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IN THE PAGES THAT FOLLOW.....



Registered Office

C. I. C. House,
199, Kew Road,
Colombo 02, Sri Lanka.

Factory & Office

P. O. Box : 02,
Malinda, Kapugoda,
Sri Lanka.

Tel.: +94 11 2409294

Fax: +94 11 2409293

e.mail :

info@linknaturalproducts.com

web site :

www.linknaturalproducts.com

Editor in Chief

R.O.B. Wijesekera

Editor

Dilmani Warnasuriya

Editorial Consultants

M. B. Wijesekera
Gamani Samarasekera

Editorial Assistance

Natasha Jayamanne

Layout & Production

Sisira Wijetunga

Printing

Harshana Printers

Distribution

The Library & Information Centre
Link Natural Products
library@linknaturalproducts.com

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EDITORIAL

THE VALUE IS IN THE RESOURCE AND THE AUTHENTICITY.

Over two decades ago environmental protectionists worldwide celebrated a most significant event. It was a landmark deal between the Drug Company Merck, and the National Biodiversity Institute of Costa Rica, "INBio". Until then, Drug companies from the industrialized world were collecting biological specimens from anywhere they wanted and shipping them to the west for research. The country with the resource got nothing. In the deal with Costa Rica, Merck was offering 1.1 million dollars up-front for bioprospecting rights, and a Royalty for any drugs resulting from the research. A share of the payment was to go towards protecting the habitat itself.

It was a significant new beginning. The matter is most relevant to the part of the world where herbal preparations are largely the therapeutic agents of the populations. Systems such as Ayurvedic Medicine, and the Chinese Traditional Medicine, use mainly plant derived therapies, but much of the plant material is drawn from the spontaneous flora such as rain forests. Rain Forests which have been an acknowledged treasure trove of therapeutic agents are very much a dwindling resource, being sacrificial to rapacious overharvesting on the one hand, and the modern development process on the other.

Governments could care less about conservation when it comes to these factors. As a result a large percentage of the species of plants, for example, that are used by Ayurvedic practitioners in India, Sri Lanka, and Nepal, are identified by the International Union for the Conservation of Nature, (IUCN), as endangered or even extinct. This brings one to the stark fact of the use of adulterant-species - meaning similar species which may not be suitable either on account of toxicity or lack of efficacy- that are employed in herbal preparations.

In the modern context the Practitioner can no longer be relied on to make his own medicines as of yore. Several factors such as the above, ranging from the dire need to save the habitat and the species, to ensuring the authenticity of the ingredients employed in preparations, lend support to scientifically driven factory produced herbal medicines, as the answer to the modern need.

Such medicines, now classified in the west as OTC's, or food supplements, are now increasingly utilized on a self selection basis, due to disillusionment with modern conventional therapies. They form the basis of a Global multi-billion dollar industry.

Hence factory production, with all the rigors of scientific surveillance, ranging from the authentication of the plant species used, through processing, to quality assessment of products, assumes supreme importance.

It is our legacy to preserve the essence of Ayurvedic practice, ensure environmental security, and utilize modern science as the driving force to benefit the health of the people.

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the Link Digest, Please mail
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SAPODILLA AN INTERESTING AND DESIRABLE TROPICAL FRUIT

By *Nirmala M. Pieris**

Sapodilla (*Manilkara zapota*) (Sinhalese – Sapathilla or Rata mi) belonging to the family Sapotaceae, is a long-lived, evergreen tree. The sapodilla is believed to be native to Yucatan and possibly other nearby parts of southern Mexico, as well as northern Belize and Northeastern Guatemala. The species is found in rain forests throughout Central America where it has apparently been cultivated since ancient times. It was introduced long ago right through tropical America and the West Indies, the Bahamas, Bermuda and the southern part of the Florida mainland. Early in colonial times, it was carried to the Philippines and later was adopted everywhere in the old world tropics and is believed to have reached Ceylon in 1802. Commercial plantings prosper in Sri Lanka, the Philippines, the interior valleys of Palestine, as well as in various countries of South and Central America, including Venezuela and Guatemala.



The sapodilla tree is fairly slow-growing, upright and elegant, distinctly pyramidal when young reaching about 18m in the open but reaching almost 30m when crowded in a forest. It is strong, wind and drought resistant and rich in white, gummy latex.

Its leaves are highly ornamental, evergreen, glossy, alternate, spirally clustered at the tips of the forked twigs.

A single tree can bear up to 2000 fruits/year. The brown colored fruit looking almost like a small potato is nearly round, oblate, oval, ellipsoidal, or conical and varies from 5-10cm in width. When immature it is hard, gummy and very astringent. Though smooth-skinned it is coated with sandy brown scurf until fully ripe.

The flesh ranges in color from yellowish to light or dark-brown or sometimes reddish-brown; may be coarse and somewhat grainy or smooth; becomes soft and very juicy when ripe. The ripe fruit has an exceptionally sweet, malty flavor.

Many believe the flavor bears a striking resemblance to caramel or a pear candied with brown sugar.

Today the fruit is popular in India, Thailand and some other south-east Asian countries where it goes by the name of ‘chikoo’. This name comes from the word chicle, which is the latex (or sap) bled from the tree. This sap was the original chewing gum used in the confectionary industry. The industry now uses a cheaper synthetic product. The sapodilla, therefore, is the original “chewing gum tree.”

