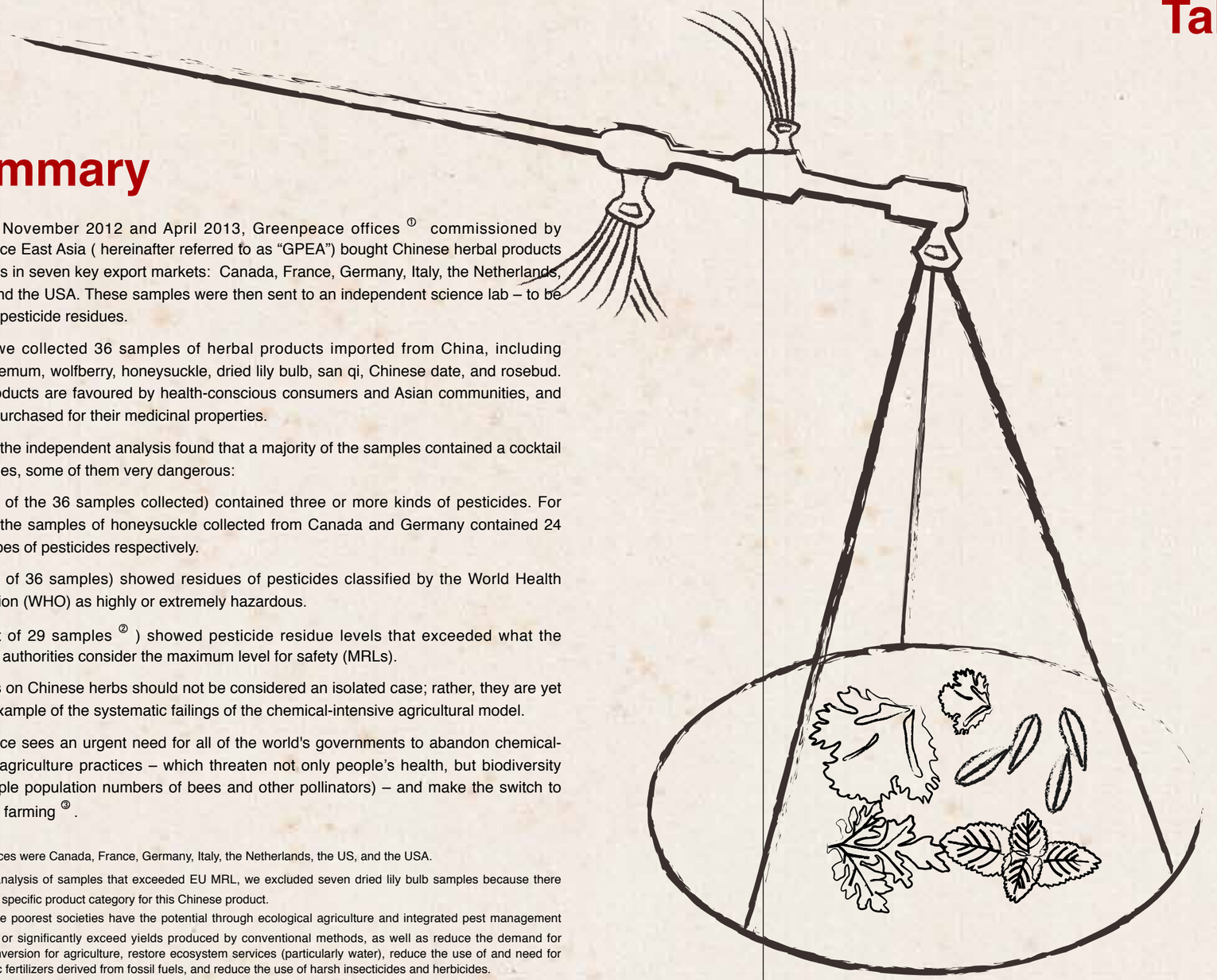
Chinese Herbs:

Elixir of Health or Pesticide Cocktail?

Results of Sample Testing from Seven Countries



Summary

Between November 2012 and April 2013, Greenpeace offices [1] commissioned by Greenpeace East Asia (hereinafter referred to as “GPEA”) bought Chinese herbal products from shops in seven key export markets: Canada, France, Germany, Italy, the Netherlands, the UK, and the USA. These samples were then sent to an independent science lab – to be tested for pesticide residues.

In total, we collected 36 samples of herbal products imported from China, including chrysanthemum, wolfberry, honeysuckle, dried lily bulb, san qi, Chinese date, and rosebud. These products are favoured by health-conscious consumers and Asian communities, and they are purchased for their medicinal properties.

However, the independent analysis found that a majority of the samples contained a cocktail of pesticides, some of them very dangerous:

• 32 (out of the 36 samples collected) contained three or more kinds of pesticides. For example, the samples of honeysuckle collected from Canada and Germany contained 24 and 26 types of pesticides respectively.

• 17 (out of 36 samples) showed residues of pesticides classified by the World Health Organization (WHO) as highly or extremely hazardous.

• 26 (out of 29 samples [2]) showed pesticide residue levels that exceeded what the European authorities consider the maximum level for safety (MRLs).

Pesticides on Chinese herbs should not be considered an isolated case; rather, they are yet another example of the systematic failings of the chemical-intensive agricultural model.

Greenpeace sees an urgent need for all of the world's governments to abandon chemical-intensive agriculture practices – which threaten not only people’s health, but biodiversity (for example population numbers of bees and other pollinators) – and make the switch to ecological farming [3] .

[1] The offices were Canada, France, Germany, Italy, the Netherlands, the US, and the USA.

[2] In our analysis of samples that exceeded EU MRL, we excluded seven dried lily bulb samples because there wasn't a specific product category for this Chinese product.

[3] Even the poorest societies have the potential through ecological agriculture and integrated pest management to meet or significantly exceed yields produced by conventional methods, as well as reduce the demand for land conversion for agriculture, restore ecosystem services (particularly water), reduce the use of and need for synthetic fertilizers derived from fossil fuels, and reduce the use of harsh insecticides and herbicides.

