

## The Scientific Values of Malaysian Herbal Products

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### ABSTRAK

*Kertas kerja ini cuba meneliti nilai sebenar produk herba Malaysia dalam aspek kualiti, keselamatan dan efikasi sebagai agen penyembuh penyakit. Ia juga akan mengenal pasti daya penggerak di belakang kecenderungan yang kuat masyarakat umum terhadap perubatan herba sebagai alternatif atau komplementari kepada ubatan konvensional. Kebanyakan produk herba di pasaran Malaysia tidak disediakan maklumat yang mencukupi ke atas ramuan, penggunaan, dos, farmakologi, kontraindikasi dan kesan samping yang dijangka. Kebanyakan maklumat yang diterbitkan ke atas produk berkaitan bukti keselamatan dan keberkesanan tidak disokong dengan bukti saintifik. Amalan masa kini perubatan tradisional masih bergantung dengan banyaknya pada maklumat yang didapati menerusi pengalaman etnofarmakologi. Walau bagaimanapun pasaran produk herba sedang mengalami pertumbuhan yang sangat besar dan terdapat peningkatan haluan menggabungkan terapi herba ke dalam amalan perubatan moden oleh ramai ahli profesional kesihatan. Malangnya populariti produk herba lebih berkaitan dengan sikap konsumer dan kebolehan saudagar herba mempengaruhi daripada nilai kualiti sebenarnya sebagai agen medisinal. Ramai orang dieksploitasi kerana jahil ke atas nilai sebenar herba sebagai agen terapeutik. Ia mengecewakan terutamanya apabila media popular, literatur promosi dan rancangan berbicara oleh individu mempromosi penipuan diberi publisiti yang meluas. Lebih buruk lagi ialah ramai individu terlatih dalam sains kesihatan mempromosi kepalsuan. Ini seringkali menyebabkan konsumer dengan tanggapan bahawa pihak berwajib tidak melarang penyalahgunaan produk herba. Oleh itu adalah penting bagi ahli farmasi dan perubatan dilatih dalam perubatan herba tradisional supaya mereka boleh mendidik orang awam tentang manfaat, kualiti, keselamatan dan penggunaan produk herba secara betul.*

*Kata kunci: Produk herba Malaysian, nilai saintifik, kualiti, keselamatan, efikasi, ubatan berasaskan sains, kepalsuan*

## ABSTRACT

*This paper attempts to examine the real values of Malaysian herbal products in the aspects of quality, safety and efficacy as curing agents. In so doing it will also determine the driving force behind the intense public interest for herbal medicine as alternative or complementary to conventional medicine. Most herbal products in the Malaysian market are not sufficiently provided with information on their ingredients, indications, dosage, pharmacology, contraindications and possible side-effects. Most published information on the products on evidence of safety and efficacy is not supported with scientific evidence. The present practice of traditional medicine still depend heavily on information obtained through ethnopharmacological experiences. However, the herbal product market is experiencing a tremendous growth and there is an increased trend of incorporating herbal therapy into modern medical practice by many mainstream health professionals. Unfortunately, the popularity of herbal products is more associated with consumer attitudes and the ability of the herbalists to influence rather than their true quality as medicinal agents. Many people are exploited due to ignorance on the real value of herbals as therapeutic agents. It is especially disappointing when popular media, promotional literature and talk shows by individuals promoting quackery are given much publicity. Even worse, many individuals trained in the health sciences are promoting quackery. This has often left the consumers with the perception that the authority condones the improper use of herbal products. Thus, it is important for pharmacists and physicians to be trained in traditional herbal medicine so that they can educate the public on the benefits, quality, safety and proper use of herbal products.*

*Key words: Malaysian herbal products, scientific values, quality, safety, efficacy, science-based medicine, quackery*

