

Medicinal Plants - East Meets West

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INTRODUCTION

Plants have been used in treating human diseases for thousands of years. Traditional medicine is still the primary source of treating disease for the majority of people in developing countries, including China, despite the advances of modern scientific medicine (Li, 2000). Even among those to whom Western medicine is available, the number of people using complementary or alternative medicine is rapidly increasing worldwide (Lambert et al., 1997). In herbal medicine, both Chinese and Western medicinal plants have their own specific characteristics and philosophy. Traditional Chinese medicine generally uses crude extracts from a number of herbs, which tend to include a wide range of chemical constituents. By contrast, conventional western prescription drugs usually contain a single compound active ingredient to treat a single ailment (Li, 2002).

Chinese herbs come with a formulation, that considers the whole body function instead of treating the specific disease like Western herbs (Woo, 1985). It is difficult to judge or evaluate their philosophy without scientific proof. However, by combining these two unique philosophies and technology, herbal medicine will be better accepted into modern medicine in the near future.

During the last decade, market demand for medicinal herbs has increased sharply in the West for both Chinese and Western herbs. It was estimated that 90 % of the world's population relies completely on raw herbs and unrefined extracts as medicines (Lambert et al., 1997). In Canada, about 23 % of Canadians have used herbal medicines (Small and Catling, 1999). In addition, as much as 25 % of modern pharmaceutical drugs contain chemical ingredients extracted from plants (Genest and Hughes, 1969). This recent surge in demand for herbal medicine is due to the general public looking for alternatives to treat or maintain their health. People are afraid of the side effects of modern drugs and the increasing cost of health care. To meet this huge demand, the increasing cultivation of medicinal plants in the West, and a massive collection of varieties of herbs from their natural habitats in the East.

In a recent survey, hundreds of commonly used Chinese medicinal herbs were found in natural habitats in the West, which have a phyletic relationship with either the same species or genus as in China (Li, 2002). Some of the principal ingredients in Chinese herbs can be extracted from related plant species grow in North America. Thus, it may be possible to substitute Chinese herbs with more reliable and readily available herbs in the West. Moreover, these North American plants are, or can be, cultivated, harvested and processed under proper management that will ensure their safety, quality and efficacy.

RESEARCH AND DEVELOPMENT

For this relatively new herbal industry, research and development are needed on a continuous basis in every level starting from farm to laboratory tests, manufacture control, animal tests and clinical trials (Anonymous, 1998a). Medicinal herbs usage will go back to old folklore days, which was totally based on tradition without any scientific proof without research (Hans and Park, 1986; Huang, 1999). In order to make this newly emerged industry sustainable, in addition to research, an understanding of the needs and a solution to improve or to solve the problems are inevitable. The following approaches should be considered.

Scientific Studies to Support Claimed Therapeutic Values

Research on medicinal uses of herbs is contributing to the growth of the herbal industry (Duke, 1985). Increased knowledge of metabolic processes and the effects of plants on human physiology have enlarged the range of application of medicinal plants (Leung and

Foster, 1996). An understanding of mode of action of medicinal herbs which treat certain ailment is very important in this modern scientific world (Chen, 1997; Bisset, 1994).

Research to Understand the Principles of Medicinal Plants

Recent research on medicinal plants and herbs has generated a great deal of information about the biological and chemical components that are responsible for the claimed medicinal effect (Farnsworth, 1973; Lewis, 1992). This trend should be enhanced to make herbal medicine sustainable and reputable.

Improve Reputation by Understanding the Problems

1. Source of the material. Only the reliable sources of material should be used. Instead of collecting from natural habitats, cultivation under proper crop management is recommended (Lambert et al., 1997).
2. Adulteration. Intentionally or unintentionally with substitutes and mixtures of prescription drugs should not be allowed.
3. Contamination. Plant material used for medicinal purpose should not have any contamination of heavy metal, pesticide residues, and microorganisms.
4. Toxicity - Most of the Chinese herbs have a well-established safety record with occasional adverse effects. However, problems arise when toxic herbs are used in excessive dosage, improper preparation, and substituted with other herbs erroneously (Rangarajan et al., 2001). For example, it was reported in France that Germander (*Teucrium chamaedrys*) induced hepatitis when it was used for weight control and cholesterol reduction and urinary cancer was associated with Aristolochia, a substitute for *Stephania tetrandra*, when it was used for reducing weight. German and Swiss health authorities reported that, in addition to at least 30 cases of hepatitis, one person has died and four others required liver transplants after regularly taking kava, used as a relaxant and a cure for insomnia, an herb that grows in the South Pacific and is available in North America as a tea and a tablet.
5. Harvest, post-harvest handling and shelf life. To increase its efficacy, plant material should be harvested at the proper time, when the active ingredient is at the peak level (Li and Wardle, 2002). Post-harvest procedures should be conducted in proper manner to maintain the highest level of active ingredient. Majority of the western herbs are dried in a drier, and temperature and moisture contents are the main concerns (Li and Wardle, 2001).
Condition and length of storage are the main factors which affect the efficacy of the products. Shelf life in the retail stores should be closely regulated, and the expire date should be clearly indicated for any product.
6. Dosages and frequency of usage. Traditionally, decoction or infusion are used for Chinese traditional herbal formulation, dosages and frequency of usage are based on the knowledge of the individual practitioner without any rational explanation. On the other hand, in Western medicine, a compound is clinically tested for effectiveness, safety and crucial dosage before it can be used in patients. The Chinese herbs, for example, Ma Huang is widely used in the West for weight control where dosage and frequency of usage have resulted in controversial effects. The medicinal values of most natural compounds are still uncertain, and very few of these compounds have been thoroughly studied in humans. At the present time, data of Chinese medicine from in-vitro and animal tests are more prevalent than clinical trials (Leung and Foster, 1996).
7. Products and labeling. Quality and proved therapeutic claims are the most important steps to take for any herbal products.