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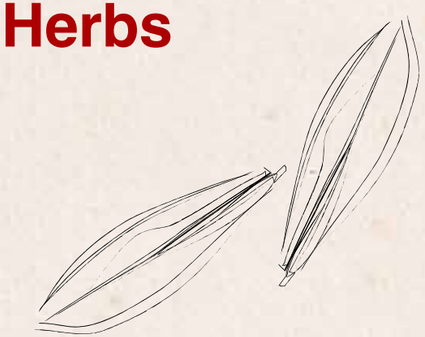
Uses and Scope of Chinese Herbs



Traditional Chinese medicine has a long history in China and is a treasured part of Chinese culture. Chinese herbs used in traditional Chinese medicine are largely derived from natural ingredients and their processed products. According to data from the third national survey on Chinese medicine resources[4], China has 12,807 kinds of Chinese medicine resources, including herbal plants (their roots, stems, flowers and fruit), animal parts, and minerals. Herbal plants have 11,146 different varieties. In traditional Chinese medicine theory, Chinese herbs are not only an alternative to Western medicine, but also an important part of the Chinese people's daily diet. Chrysanthemum, honeysuckle and other herbs, for example, are directly soaked in water or made into other beverages. Wolfberries, lily bulbs, ginseng and other herbal ingredients have a wide range of uses in medicinal soups and other dishes. Fennel, dried ginger, and prickly ash, also classified as Chinese herbs, are used in everyday Chinese cooking as seasonings.

[4] There have been three national surveys conducted on Chinese medicine resources. The third survey was conducted between 1983 and 1987. The fourth survey is currently being carried out. [rev 2011 Nov 6; cited 2013 May 14] Available from: http://www.gov.cn/jrzg/2011-11/06/content_1986952.htm

The Overseas Market for Chinese Herbs

Chinese medicinal herbs are a gift from nature and a cultural heritage stemming back thousands of years. Sadly, these precious plant species have now become the latest “victims” of chemical-intensive agriculture.

Traditional Chinese medicine, mostly based on natural therapies, is becoming increasingly known and accepted in the Western world. Treatment using traditional Chinese medicine is available in many European hospitals, backed by scientific evidence that proves, to some degree, their effectiveness [5] . Examples include pain relief through acupuncture and morning sickness relief by ginger extracts. One of the basic tenets of Chinese herbs is that many plants, either as medicine or food, are good for health. A growing number of Westerners have shown an interest in taking Chinese herbs resulting in an increased presence in Western markets. Export volumes of Chinese herbs from China in 2011 amounted to 2.33 billion US dollars, with an annual increase rate of 36.48% compared to that of the previous year .

GPEA recently published a report “Chinese Herbs: Elixir of Health or Pesticide Cocktail? - Investigation Report on Chinese Herbs and Pesticides”. Chinese herbs, purchased from nine Chinese herbal medicine companies, were tested, and three herbal medicine producing regions were investigated. Our independent analysis discovered that, in spite of the trust consumers and patients have in the health benefits of Chinese herbs, the Chinese herb farming model is heavily dependent on the use of chemical pesticides. The presence of pesticide residue in herbs also indicates.

Chinese herbs grown in China are sold in Europe and North America. To get a better picture of the pesticide residues present in Chinese herbs currently on the market, Greenpeace East Asia also tested seven kinds of Chinese herbs that were produced in China but sold overseas. We hereby present key results from our investigation into the pesticides on exported Chinese herbs.

[5] NHS Choice. “CHM: What is evidence”. Available from http://www.nhs.uk/Livewell/complementary-alternative-medicine/Pages/what-is-scientific-evidence.aspx

Sample Testing Method and Results

Between November 2012 and April 2013, Greenpeace offices selected seven kinds of Chinese herbs for testing, namely: chrysanthemum, wolfberry, honeysuckle, dried lily bulb, san qi root, Chinese date and rosebud. We purchased a total of 36 products from Canada, France, Germany, Italy, the Netherlands, the UK and the USA (see annex 1). 500 grams of each product were bought, sealed individually in a secure pouch to prevent cross-contamination, and sent to an independent third party laboratory. Below are the key findings:

1.Majority of Samples Contained a Cocktail of Pesticides

All samples were found to contain pesticide residues, except for one Chinese date sample in Germany. 32 out of 36 samples contained three or more kinds of pesticides. A honeysuckle sample from Canada contained the highest number of pesticide residues, with 26 different types of pesticides. The lily bulb samples had a lower end number of different residues, but still had between 1-7 kinds depending on the country (figure 1). Such large numbers of different pesticides found on individual samples is known as the "cocktail effect", as the combination of different pesticides may have an effect more dangerous than simply an individual one (synthetic effect). There has so far been relatively little research on the toxicological effect of ingesting a mixture of pesticides, but based on the precautionary principle continuous exposure should be avoided.

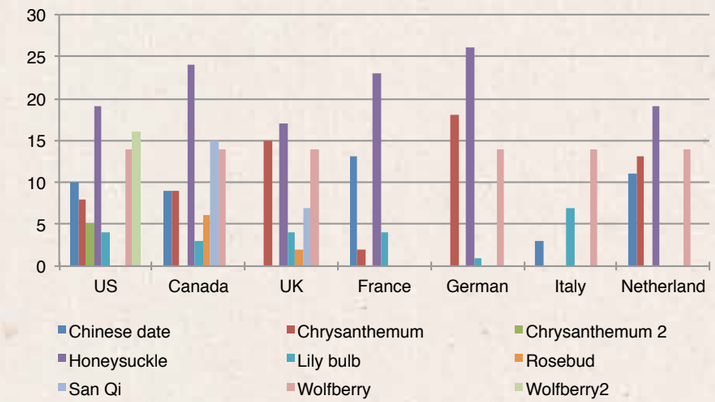


Figure 1: Multiple types of pesticide residues found in seven Chinese herbal products tested in seven countries [6]

[6] Not all products were available for purchase in each country, thus an absent bar means the product was not tested in that country.

2.Several Samples Revealed Pesticides Classified by the WHO as Extremely or Highly Hazardous (WHO Ia & Ib)

Nearly half of the samples (17 of the 36 samples) contained residues of pesticides classified by the WHO as extremely or highly hazardous (class Ia and Ib). These include carbofuran, phorate, and triazophos, albeit at low concentrations (table 1). Pesticides classified by the WHO as 'WHO Ia & Ib' are considered to be a highly acute risk to health. Acute pesticide poisoning may happen when a person is directly exposed to these pesticides. Acute pesticide poisoning is unfortunately a relatively frequent occurrence in the agricultural industry. A study undertaken between 1998-2005 examined 3,271 acute pesticides poisoning cases in American agricultural farmers, and suggested that acute pesticide poisoning in the agricultural industry continues to be a significant problem[3] . This is of greater concern in developing countries where farmers tend to use less protection and are less informed regarding usage instruction when spraying pesticides.

