

藥用及保健植物

前 言

本場承行政院國家科學委員會補助，邀請加拿大農部太平洋區農糧食品研究中心研究員勵鑫齋博士，於本(九十)年二月九日至十五日來台短期指導藥用及保健植物之研究發展工作。勵博士來台期間在本場發表「See Buckthorn - A new crop with valuable nutraceutical and medicinal values」，及在中興大學農藝系發表「R & D of medicinal herbs in nutraceuticals」為題等二次專題演講，特將勵博士兩次專題演講之論文摘要刊出。

勵鑫齋博士1965年畢業於中興大學農藝系，1974年取得加拿大Uni. British Columbia植物育種學博士，畢業後進入加拿大農部太平洋區農糧食品研究中心服務迄今，多年來從事有關藥用及保健植物之栽培、育種及植物藥理之研究，發表相關論文極多，並著「Medicinal Plants: Culture, Utilization and Phyto - Pharmacology」一書。

Sea Buckthorn - A New Crop with Valuable Nutraceutical and Medicinal Values

Thomas S. C. Li ¹

Sea buckthorn (*Hippophae rhamnoides* L.) is a winter hardy, deciduous shrub with subglobose yellow or orange berries, 6 to 10 mm long and 4 to 6 mm in diameter. It is a dioecious multi-branched, thorny shrub, reaching two to four metres in height with stout branches forming a round or symmetrical head. It has brown or black rough bark and a thick grayish-green crown. Male and female flowers are inconspicuous appearing before the leaves. Flower buds are formed mostly on 2-year-old wood, differentiated during the previous growing season. The root system is characterized by nitrogen fixing nodules.

Sea buckthorn can be used for many purposes and has momentous economic potential. It has been used for centuries in Europe and Asia. Recently, it has attracted considerable attention from researchers around the world, including North America, mainly for its nutritional and medicinal value. The fruits are rich in carbohydrates, organic acids, amino acids and vitamins. Sea buckthorn is also high in protein, especially globulins and albumins, and fatty acid such as linoleic and linolenic acids. The concentration of vitamin C in sea buckthorn fruit, ranged from 20 - 500 mg/100 g fruit, is higher than strawberry, kiwi, orange, tomato, carrot and hawthorn. Vitamin E (105 - 160 mg/100 g seed oil, 75 - 230 mg/100 g pulp oil) content in sea buckthorn is higher than wheat embryo, safflower, maize, and soybean.

Medicinal uses of sea buckthorn are well documented in Europe and Asia. Clinical tests on medicinal uses were first initiated in Russia during the 1950's. Sea buckthorn oil was formally listed in the Chinese Pharmacopoeia in 1977. The most important pharmacological functions attributed to sea buckthorn oil including anti-inflammatory, antimicrobial, pain relief and promoting regeneration of tissues. Sea buckthorn oil is popular in cosmetic preparations, it also touted as a treatment for oral, rectum, and vaginal mucositis, cervical erosion, radiation damage, burns, scalds, duodenal ulcers, gastric ulcers, chilblains skin ulcers caused by malnutrition and other skin damage.

More than ten different drugs have been developed from sea buckthorn in Asia and Europe and are available in different forms, such as liquids, powders, plasters, films, pastes, pills, liniments, suppositories and aerosols. Sea buckthorn oil extracted from seeds is popular in cosmetic preparations, such as facial cream. There are numerous products

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made from sea buckthorn in Europe and Asia, such as prescription drugs, health remedy and cosmetic products, tea from leaves, beverages and jam from fruits, fermented products from pulp, and animal feeds from leaves, pulp and seed residues.

In conclusion, sea buckthorn is an unique and valuable plant species currently being domesticated in various parts of the world. The species has been used to a limited extent in North America for conservation planting, but the use of food and non-food sea buckthorn products has not been pursued. The plants are easily propagated and yields are relatively high, and production is reliable, with the potential market mainly in Europe at the moment. Most sea buckthorn research has been conducted in Asia and Europe in the past and Canada has increased its research recently.