## INTRODUCTION

The Malaysian herbal product market is experiencing a tremendous growth due to intense public interest in the use of crude plant-based products as medications. More people are turning to herbal products as alternative to the conventional therapeutic medicine. Malaysia consumes approximately RM1.2 billion worth of imported herbal products annually (Salleh 1998). According to recent estimates by the World Health Organization, more than 3.5 billion people in the developing countries are relying on plants to treat various ailments (Balick & Cox 1997). The situation is similar in the developed countries. In the United States of America, billions of dollars are spent each year for herbal capsules, tablets, herbal teas and tonics for medicinal purposes. The retail sales of herbal products is estimated to be slightly over US4 billion in 2000 (Blumenthal et al. 2000). It is estimated that

between 17–32 percent of adults have used at least one herb during the previous years. Thirty-three percent of Canadians were looking for complementary therapies annually (Jellin 1998). In fact treatment with herbal medicines in Europe has become a well established part of health care. In Germany, more than 80 percent of physicians regularly prescribe herbal therapies (Barrett 1998).

More than 90% of the raw materials used in the manufacture of herbal products in Malaysia are imported, mainly from Indonesia, China and India (Ibrahim & Khozirah, 1996). The Statistics Department (1996) reported a total import of medicinal plants amounting to RM93.4 million in 1986, gradually increased to RM264.8 million in 1996. To reduce cash outflow, the authority is encouraging the propagation of home-grown herbs which are underutilized and the production of home-made herbal products. Attempts have been made by several public and private sectors to cultivate medicinal plants such as *Eurycoma longifolia* (tongkat ali), *Labisia pumila* (kacip fatimah) and *Cinnamomum verum* (kayu manis) on a commercial scale (Ibrahim & Khozirah 1996; Azizol & Ilham 1998).

It would be necessary for a herbal product to be provided with information on its ingredients, indications, dosage, pharmacology, contraindications and possible side-effects before a rational decision on its use as a medicinal agent be made. This paper attempts to examine the quality of Malaysian herbal products and their promotion as science-based medicinal agents or products of quackery.

## PREPARATION OF HERBAL PRODUCTS

Herbal products are crude plant preparations used in various alternative medicine practices such as traditional Malay medicine, traditional Chinese medicine, Ayurvedic medicine, naturopathy and homeopathy for their supposed medicinal values. Many herbal products are also being marketed as nutritional food or dietary supplements. Herbal products are actually crude drugs containing a mixture of phytochemicals such as terpenoids, alkaloids, glycosides, flavonoids and tannins together with the primary compounds of carbohydrates, lignins, nucleic acids, lipids and proteins (Ibrahim 1998). A herbal product may contain a single herbal ingredient but it may also be made up of a mixture of small doses of many plant parts from multiple species. It is not uncommon to have more than 5 herbal ingredients in one herbal product. Thus, an aqueous–alcoholic extract of a herbal preparation may contain hundreds or even thousands of chemicals.

Traditionally herbal products are prepared in aqueous extracts by soaking plant materials in cold or hot water or prepared in a powdered form to be used externally as poultices or pastes. The traditional practitioners collect and mix the plant materials according to their own formulations and dispense the medicines to their patients, sometimes accompanied with prayers, religious or ceremonial chants (Ibrahim, 1998). The practice of traditional medicine was initially more of

a social obligation to help promoting and maintaining the health of a community but gradually the practice shifted towards profit-oriented activities. Introduction of modern technology in the commercial production of herbal products has resulted in the preparation of plant extracts in the form of alcoholic or solid extracts, tinctures and freeze-dried or spray-dried powders. Many of them are now formulated into modern pharmaceutical forms, dressed up to look like modern drugs. Some of these products are prepared as standardized processed products based on quantified amount of marker compounds.

## QUALITY OF HERBAL PRODUCTS

The concentration of the phytochemicals and the ratio between different constituents in the plants vary continually as the compounds are in a dynamic state, i.e. they are synthesized and metabolized continuously in the living tissues. Variations may be caused by genetic and ecological factors. The latter include soil nutrients, land topography, light and temperature and allelopathy. Thus a knowledge of variations that may occur within a species is important for estimation of the quality of the herbal medicine. Variation in the chemical components of herbal extracts may also occur if different solvent systems are used for extraction. Alcoholic or organic extracts will provide a different spectrum of organic compounds from those obtained by aqueous extraction. Improper handling of the plant materials during collection, preparation, drying and storage may cause deterioration in the quality of the herbs as some of the ingredients may undergo decomposition. All of these factors have to be considered in choosing plant materials as raw materials to prepare high quality herbal products.