			Number of products, where found	Range of residue levels found (mg/kg)	Countries where the samples were bought
Extremely Hazardous	WHO class Ia	Ethoprophos	1	0.09	Canada
		Phorate	3	0.006-0.01	Canada, Italy, France
Highly Hazardous	WHO class Ib	Carbofuran	10	0.007-0.08	US, France, Italy, UK, Netherland, Germany, Canada
		Omethoate	5	0.01	France, Germany, Canada
		Methamidophos	1	0.14	Canada
		Methomyl	2	0.005-0.008	Germany, Canada
		Triazophos	4	0.02-0.17	US, Germany, Netherland

Table 1: Presence of pesticide residue classified as WHO Ia and Ib

3. 26 Out of 29 Samples Had Residue Levels Higher than the EU Maximum Residue Limits (MRL)

While EU MRLs should not be taken as a guarantee of safe levels of toxic chemicals, 26 out of the 29 samples had pesticide residues that exceeded EU MRLs. Lily bulb samples are not considered in the analysis of residue levels exceeding EU MRLs since there was no product category specific to this Chinese herb product [7]. Fungicide thiophanate-methyl was found in honeysuckle samples bought in all six countries at levels exceeding EU MRLs. According to classifications by the WHO, thiophanate-methyl is a chemical of low acute toxicity. However, both the EU and the Australian government define it as having potential harm to the respiratory system and aquatic organisms[4] (see figure 2 for pesticide residues on the six honeysuckle samples purchased in six countries).

MRL: Not a guarantee for food safety

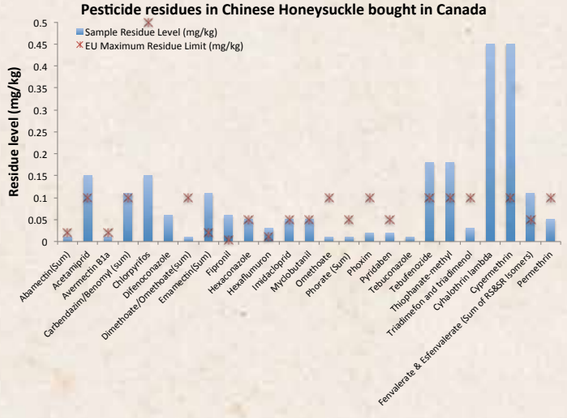
The establishment of MRLs takes farming practices into consideration, and is used for management purposes. Assumptions made by toxicity studies in the lab are that a certain level of pesticide exposure is acceptable or at least unavoidable. However, what has been often neglected in these studies is that long-term exposure to any dosage of chemical pesticides might pose a considerable threat to people's health.

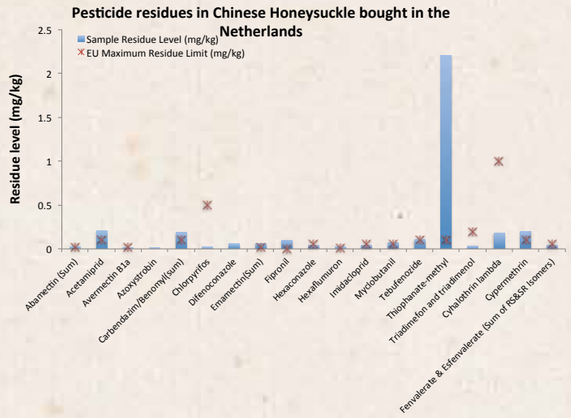
[7] The MRL standards for each product are based on the groups of product classification under EU No. 212/2013. These standards are defined by EC No. 296/2005 which was updated on 17/04/2013. Each sample's product category within the EU MRL standards are:

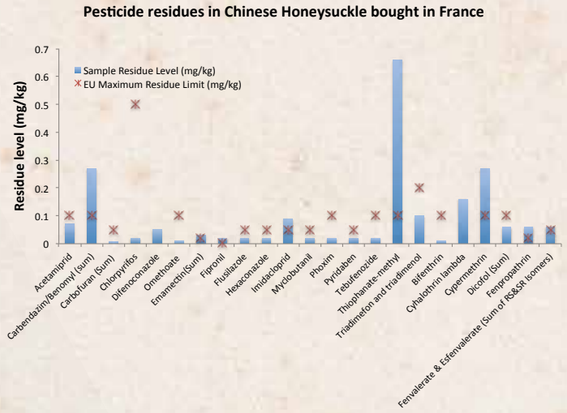
1) Wolfberry: category with code number 231010 - tomatoes (Cherry tomatoes, tree tomato, Physalis, gojiberry, wolfberry (Lycium barbarum and L. Chinese))
2) Chinese Date: category with code number 0140040 - plums (under category stone fruit, examples of varieties include Red date/ Chinese date/Chinese jujube)
3) Honeysuckle, Chrysanthemum, Rosebud: category with code 631990 – others (under the category of herbal infusions (dried) - (a) flowers)
4) San Qi powder, San Qi root: category with code 633990 – others (under the category of herbal infusions (dried) - (c) roots)

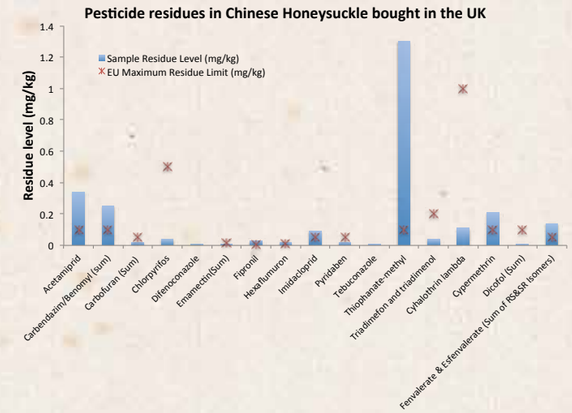
The EU classifies[5] carbendazim as a chemical that could potentially harm the unborn child, affect male fertility, and cause inheritable genetic damage. And yet this chemical was the most commonly found pesticide from 25 of the samples, with 11 of the samples exceeding the EU's MRL.