Unique plant products, especially those with proven nutritional quality, are gaining popularity in North America. Development of a North American sea buckthorn industry presents a unique opportunity for agricultural production of a value-added crop on marginal land.

R & D of Medicinal Herbs in Nutraceuticals

Thomas S. C. Li ¹

The use of medicinal plants for health reasons started thousands of years ago and is still part of medical practices in China, Egypt, India, and other developing countries. Over the centuries, the use of medicinal herbs has become an important part of daily life in the western world despite significant progress in modern medical and pharmaceutical research. Since World War II, the increasing availability of medicinal herbal products, a desire for nutraceuticals or functional foods and alternative medicines, and concerns about the possible side effects of some synthetic drugs have revived the use of medicinal herbs. Recently, there has been a tremendous surge of interest in medicinal herbs, and their products have become a multi-billion dollar industry in both North America and Europe.

Research on medicinal and cosmetic uses of herbs is contributing to the growth of the herbal industry. Increasing knowledge of metabolic processes and the effects of plants on human physiology, have enlarged the range of application of medicinal plants. Some lesser known plants have been found to have significant medicinal values. According to the report by World Bank in 1997 (Technical Paper No. 355), it is apparent that the significance of plant-based medicines has been increasing all over the world. Nearly 50 per cent of medicines on the market are made of natural basic materials. Interestingly, the market demand for medicinal herbs is likely to remain high because many of the active ingredients in medicinal plants cannot yet be prepared synthetically.

Recent research on medicinal plants and herbs has generated a great deal of information about the biologically active chemical components, that are responsible for the claimed medicinal effects. The level of active ingredients or chemical constituents has been used as a standard marker for the quality of raw plant materials and value-added products.

Medicinal substances found in plants are the products of natural metabolic processes. However, each species has its own genetic structure that governs the presence of chemical components or bioactive molecules. In addition, the effects of environment and differences among varieties or cultivars within each species create variations in the quantity of compounds present. Thus, each plant species or variety produces chemical compounds differently, and some plants produce medicinally useful compounds, others do not or do so in very small quantities.

Until recently, almost all of the uses of medicinal plants for the treatment of human ailments were based on hearsay, folklore, or tradition, without scientific proofs, a practice that is potentially harmful and dangerous. The recent surge of interest in the use of medicinal plants has generated a great deal of research on major constituents and their effects on human health. The results of clinical studies have proven some of the claims. However, more research is needed to extend the search for potentially beneficial herbs from natural sources and determine their use in modern medicine.

In the past, the medicinal values of herbs were based on tradition and accidental discovery. There are many herbal preparations that are safe and may help ease minor ailments. A few are potent and dangerous to use. Some medicinal plants that are widely available should not be taken internally because the safety of their prolonged use is in question. Others are very poisonous, and great care should be taken to prevent children and livestock from eating them. Toxicity does not only refer to lethal effects but also to minor body reactions such as allergy irritation, and sensitivity.

There is limited information in the literature regarding the proper usage of medicinal herbs, such as dosage, frequency and usage period, physical condition and sensitivity of the user, and possible interaction with prescribed drugs. More and more herbal products on the market are mixtures of two or more herbs, which is a serious concern, because there is limited research on the effect of combinations of herbs on humans. To avoid possible toxicity, thorough research and the guidance of a physician or naturopathic physician are strongly recommended.

Traditionally, medicinal plants were not consumed in their fresh state. Certain parts (leaves, bark, root, or fruit) were picked from the wild, dried, and used for treating ailments. With the advance of modern technology, the parts of plants that contain active ingredients are now being processed in various forms, such as extracts and powders, for use in value-added products.

Recently, nutraceuticals and functional foods have emerged as major trends in the food and health supplements industries, for the purpose of delivering specific non-nutritive physiological benefits that may enhance health. These applications require quantities of plant-based materials and increased understanding of the nature of medicinal plants. The use of herbs is no longer only for flavouring, seasoning, and colouring or in the form of infusions and decoctions, as in traditional Chinese medicine. More research is needed to discover the best means of extracting the maximum amounts of active ingredients without reducing their quality. In addition, stability, optimum storage conditions, and shelf life also need to be identified.