The plant materials used in a herbal product should be in uniform quality, with respect to the content of the active ingredients, to produce galenicals of uniform strength. The plant materials have to be analyzed by modern analytical and chromatographic techniques together with appropriate bioassays to identify the active constituents as markers. Identification of active ingredients as markers can be very difficult so many pharmacopoeias allow the use of well defined constituents as alternatives. Identification of marker is made more complicated for product containing more than one herbal ingredient. The crude drugs should conform to the standards set by the official monographs to qualify them to be used as herbal medicines. Evaluation of crude drugs include botanical verification, pharmacognostical analysis, determination of purity and amount of marker or active compounds, disintegration and dissolution tests. However, many local medicinal plants used in herbal preparations are not cited in official pharmacopoeias, i.e. they do not have standard references, thus standardization of herbal products cannot be carried out effectively. In fact most herbal products sold in Malaysia are not standardized.

Monographic specifications of the various medicinal plants need to be established and documented. A monograph on 20 selected medicinal plants entitled “Malaysian Herbal Monograph’ has been published (Malaysian Herbal Monograph, 1999). The work on the monograph should be continuously updated with new information especially on research findings pertaining to quality, safety and efficacy of the plants and should also be continued on other species. The monograph should be used as an official reference document by regulatory bodies and manufacturers for quality assurance purposes. Unfortunately, there is no strict analytical control in Malaysia to ensure only herbal products of high quality are allowed to reach the market. Herbal products containing herbs which have not been included in standard pharmacopoeias are still allowed to be sold to the general public. Existing analytical procedures carried out by the authority to evaluate crude drugs have been inadequate. Herbal products are only required to comply with less stringent standards of quality as prerequisite for registration and commercial utilization. The herbal products are only evaluated for proper labeling and packaging and subjected to disintegration, dissolution, microbial and pyrogen tests. There are already efforts to include other tests such as identity tests and assay for active ingredients to ensure reproducible quality of a herbal remedy. Implementation of inadequate quality control procedures could possibly result in products of low quality to reach the market. Species misidentification, adulteration or contamination with foreign matters and fraudulent activities such as substitution of genuine plant parts with inferior commercial varieties or exhausted drugs could be carried out unnoticed.

The local manufacturers are required to adhere to Good Manufacturing Practice (GMP) guidelines in the manufacture of herbal products. The guidelines entail the need for factories to practise GMP in all aspects of manufacturing in relation to the workers, premises, equipment, processes, raw materials, quality control, documentation and reports. The guidelines have been prepared where the capability of the local manufacturers was taken into account without compromising on the purpose of producing high quality herbal products. However, most local manufacturers which are mainly small-scale operators could not adhere to the guidelines mainly due to financial constraint. This has led to the emergence of many illegal backyard factories which are more concerned about making profit rather than practicing good manufacturing practice in the manufacture of herbal products.

## SAFETY OF HERBAL PRODUCTS

Some people especially herbal vendors consider herbal products must be safe because they are natural. This is simply not true. Medicinal plants cannot be considered safe just because they have a long record of use in folk medicine. There are already many reports of various toxic symptoms following lengthy

consumption of herbal medicine. The adverse reactions produced by these plants include allergic reactions of the skin (contact dermatitis), bronchial asthma, cardiac, hepatic, hormonal, irritant and purgative effects. Some of the potential adverse effects are well documented in many official monographs (Newall et al. 1996). For example some natural products such as alkaloids are known to be very toxic even at low doses. Many plants including comfrey (*Symphytum officinale*) contained pyrrolizidine alkaloids which are known to be harmful to the liver, in which they can cause potentially fatal blockage of the hepatic veins (Mattocks 1986). Animal studies have shown that essential oil components such as safrole and apiol are hepatotoxic and methylchavicol and  $\beta$ -asarone are carcinogenic (Tisserand and Balacs 1995). Many local plants such as *Gluta renghas* (rengas) and *Derris elliptica* (akar tuba) contain exudates which are employed as arrow-poison and fish-poison (Burkill 1966).