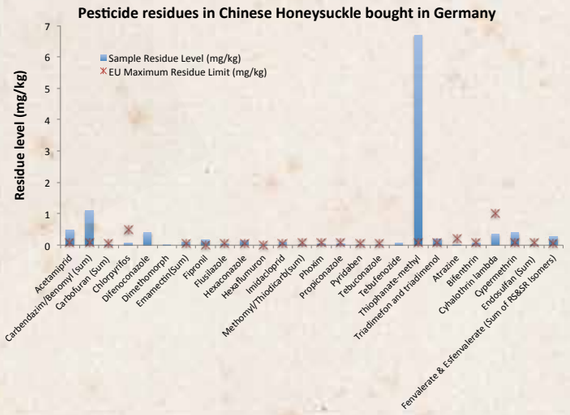
Many of the samples contained several pesticides exceeding the EU MRLs. For example, a sample of Coconut Tree branded honeysuckle in Germany tested positive for 26 different pesticides, nine of them exceeding EU MRLs. Of the chrysanthemum bought in Britain, 15 pesticides were detected and eight of them exceeded EU MRLs (annex 2).

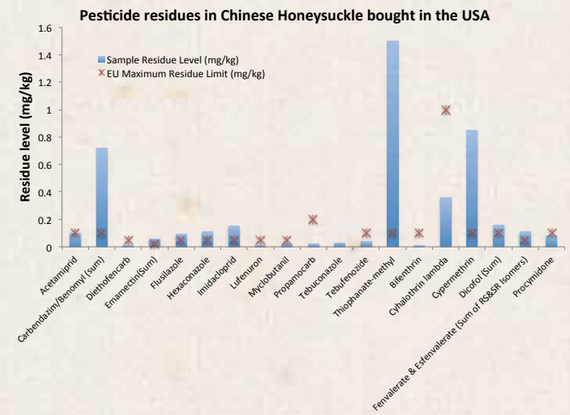












Conclusions and Suggestions: the Solution is Ecological Farming

1.Just Another Example of the Systemic Failure of Chemical-intensive Agriculture

Pesticide contamination of Chinese herbs should not be viewed as an exceptional case, but rather yet another example of failure by the chemical-intensive agricultural model in China and around the world. The reliance on chemical pesticides is so heavy that even natural herbs, which have a reputation for being healthy, are now contaminated by pesticides. In addition, we found the presence of extremely hazardous pesticides that may come from deliberate application on the plants, or contamination from the environment due to historical use.

Although a large amount of pesticide is used, only a small percentage reaches the target crops. The majority ends up in the environment – the soil, water and atmosphere, which then has a negative impact on non-target organisms, and destroys the ecological balance of the surrounding environment. For example, a recent Greenpeace International report Bees in Decline reviewed the key factors affecting the decline in populations of bees and other pollinators. The report concludes that the use of certain chemical pesticides is one of the factors responsible for bee decline globally. The study also highlights the ecological and economic importance of healthy bee populations and stresses the urgent need to eliminate the use of top-ranking bee harming pesticides .

Chemical pesticides also kill many insects that can be beneficial for natural pest control in the farm. This is one reason why chemical pesticides make it harder to avoid pest damage in the crop, leading to an increase in incidence of damage by pests and disease. Thus, in the long term, chemical-intensive agriculture becomes more vulnerable to pest damage and requires greater and greater use of pesticides. This means higher costs for farmers and higher risks to all of us due to the presence of toxics chemicals in agriculture. In short, the impact on the environment by this current form of agriculture has become tremendously damaging.

2.Getting off the Chemical Treadmill: Ecological Farming is the Solution

Ecological farming protects soil, water resources, the climate and biodiversity. It does not use chemical fertilizers or pesticides, rather a variety of modern, ecological farming technologies and techniques to keep the environment clean and maintain the ecological balance. Ecological farming advocates species and crop diversification. It stresses the inter-dependence of natural resources, such as protecting biodiversity, recycling nutrients, promoting soil regeneration, and the good use of all natural resources of the whole ecosystem. It is a much more flexible and effective agricultural strategy, particularly under erratic climatic changes.

In their purest form, Chinese herbs should represent nature, without chemical pollution. In order to create an uncontaminated environment for the farming of Chinese herbs, we need to abandon the current chemical agricultural model and switch to an ecological model. Policy makers should generate and reward policy options that encourage sustainable and environmental practices. Examples include incentives to promote integrated pest management, payment to farmers and local communities for ecosystem services, facilitating and providing incentives for alternative markets such as green products , and moving towards an ecological farming model.

Reference

[1] 张惠源，赵润怀，袁昌齐，孙传奇，张志英．我国的中药资源种类．《中国中药杂志》，1995年07期。

[2] 中国医药保健品进出口商会，2011 年中国医药保健品进出口统计 . [report on the internet]. [rev 2010 Feb 7; cited 2013 May 20]. Available from: http://www.cccmhpie.org.cn/Pub/3317/47889.shtml

[3] Geoffrey M. Calvert MD, MPH1*, Jennifer Karnik MPH1, Louise Mehler PHD, MD2, John Beckman BS3, Barbara Morrissey MS4, Jennifer Sievert BA5, Rosanna Barrett MPH6, Michelle Lackovic MPH7, Laura Mabee BA8, Abby Schwartz MPH9, Yvette Mitchell MS10, Stephanie Moraga-McHaley MS11. Acute pesticide poisoning among agricultural workers in the United States 1998–2005. American Journal of Industrial Medicine, Volume 51, Issue 12, pages 883–898, December 2008.

[4] Thiophanate-methyl, classified by the EU as possibly causing harm to the respiratory system, under Dir. 67/548/EEC, and very toxic to aquatic life with long lasting effects, under Reg. 1272/2008.

[5] Classified by the EU as possibly causing harm to unborn children, impairing fertility and causing inheritable genetic damage, Dir. 67/548/EEC.

[6] Greenpeace, "Bees in Decline", a review of factors that put pollinators and agriculture in Europe at risk. [report on the internet]. [rev 2013 Apr 9; cited 2013 May]. Available from: http://www.greenpeace.org/international/en/publications/Campaign-reports/Agriculture/Bees-in-Decline/.

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[9] Rockstrom, J., Steffen, W., Noone, K., Persson, A., Chapin, F. S., Lambin, E. F., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sorlin, S., Snyder, P. K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R. W., Fabry, V. J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P. & Foley, J. A. 2009. A safe operating space for humanity. Nature, 461: 472-475.