Public Education and Public Confidence

Public education is needed to raise awareness that some medicinal herbs are potent and dangerous to use by children and woman during pregnancy. The most important factors to address for gaining confidence and acceptance of this industry by the public are quality and safety.

MAKE CHINESE AND WESTERN MEDICINAL PLANTS REPUTABLE AND MAINSTREAM MEDICINE

To achieve this goal, an evidence-based approach is necessary to move remedies of Chinese and Western medicinal plants into the 21st century.

Scientific Research and Regulatory Recommendations

1. Good agricultural practices (GAP). The whole process of understanding the mode of action and proving therapeutic values of medicinal plants started with growing the crop. A good agriculture practice is the first important step which directly effected the efficiency of medicinal herbs. GAP is well accepted in Europe, and a certificate of GAP is needed for farmers to sell their product. GAP became important because of a few recent incidences (Anonymous, 1998b; Rangarajan et al., 2001) of a significant increase in the number of food borne disease outbreaks associated with fresh produce. Produce-associated outbreaks can be caused by bacteria (*Salmonella*, *E. coli*), viruses (Hepatitis A), or parasites (*Cryptosporidium*, *Cyclospora*).

Reducing the incidences of contamination should start at the farm by minimizing risks before planting, such as identify potential sources of on-farm contamination, manure, water (quality and methods), and hand washing, health, and hygiene for both farmers and customers in U-pick farms. In addition, any farm should have a good record keeping.

Minimizing risks during post-harvest handling, worker hygiene includes clean packinghouse, washing operations and packing lines, produce cooling and cold storage, transportation of produce from farm to market, and implementation of a trace back system.

2. Good laboratory practice (GLP). A standardized laboratory procedure is needed to test items contained in pharmaceutical products, pesticide products, cosmetic products, veterinary drugs as well as food additives, feed additives, and industrial chemicals. The purpose of testing these items is to obtain data on their properties and/or their safety with respect to human health and/or the environment. GLP include work conducted in the laboratory, in greenhouses, and in the field (Anonymous, 1998a).

3. Good manufacturing practice (GMP). The Food and Drug Administration (FDA) is revising the current good manufacturing practice requirements for medical devices and incorporating them into quality system regulation. The quality system regulation includes requirements related to the methods used in, and the facilities and controls used for designing, manufacturing, packaging, labeling, storing, installing, and servicing of medical devices intended for human use. Manufacturers establish and follow quality systems to help ensure that their products (food, drugs, biologicals and devices) consistently meet applicable requirements and specifications (Anonymous, 1996).

4. Good clinical practices (GCP). GCP is a standard for the design, conduct, performance, monitoring, auditing, recording, analysis, and reporting of clinical trials. Compliance with this standard assures that the data and reported results are credible and accurate and that the rights, safety, and well-being of trial subjects are protected. FDA requires that the biomedical research it regulates conforms to GCP standards as articulated in FDA regulations. To help ensure that GCP standards are followed, FDA inspects and audits the conduct and reporting of clinical trials (Anonymous, 2001).

Government Regulatory Control to Build up Public Confidence

Good agricultural practice is one of the most important steps which directly affect the efficiency and public confidence of medicinal herbs. In the future, a government regulated certificate may be needed to assure the safety and quality of the products. The second step to build up public confidence is the regulated manufacture procedures. Good Manufacture Practices (GMP) should be enforced to control products manufactured in the most reliable fashion. Quality control is another significant step to ensure that the product is safe for use and without any contamination. A Good Laboratory Practice (GLP) with standardized analytical procedures is important.

Accurate and proper product labeling under government regulation are needed for the claimed active ingredient contents and their therapeutic values. Regulations differ from

country to country, so the manufacturer is responsible for scientific proof on product claims.

Public Education

Public education is needed to raise awareness that some medicinal herbs are potent and dangerous to use especially by children and pregnant women. The most important factors to address for gaining confidence and acceptance of this industry by the public are quality, safety and to be fully aware of the possibility of drug, herb, and vitamin interactions (Harknes and Bratman, 2000).

Knowledge and Training of Practitioners and Pharmacists

Natural medicines have increased their popularity in the recent years. However, reliable information on the possible interaction between herbal medicine and prescription drugs are not well understood. Being aware of such interactions that may have serious side effects on health, it is important for any patient to reveal the usage of herbal products to physicians and pharmacists. Unfortunately, most physicians and pharmacists have limited knowledge of herbal medicine to make an informed judgment. Aware of this lack in training, some of the universities in North America and Europe have started to provide courses in herbal medicine, including mode of action and therapeutic values, in medical schools.

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