Majority of herbal medicines are used to treat minor and often chronic ailments. The chronic forms of toxicity such as colon cancer and deformed new born may be due to herbal medicine but this may not be reported or overlooked as the patients are not providing information on herbal preparations he or she has taken. If a plant containing toxins is used in a herbal preparation, the toxic effect may not be immediate since the concentration of the toxins in the dilute preparation is low, i.e. below the toxicity level. However, after prolonged use the toxins may accumulate in store depots in the body and cause chronic toxicities such as hepatotoxicity, carcinogenicity and mutagenicity. As with conventional medicines, herbal products should also be taken with caution or avoided during pregnancy unless the benefit outweighs the potential risk. Volatile oils in many herbs are reputed to be abortifacient and some herbal teas contain laxative not recommended during pregnancy (Tisserand and Balacs 1995; Roulet 1988). Concurrent use of herbal medicine and conventional medicine can lead to potential untoward reactions or contraindications. However, there is limited information on herbal-drug interactions. Unless the chemical contents are known and pharmacological properties of the herbal medicine are well established, potential interaction with conventional medicines due to concurrent use is not easy to rationalize. For example, herbs that lower blood sugar levels may cause hypoglycaemia if taken together with existing hypoglycaemic therapy. Herbal medicine containing high levels of coumarins may potentiate the effect of anticoagulant drugs.

The manufacturers of herbal medicine should provide evidence of safety and information on possible side effects and contraindications before the crude drugs can be registered for commercial use. As with all medicinal products, herbal products should also be evaluated for their risk-to-benefit ratio. There should be no differences in standards set for safety of herbal medicines from those of other pharmaceutical preparations. The toxicity testing carried out on herbal medicines include acute toxicity, chronic toxicity, foetal toxicity and effect on fertility, mutagenic, hepatotoxic, and carcinogenic responses. However,

toxicological data on medicinal plants are limited. The procedures to carry out the tests are lengthy and expensive. Most local manufacturers of herbal medicines are not able to perform them. In fact as in most countries herbal medicines are not subjected to the same requirements as modern medicine. Toxicity testing on herbal medicines are amended and become more simplified, resulting in many herbal medicines with potential risk to human health may manage to reach the market. In Malaysia, herbal products submitted for product license are only assessed for the presence of toxic metals (lead, mercury, arsenic, and cadmium) and scheduled poisons. Limit tests for the heavy metals have been successfully carried out, however, test for scheduled poisons have been limited to certain group of chemicals which include some alkaloids and steroids.

### EFFICACY OF HERBAL PRODUCTS

The present practice of traditional medicine still depend heavily on information obtained through ethnopharmacological experiences. Many of the medicinal plants do not have scientific or medical documentation to support their claims. The scientific data that need to be presented for validation of efficacy include the chemical constituents of the plant, pharmacological actions and clinical efficacy. In term of efficacy as medicinal agents, herbal medicines can be classified as genuine, experimental or questionable (Barret 1998). The genuine herbal medicines are products that have been subjected to rigorous scientific study and have met science-based criteria for effectiveness. They are scientifically proven, evidence-based medicines. There are relatively few science-based herbal medicines which include ginseng, ginkgo, chamomile, valerian, fewerfew and hops. Unfortunately non of them is a local herb. Experimental herbal products are unproven but have a plausible rationale and are undergoing scientific investigation. In most cases phytochemical and animal studies data are available to support traditional uses but clinical data is inadequate. Examples of local medicinal plants which can be categorized under this group are tongkat ali, kacip fatimah and pengaga. Questionable herbal products are products of quackery where there is lack of scientific documentation and their therapeutic claims are based on ethnopharmacological information and lack a scientifically plausible rationale. Unfortunately most of the local medicinal plants belonged to this group.