[10] IAASTD. International assessment of agricultural knowledge, science and technology for development, Synthesis report[R]. USA: IAASTD, ISBN 978-1-59726-550-8, 2009.

Annex 1: International Sample List

No.	Brand	Sample	Purchase Date	Country
1	KW	Honeysuckle	2013/3/25	Canada
2	KW	Chinese date	2013/3/25	Canada
3	Double Deer	Chrysanthemum	2013/3/25	Canada
4	Tune Ren Hong	San Qi Powder	2013/3/26	Canada
5	Sailing Boat brand	Dried Lilybulb	2013/3/26	Canada
6	Golden Leopard	Rosebud	2013/3/26	Canada
7	KW	Wolfberry	2013/3/25	Canada
8	Longevity	Honeysuckle	2013/3/19	France
9	EAglobe	Chrysanthemum	2013/3/19	France
10	EAglobe	Dried Lilybulb	2013/3/19	France
11	Longevity	Chinese date	2013/3/20	France
12	Three Coconut Tree	Honeysuckle	2013/3/20	Germany
13	Three Coconut Tree	Dried Lilybulb	2013/3/20	Germany
14	Three Coconut Tree	Chrysanthemum	2013/3/20	Germany
15	Three Coconut Tree	Wolfberry	2013/3/20	Germany
16	Three Coconut Tree	Chinese date	2013/3/20	Germany
17	Teng Guan	Chinese date	2013/3/19	Italy
18	Longevity	Dried Lilybulb	2013/3/19	Italy
19	Longevity	Wolfberry	2013/3/19	Italy
20	GoldenDiamond	Chrysanthemum	2013/3/19	Netherlands
21	GoldenDiamond	Honeysuckle	2013/3/19	Netherlands
22	GoldenDiamond	Chinese date	2013/3/19	Netherlands
23	GoldenDiamond	Wolfberry	2013/3/19	Netherlands
24	Tongrentang	Honeysuckle	2013/3/14	UK
25	Tongrentang	Chrysanthemum	2013/3/14	UK
26	Tongrentang	Wolfberry	2013/3/14	UK
27	Tongrentang	San Qi Root	2013/3/14	UK
28	Tongrentang	Dried Lilybulb	2013/3/14	UK
29	Tongrentang	Rosebud	2013/3/14	UK
30	Sen Ji	Chrysanthemum	2012/11/18	US
31	Ben Cao	Wolfberry	2012/11/18	US
32	Ben Cao	Honeysuckle	2013/3/14	US
33	Lam Sheng Kee	Chinese date	2013/3/14	US
34	Ben Cao	Chrysanthemum	2013/3/14	US
35	Humei Foods	Wolfberry	2013/3/14	US
36	Ben Cao	Dried Lilybulb	2013/3/14	US

Annex 2: International Sample Testing Results

WHO classification explanation:
Ia = Extremely hazardous; Ib = Highly hazardous; II = Moderately hazardous;
III = slightly hazardous; U = Unlikely to present acute hazard in normal use;
O = Obsolete as pesticide, not classified; *=not listed.
MRL EU "-": No specific product category for this Chinese product, therefore, MRL not listed

Canada

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
KW	Honeysuckle	24	Abamectin（Sum）	0. 01	0. 02		*
			Acetamiprid	0. 15	0. 1		*
			Avermectin B1a	0. 01	0. 02		*
			Carbendazim/Benomyl （sum）	0. 11	0. 1		U
			Chlorpyrifos	0. 15	0. 5		II
			Difenoconazole	0. 06	20		II
			Omethoate	0. 01	0. 1		Ib
			Emamectin（Sum）	0. 11	0. 02		*
			Fipronil	0. 06	0. 005	Y	II
			Hexaconazole	0. 05	0. 05		III
			Hexaflumuron	0. 03	0. 01		U
			Imidacloprid	0. 05	0. 05		II
			Myclobutanil	0. 05	0. 05		II
			Phorate （Sum）	0. 01	0. 05	Y	Ia
			Phoxim	0. 02	0. 1		II
			Pyridaben	0. 02	0. 05		II
			Tebuconazole	0. 01	50		II
			Tebufenozide	0. 18	0. 1		U
			Thiophanate-methyl	0. 18	0. 1		U
			Triadimefon and triadimenol	0. 03	0. 2		II
			Cyhalothrin lambda	0. 45	1		II
			Cypermethrin	0. 45	0. 1		II
			Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0. 11	0. 05		II
			Permethrin	0. 05	0. 1		II
Tune Ren Hong	San Qi Powder	15	Boscalid	0. 04	0. 5		U

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Tune Ren Hong	San Qi Powder	15	Carbendazim/Benomyl（sum）	0. 02	0. 1		U
			Dimethomorph	0. 05	0. 05		U
			Ethoprophos	0. 09	0. 02	Y	Ia
			Iprodione	0. 03	0. 1		III
			Oxadixyl	0. 02	0. 02		II
			Propargite	0. 01	0. 02		III
			Propham	0. 07	0. 1		*
			Pyraclostrobin	0. 01	0. 05		*
			Pyrimethanil	0. 01	0. 1		III
			Thiophanate-methyl	0. 35	0. 1		U
			Triadimefon and triadimenol	0. 13	0. 2		II
			HCH （Sum, without Lindan）	0. 04	0. 02	Y	II
			Procymidone	0. 22	0. 1		U
			Quintozene	0. 04	0. 1		u
KW	Chinese date	9	Omethoate	0. 01	0. 02		Ib
			Forchlorfenuron	0. 02	0. 05		U
			Imidacloprid	0. 04	0. 3		II
			Tebuconazole	0. 37	1		II
			Triadimefon and triadimenol	0. 03	0. 1		II
			Bifenthrin	0. 04	0. 2		II
			Cyhalothrin lambda	0. 02	0. 2		II
			Cypermethrin	0. 06	2		II
			Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0. 21	0. 02		II
Double Deer	Chrysanthemum	9	Acephate	0. 11	0. 05		II
			Acetamiprid	0. 06	0. 1		*
			Carbendazim/Benomyl(sum)	0. 29	0. 1		U
			Chlorpyrifos	0. 13	0. 5		II
			Hexaflumuron	0. 04	0. 01		U
			Imidacloprid	0. 09	0. 05		II
			Lufenuron	0. 03	0. 05		*
			Methamidophos	0. 14	0. 05	Y	Ib
			Cypermethrin	0. 09	0. 1		II
Sailing Boat	Dried Lilybulb	3	Carbendazim/Benomyl （sum）	0. 15	-		U
			Prochloraz	0. 02	-		II
			Thiophanate-methyl	0. 08	-		U
Golden Leopard	Rosebud	6	Carbendazim/Benomyl(sum)	0. 08	0. 1		U

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Golden Leopard	Rosebud	6	Carbofuran	0. 01	0. 05	Y	Ib
			Imidacloprid	0. 03	0. 05		II
			Methomyl/Thiodicarb (sum)	0. 005	0. 1		Ib
			Myclobutanil	0. 02	0. 05		II
			Triadimefon and triadimenol	1. 4	0. 2		II
KW	Wolfberry	12	Acetamiprid	0. 47	0. 15		*
			Amitraz (sum)	0. 1	0. 05		II
			Carbendazim/Benomyl (sum)	0. 18	0. 3		U
			Carbofuran (Sum)	0. 08	0. 01	Y	Ib
			Clofentezine	0. 1	0. 3		III
			Imidacloprid	0. 25	0. 5		II
			Myclobutanil	0. 05	0. 3		II
			Propargite	0. 09	2		III
			Pyridaben	0. 14	0. 3		II
			Thiophanate-methyl	0. 04	1		U
			Triadimefon and triadimenol	0. 17	1		II
			Cyhalothrin lambda	0. 02	0. 1		II

France

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Longevity	Honeysuckle	23	Acetamiprid	0.07	0.1		*
			Carbendazim/Benomyl (sum)	0.27	0.1		U
			Carbofuran (Sum)	0.007	0.05	Y	Ib
			Chlorpyrifos	0.02	0.5		II
			Difenoconazole	0.05	20		II
			Omethoate	0.01	0.1		Ib
			Emamectin(Sum)	0.03	0. 02		*
			Fipronil	0.02	0.005	Y	II

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Longevity	Honeysuckle	23	Flusilazole	0.02	0.05		II
			Hexaconazole	0.02	0.05		III
			Imidacloprid	0.09	0.05		II
			Myclobutanil	0.02	0.05		II
			Phoxim	0.02	0.1		II
			Pyridaben	0.02	0.05		II
			Tebufenozide	0.02	0.1		U
			Thiophanate methyl	0.66	0.1		U
			Triadimefon and triadimenol	0.1	0.2		II
			Bifenthrin	0.01	0.1		II
			Cyhalothrin lambda	0.16	1		II
			Cypermethrin	0.27	0.1		II
			Dicofol (Sum)	0.06	0.1		II
			Fenpropathrin	0.06	0.02		II
			Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0.06	0.05		II
EAglobe	Chrysanthemum	2	Omethoate	0.01	0.1		Ib
			Phorate (Sum)	0.01	0.05	Y	Ia
EAglobe	Dried Lilybulb	4	Carbendazim/Benomyl (sum)	0.22	-		U
			Chlorpyrifos	0.01	-		II
			Thiophanate-methyl	0.09	-		U
			Procymidone	0.04	-		U
Longevity	Chinese date	13	Carbendazim/Benomyl (sum)	0.08	0.5		U
			Chlorobenzuron	0.04	0. 01		*
			Difenoconazole	0.12	0.5		II
			Imazalil	0.03	0.05		II
			Imidacloprid	0.01	0.3		II
			Prochloraz	0.06	0.05		II
			Propiconazole	0.03	0.05		II
			Thiophanate-methyl	0.01	0.3		U
			Cyhalothrin lambda	0.05	0.2		II
			Cypermethrin	0.11	2		II
			Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0.1	0.02		II
			Methacrifos	0.02	0.05		II
			Tetradifon	0.06	0.01		U

Germany

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Three Coconut Tree	Honeysuckle	26	Acetamiprid	0.48	0.1		*
			Carbendazim/Benomyl (sum)	1.1	0.1		U
			Carbofuran (Sum)	0.01	0.05	Y	Ib
			Chlorpyrifos	0.08	0.5		II
			Difenoconazole	0.41	20		II
			Dimethomorph	0.03	0.05		U
			Emamectin(Sum)	0.09	0.02		*
			Fipronil	0.16	0.005	Y	II
			Flusilazole	0.04	0.05		II
			Hexaconazole	0.14	0.05		III
			Hexaflumuron	0.03	0.01		U
			Imidacloprid	0.1	0.05		II
			Methomyl/Thiodicarb(sum)	0.008	0.1		Ib
			Phoxim	0.05	0.1		II
			Propiconazole	0.05	0.1		II
			Pyridaben	0.03	0.05		II
			Tebuconazole	0.03	50		II
			Tebufenozide	0.07	0.1		U
			Thiophanate-methyl	6.7	0.1		U
			Triadimefon and triadimenol	0.2	0.2		II
			Atrazine	0.02	0.1		III
			Bifenthrin	0.06	0.1		II
			Cyhalothrin lambda	0.36	1		II
			Cypermethrin	0.41	0.1		II
			Endosulfan (Sum)	0.03	0.1		II
			Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0.27	0.05		II
Three Coconut Tree	Dried Lilybulb	1	Acetamiprid	0.04	-		*

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Three Coconut Tree	Chrysanthemum	18	Carbendazim/Benomyl (sum)	0.87	0.1		U
			Chlorpyrifos	0.05	0.5		II
			Difenoconazole	0.04	20		II
			Omethoate	0.01	0.1		Ib
			Dimethomorph	0.24	0.05		U
			Imidacloprid	0.19	0.05		II
			Metalaxyl	0.05	0.1		II
			Oxadixyl	0.04	0.02		II
			Propamocarb	1.1	0.2		U
			Propiconazole	0.01	0.1		II
			Pyridaben	0.01	0.05		II
			Pyrimethanil	0.02	0.1		III
			Tebuconazole	0.01	50		II
			Thiophanate-methyl	0.1	0.1		U
			Triadimefon and triadimenol	0.02	0.2		II
			Cypermethrin	0.13	0.1		II
			Procymidone	0.02	0.1		U
			Profenofos	0.31	0.1		II
Three Coconut Tree	Wolfberry	14	Abamectin (Sum)	0.01	0.02		*
			Acetamiprid	0.41	0.15		*
			Carbendazim/Benomyl (sum)	0.05	0.3		U
			Carbofuran	0.01	0.01	Y	Ib
			Chlorpyrifos	0.01	0.5		II
			Clofentezine	0.02	0.3		III
			Difenoconazole	0.02	2		II
			Imidacloprid	0.06	0.5		II
			Propargite	0.08	2		III
			Pyridaben	0.02	0.3		II
			Thiophanate-methyl	0.69	1		U
			Cyhalothrin lambda	0.02	0.1		II