Scientific research have shown that majority of the herbal products are not effective as therapeutic agents, though some show satisfactory pharmacological properties. The beneficial effects of herbal medicines have been dismissed by many health professionals as placebo effect. The pharmacological response of a herbal medicine is determined by the concentration of the active chemical constituents of the plant extracts used in the product. However, the dose levels of the active ingredients are not clearly defined as a formulated product usually

contain minute doses of numerous herbal ingredients. The therapeutic activity of a drug depends mainly on the interaction of a single structurally specific drug with a receptor. Perhaps the mechanism of action of a herbal ingredients involve multiple drug-receptor interactions to produce a cumulative pharmacological response. Efficacy of herbal medicines especially those intended for use to treat serious medical conditions should be substantiated by adequate trial design through evaluation of large randomized, double-blind, clinical-controlled trials. This is to minimize or eliminate the effect of bias on data collection and interpretation. However, very few herbal medicine have been evaluated by controlled clinical studies due to the high costs associated with such studies. Thus it is not surprising that in most countries, including Malaysia, proof of efficacy has not been included as a prerequisite for registration and commercial utilization of herbal medicine.

### REGULATIONS ON HERBAL PRODUCTS

The Federal Drug Agency of the United States of America (FDA, USA), in its Dietary Supplement Health and Education Act of 1994, classifies herbs as dietary supplements and forbids manufacturers to claim that their products are able to treat or prevent specific diseases. In Germany, under its German Commission E, and other European Union countries, herbal preparations are regulated as drugs. In Malaysia, the 'Registration of Traditional Medicine' implemented recently is to regulate herbal products for human use in accordance with the 'Control of Drugs and Cosmetics Regulations 1984' (Legal Research Board 1998). Only herbal products prepared in pharmaceutical forms, i.e. capsule, tablet, pill, lotion and liquid preparations, are required to be registered with the Drug Control Agency. The registration exercise is to ensure that herbal products are assessed for their quality, safety and efficacy before they are marketed for human use. Another regulation related to herbal products in Malaysia is the Medicines (Sales and Advertisement) Act, 1956, which prohibits the promotion of traditional medicines for the treatment of 20 serious medical conditions (Thoo 1990).

### PROMOTION OF HERBAL PRODUCTS AS SCIENCE-BASED MEDICINES OR PRODUCTS OF QUACKERY

Many people are victims of quackery due to ignorance and not always sufficiently critical with regard to quality, safety and efficacy of the crude drugs. The quality of herbal medicines has been more closely associated with claims put up in labels and advertisements and attractive packaging. The popularity of herbal products is more associated with several consumer attitudes. More people are showing great interest in taking charge of their own health and are willing to pay

the costs of alternative remedies for self-medication. They can be easily misled by deceptive claims on herbal products especially individuals who have serious or chronic diseases that make them feel desperate enough to try anything that offers hope. Most herbal users find that these alternative medicines are more congruent with their own culture, beliefs and spiritual values. Many of them are strong believers and great preservers of tradition. They believe that the length of time herbal medicines have been used and handed down from generation to generation is a measure of their effectiveness. Dissatisfaction with modern medicine due mostly to adverse effects of pharmaceuticals and the belief that there is minimal or no side effects from natural products are also contributing to the popularity of herbal medicine.

It is especially disappointing when popular media, promotional literature and talk shows by individuals promoting quackery on herbal products are given much publicity. Misleading advertisements on herbal products are aired daily over the radio and television. This has often left the consumers with the perception that the authority condones the improper use of herbal products. The Medicines (Sale and Advertisement) Act 1956 prohibited the promotion of traditional medicines for the treatment of twenty serious medical conditions (Thoo 1990). However, many herbal products with multiple health claims on their labels including those for the serious ailments are easily available in the market and some are even sold in pharmacies. In an effort to tighten control on advertisements of traditional medicines the authority is reviewing the Medicine Act 1956 to increase the penalties and to expand the scope of its coverage by not only covering those who made false claims but also publishers of misleading advertisement. To evade the law, some herbal products are marketed as nutritional foods or dietary supplements. The nutritional value (such as multivitamins, amino acids, minerals, antioxidants and low cholesterol foods) these herbal products are supposed to have are usually not needed if we have a balanced diet. The claims made for herbal products are always exaggerated and extravagant. Examples of deceptive claims on the labels are offer to cleanse the blood of toxic impurities, improve blood circulation, strengthen the immune systems, bring it in harmony with nature, improve one's virility and help the body to heal itself. In fact claims on the use of herbs as sex aids such as *Eurycoma longifolia* (tongkat ali) have been the most popular and widely publicized. The use of non-medical terminology is a disclaimer and a slick way to avoid prosecution for wrongful advertisements and to influence the consumers.