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Three Coconut Tree	Wolfberry	14	Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0.21	0.02		II
			Triazophos	0.02	0.01		Ib
Three Coconut Tree	Chinese date	Not Detected					

Italy

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Teng Guan	Chinese date	3	Carbendazim/Benomyl (sum)	0.02	0.5		U
			Propargite	0.12	4		III
			Tebuconazole	0.08	1		II
Longevity	Dried Lilybulb	7	Carbendazim/Benomyl (sum)	0.03	-		U
			Chlorpyrifos	0.02	-		II
			Phorate (Sum)	0.006	-	Y	Ia
			Thiophanate-methyl	0.04	-		U
			Dicofol (Sum)	0.01	-		II
			Dienochlor	0.17	-		O
			Procymidone	0.07	-		U
Longevity	Wolfberry	13	Acetamiprid	0.33	0.15		*
			Amitraz (sum)	0.04	0.05		II

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Longevity	Wolfberry	13	Carbendazim/Benomyl (sum)	0.02	0.3		U
			Carbofuran (Sum)	0.01	0.01	Y	Ib
			Clofentezine	0.02	0.3		III
			Imidacloprid	0.1	0.5		II
			Propargite	0.16	2		III
			Pyridaben	0.01	0.3		II
			Tebufenozide	0.02	1		U
			Triadimefon and triadimenol	0.02	1		II
			Anthraquinone	0.02	0.01		U
			Cypermethrin	0.05	0.5		II
			Fenpropathrin	0.04	0.01		II

Netherlands

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Golden Dia-mond	Chrysanthemum	13	Acetamiprid	0.13	0.1		*
			Buprofezin	0.05	0.05		III
			Carbendazim/Benomyl(sum)	0.05	0.1		U
			Chlorpyrifos	0.32	0.5		II
			Fipronil	0.02	0.005	Y	II

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Golden Diamond	Chrysanthemum	13	Hexaflumuron	0.08	0.01		U
			Imidacloprid	0.07	0.05		II
			Phoxim	0.01	0.1		II
			Triadimefon and triadimenol	0.03	0.2		II
			Cyhalothrin lambda	0.06	1		II
			Cypermethrin	0.08	0.1		II
			Endosulfan (Sum)	0.2	0.1		II
			Profenofos	0.02	0.1		II
Golden Diamond	Honeysuckle	19	Abamectin (Sum)	0.02	0.02		*
			Acetamiprid	0.21	0.1		*
			Avermectin B1a	0.01	0.02		*
			Azoxystrobin	0.01	50		U
			Carbendazim/Benomyl(sum)	0.19	0.1		U
			Chlorpyrifos	0.02	0.5		II
			Difenoconazole	0.06	20		II
			Emamectin(Sum)	0.06	0.02		*
			Fipronil	0.1	0.005	Y	II
			Hexaconazole	0.04	0.05		III
			Hexaflumuron	0.02	0.01		U
			Imidacloprid	0.04	0.05		II
			Myclobutanil	0.07	0.05		II
			Tebufenozide	0.11	0.1		U
			Thiophanate-methyl	2.2	0.1		U
			Triadimefon and triadimenol	0.03	0.2		II
			Cyhalothrin lambda	0.18	1		II
			Cypermethrin	0.2	0.1		II
			Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0.04	0.05		II

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Golden Diamond	Chinese date	11	Carbendazim/Benomyl(sum)	0.15	0.5		U
			Chlorobenzuron	0.28	0.01		*
			Difenoconazole	0.31	0.5		II
			Imidacloprid	0.03	0.3		II
			Prochloraz	0.11	0.05		II
			Propiconazole	0.17	0.05		II
			Pyrimethanil	0.02	3		III
			Tebuconazole	0.16	1		II
			Thiophanate-methyl	0.09	0.3		U
			Cyhalothrin lambda	0.02	0.2		II
			Cypermethrin	0.23	2		II
GoldenDiamond	Wolfberry	14	Acetamiprid	0.43	0.15		*
			Carbendazim/Benomyl(sum)	0.14	0.3		U
			Carbofuran(Sum)	0.01	0.01	Y	Ib
			Clofentezine	0.01	0.3		III
			Difenoconazole	0.02	2		II
			Imidacloprid	0.02	0.5		II
			Propargite	0.02	2		III
			Pyridaben	0.04	0.3		II
			Tebuconazole	0.01	1		II
			Thiophanate-methyl	0.06	1		U
			Cypermethrin	0.07	0.5		II
			Fenpropathrin	0.06	0.01		II
			Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0.12	0.02		II
			Triazophos	0.07	0.01		Ib

UK

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Tongrentang	Honeysuckle	17	Acetamiprid	0.34	0.1		*
			Carbendazim/Benomyl (sum)	0.25	0.1		U
			Carbofuran (Sum)	0.02	0.05	Y	Ib
			Chlorpyrifos	0.04	0.5		II
			Difenoconazole	0.01	20		II
			Emamectin(Sum)	0.01	0.02		*
			Fipronil	0.03	0.005	Y	II
			Hexaflumuron	0.02	0.01		U
			Imidacloprid	0.09	0.05		II
			Pyridaben	0.02	0.05		II
			Tebuconazole	0.01	50		II
			Thiophanate-methyl	1.3	0.1		U
			Triadimefon and triadimenol	0.04	0.2		II
			Cyhalothrin lambda	0.11	1		II
			Cypermethrin	0.21	0.1		II
			Dicofol (Sum)	0.01	0.1		II
			Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0.14	0.05		II
Tongrentang	Chrysanthemum	15	Acetamiprid	0.05	0.1		*
			Buprofezin	0.22	0.05		III
			Carbendazim/Benomyl (sum)	0.12	0.1		U
			Chlorpyrifos	0.14	0.5		II
			Fenobucarb	0.03	0.01		II
			Fipronil	0.01	0.005	Y	II
			Imidacloprid	0.06	0.05		II
			Isoprocarb	0.02	0.01		II
			Phoxim	0.01	0.1		II
			Thiophanate-methyl	0.05	0.1		U
			Triadimefon and triadimenol	0.01	0.2		II

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Tongrentang	Chrysanthemum	15	Cyhalothrin lambda	0.05	1		II
			Cypermethrin	0.13	0.1		II
			Endosulfan (Sum)	0.23	0.1		II
			HCH (Sum, without Lindan)	0.02	0.02	Y	II
Tongrentang	Wolfberry	13	Acetamiprid	0.19	0.15		*
			Amitraz (sum)	0.01	0.05		II
			Carbendazim/Benomyl (sum)	0.03	0.3		U
			Carbofuran (Sum)	0.03	0.01	Y	Ib
			Chlorpyrifos	0.03	0.5		II
			Clofentezine	0.01	0.3		III
			Difenoconazole	0.02	2		II
			Imidacloprid	0.07	0.5		II
			Propargite	0.08	2		III
			Pyridaben	0.02	0.3		II
			Thiophanate-methyl	0.01	1		U
			Cyhalothrin lambda	0.04	0.1		II
			Cypermethrin	0.12	0.5		II
Tongrentang	San Qi Root	7	Carbendazim/Benomyl (sum)	0.02	0.1		U
			Dimethomorph	0.04	0.05		U
			Triadimefon and triadimenol	0.08	0.2		II
			HCH (Sum, without Lindan)	0.008	0.02	Y	II
			Pentachloroaniline	0.06	0.01		*
			Procymidone	0.27	0.1		U
			Quintozene	0.14	0.1		U
Tongrentang	Dried Lilybulb	4	Carbendazim/Benomyl (sum)	0.26	-		U
			Dicofol (Sum)	0.12	-		II
			Dienochlor	0.08	-		O
			Procymidone	0.03	-		U
Tongrentang	Rosebud	2	Abamectin (Sum)	0.005	0.02		*
			Carbendazim/Benomyl (sum)	0.14	0.1		U

USA

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Sen Ji	Chrysanthemum	5	Acetamiprid	0.02	0.1		*
			Buprofezin	0.02	0.05		III
			Carbendazim/Benomyl (sum)	0.26	0.1		U
			Chlorpyrifos	0.22	0.5		II
			Imidacloprid	0.14	0.05		II
Ben Cao	Wolfberry	13	Acetamiprid	0.31	0.15		*
			Amitraz (sum)	0.01	0.05		II
			Carbofuran	0.01	0.01	Y	Ib
			Chlorpyrifos	0.01	0.5		II
			Clofentezine	0.01	0.3		III
			Imidacloprid	0.04	0.5		II
			Propargite	0.05	2		III
			Pyridaben	0.04	0.3		II
			Triadimefon and triadimenol	0.01	1		II
			Cyhalothrin lambda	0.07	0.1		II
			Cypermethrin	0.09	0.5		II
			Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0.06	0.02		II
			Triazophos	0.05	0.01		Ib
Ben Cao	Honeysuckle	19	Acetamiprid	0.1	0.1		*
			Carbendazim/Benomyl (sum)	0.72	0.1		U
			Diethofencarb	0.01	0.05		U
			Emamectin(Sum)	0.06	0.02		*
			Flusilazole	0.09	0.05		II
			Hexaconazole	0.11	0.05		III
			Imidacloprid	0.15	0.05		II
			Lufenuron	0.01	0.05		*
			Myclobutanil	0.02	0.05		II
			Propamocarb	0.02	0.2		U
			Tebuconazole	0.03	50		II
			Tebufenozide	0.04	0.1		U
			Thiophanate-methyl	1.5	0.1		U
			Bifenthrin	0.01	0.1		II

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Ben Cao	Honeysuckle	19	Cyhalothrin lambda	0.36	1		II
			Cypermethrin	0.85	0.1		II
			Dicofol (Sum)	0.16	0.1		II
			Fenvalerate & Esfenvalerate (Sum of RS&SR Isomers)	0.11	0.05		II
			Procymidone	0.08	0.1		U
Lam Sheng Kee	Chinese date	10	Carbendazim/Benomyl (sum)	0.03	0.5		U
			Chlorobenzuron	0.07	0.01		*
			Difenoconazole	0.42	0.5		II
			Flusilazole	0.04	0.1		II
			Myclobutanil	0.03	0.5		II
			Prochloraz	0.26	0.05		II
			Propiconazole	0.18	0.05		II
			Tebuconazole	0.45	1		II
			Thiophanate-methyl	0.01	0.3		U
			Cypermethrin	0.16	2		II
Ben Cao	Chrysanthemum	8	Carbendazim/Benomyl (sum)	0.04	0.1		U
			Chlorpyrifos	0.04	0.5		II
			Fipronil	0.01	0.005	Y	II
			Phoxim	0.01	0.1		II
			Propamocarb	0.09	0.2		U
			Cyhalothrin lambda	0.04	1		II
			Endosulfan (Sum)	0.16	0.1		II
			Triazophos	0.17	0.02		Ib
Humei	Wolfberry	16	Acetamiprid	0.55	0.15		*
			Carbendazim/Benomyl (sum)	0.12	0.3		U
			Chlorpyrifos	0.09	0.5		II
			Clofentezine	0.06	0.3		III
			Difenoconazole	0.04	2		II
			Flusilazole	0.01	0.02		II
			Imidacloprid	0.09	0.5		II
			Prochloraz	0.01	0.05		II
			Propargite	0.19	2		III
			Propiconazole	0.02	0.05		II
			Pyridaben	0.03	0.3		II

Brand	Product	No. of pesticide residue	Pesticide residue	Amount (mg/kg)	MRL EU	Banned in China	WHO classification
Humei	Wolfberry	16	Tebuconazole	0.11	1		II
			Thiophanate-methyl	0.04	1		U
			Chlorothalonil	0.02	2		U
			Cyhalothrin lambda	0.04	0.1		II
			Cypermethrin	0.07	0.5		II
Ben Cao	Dried Lilybulb	4	Carbendazim/Benomyl (sum)	0.08	-		U
			Thiophanate-methyl	0.15	-		U
			Procymidone	0.04	-		U
			Quintozene	0.04	-		U