Most local herbal products manufacturers are small scale entrepreneurs although the number of large corporate establishments is increasing. Many of them claim to formulate and manufacture various health care products, carry out research to develop new products lines and follow GMP to produce products of high quality. However, in actual fact most companies import their raw ingredients from the same bulk wholesalers and merely repackage them into brand name products. Multilevel marketing companies are the major distributor of the

products. Herbal products are also sold in pharmacies and health food stores and can now be purchased directly from companies through media and internet advertising. Thus, there is an urgent need for regulatory intervention and strict enforcement of law on the advertisement and sales of herbal products as remedies to protect public health.

## EDUCATION ON HERBAL MEDICINE

There is an increased trend of incorporating herbal therapy into modern medical practice by many mainstream health professionals. However, most of these health care professionals are not trained or are not experts in herbal medicine. Most of them make their own decisions on the use of herbal medicine based on the little knowledge they obtained from promotional literature and herbal manufacturers. It is especially disappointing when many websites in the internet which have information linked to herbal product promotion and sale have become a popular source of reference by practitioners and consumers. Although some sites contain reliable information which is referred to articles published in reputable scientific journals, most published information on herbal products on evidence of safety and efficacy is unreliable. Any claims that are made about herbal product safety or efficacy should be referred to scientific literature that can substantiate the claims. Even worse, there are health care practitioners who set ethical principles aside and knowingly promote herbal products as products of quackery. Thus, it is important for health care professionals to be trained in traditional herbal medicine so that they can educate the public on the benefits, quality, safety and proper use of herbal products.

Ironically, pharmacists are in an ideal position to advise patients on herbal products. There is an increasing number of patients coming to pharmacies and clinics to seek information on herbal remedies. However, health care professionals must exercise care when advising patients if they have not been trained in herbal medicine. They need to be trained and educated on all aspects of herbal medicine which include knowledge on the chemical constituents, indications, dosage, dose form, pharmacology, clinical controlled trials, possible side effects and contraindications. They should always be updated with new scientific information on herbal products as they are expected to answer questions and refute or substantiate claims made by various products. There is a need to include education on the benefits and safety of herbal medicine as well as assurance of quality in pharmacy curriculum in the local universities. Education on herbal medicine may be a major component of pharmacognosy which is generally a core subject in many pharmacy program or be taught as a subject on its own.

## CONCLUSION

The real value of herbal products as medicinal agents depends on how much they comply with the standards set for efficacy, safety and quality. Many feel that the regulation would be too restrictive since the evaluation process is lengthy and expensive. The requirements are difficult to be fulfilled by many local herbal manufacturers. The standards of quality and safety set are amended and made less stringent to ensure that local manufacturers can comply with the requirements. Accordingly the quality, safety and efficacy of herbal products in the Malaysian market have not reached satisfactory level. The less stringent procedures provide opportunities for unscrupulous vendors who may know little about medicinal plants to sell herbal products based on unsubstantiated or false claims of quality, safety and quality. Moreover, the manufacture and sale of herbal products are not closely regulated and controlled by the authority, resulting in mushrooming of multilevel companies marketing herbal products with deceptive claims. Promotion and sale of herbal products as products of quackery through promotional literature, testimonials, talk shows, advertisements in popular media, over radio and television and the internet can be checked if there is a combined effort by the authority, health care professionals, non-government organizations and the consumers. The consumers should be made aware of the real value of herbal products and the exploitation and threat of quackery.

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