Sapodillas are available all around the season in the markets. Harvesting is usually done by plucking each fruit gently as in mango. It is often difficult to tell when a sapodilla is ready to harvest. Mature fruit appears brown and easily separates from the stem without leaking of the latex. The fruit can be scratched to make sure the skin is not green beneath the scurf.

* *Dr. Nirmala M. Pieris is at present a Consultant for UNIDO and also for Link Natural Products.*

When purchasing fresh sapodilla only fruits with smooth intact skin and without cuts, cracks, bruises or wrinkles must be bought. Once ripe, the fruit just yields to gentle thumb pressure. Mature but unripe fruits must be kept at room temperature for 7 to 10 days to ripen. Firm, ripe sapodillas will keep well for several days in the home refrigerator.



A Healthy Fruit for a Healthy Life

Sapodilla is loaded with dietary fiber which makes it a good bulk laxative. The fiber content helps relieve constipation episodes, and also helps protect the mucous membrane of the colon from cancer causing toxins by firmly binding to them. The fruit is rich in antioxidant polyphenolic compounds such as tannins. Tannins are a complex family of naturally occurring polyphenols that neutralize acids by precipitating proteins. Tannins have shown to have potential anti-inflammatory, antiviral, anti-bacterial and anti-parasitic effects which help limit conditions like erosive gastritis, reflux-oesophagitis, enteritis and irritating bowel disorders. Some other fruits that are rich in tannins include pomegranate and grapes.

The fruit contains good amounts of antioxidant vitamins like vitamin C and vitamin A. Vitamin A is essential for vision. It is also

required for maintaining healthy mucus membranes and skin. Consumption of natural fruits rich in vitamins are known to protect from lung and oral cavity cancers. So also, consumption of foods rich in vitamin C helps body develop resistance against infectious agents and scavenge harmful free radicals. Fresh ripe sapodilla is a good source of minerals such as; iron, potassium, calcium, magnesium, phosphorous, selenium, copper and zinc. These compounds are essential for optimal health as they involve in various metabolic processes in the body as cofactors for the enzymes.

The soft, easily digestible pulp of the fruit is made up with simple sugars like fructose and sucrose that when eaten replenishes energy and revitalizes the body instantly. The sapodilla thus called an energy fruit contains so much sugar that people with diabetes are advised to avoid eating it.

Sapodilla also helps promote collagen



production and will help rejuvenate the skin; so the fruit is good at slowing the aging process of the skin and can help prevent the formation of deep wrinkles. The pulped fruit is also good as a face mask.

A paste of the seeds is applied on stings and bites from venomous animals. The latex is used in the tropics as a crude filling for tooth cavities.

Many Ways of Eating Sapodilla

Generally the ripe sapodilla, un-chilled or preferably chilled, is merely cut in half and the flesh is eaten with a spoon. It is an ideal dessert fruit as the skin, which is not eaten, remains firm enough to serve as a “shell”. Care must be taken not to swallow a seed, as the protruding hook can lodge in the throat.

It was long proclaimed that the fruit could not be cooked or preserved in any way. But, if you have ready access to the fruit there are numerous ways to serve it: battered and fried like it is done in Indonesia, stewed with lime juice and ginger as done in Malaysia or pulped and added to cakes, fermented to make wine, and can even replace apples in pies. A dessert sauce can be made by peeling and seeding the ripe fruit, pressing the flesh through a colander, adding orange juice and topping with whipped cream. The flesh can also be blended into an egg custard mix before baking.

Fresh fruit sections are a great addition to fruit salads. Sapodilla milk shake is a favorite drink in Asia. It is also used in ice-creams, cakes, pies, sorbets etc. Bahamians often crush the ripe fruits, strain, boil and preserve the juice as syrup. They also add mashed sapodilla pulp to pancake batter and to ordinary bread mix before baking. It is also possible to make fine jam by peeling and stewing cut-up ripe fruits in water and skimming off the green scum that rises to the surface that appears to be dissolved latex. Adding sugar to improve the texture and sour orange juice and a strip of peel to offset the increased sweetness makes a jam of a very nice color where cooking with sugar changes the brown color of the flesh to a pleasing red.

Aroma Components

The nature of the compounds responsible for the characteristic flavor of sapodilla have been reported subsequent to obtaining representative samples of the aroma volatiles by means of a modified Likens and Nickerson apparatus using 2-methyl butane as the solvent, concentration by a low-temperature-high vacuum procedure and identification by GC-MS



using both EI and CI mass spectrometry techniques.

The fruit produces only a small quantity of aroma volatiles (in total about 5 µg/kg of fresh fruit) less than that obtained for most similar fruits and this partly explains its delicate flavor. A group of “benzyl related” compounds

comprise over 45% of the essence and includes a series of 5 alkyl benzoates. Methyl benzoate and methyl salicylate were both described as having sapodilla fruit aroma on odor evaluation of separated components at an odor port at the exit of the GC column. Ethyl benzoate and propiophenone have related aroma characteristics.

Chicle and Chewing Gum

A major by-product of the sapodilla tree is the gummy latex called "chicle" that contains about 15% rubber and 38% resin. Latex is tapped only if the tree is at least 20 to 25 years old. Each tapping yields only about 1kg of gum over a period of six hours; and trees are tapped only once in three or four years. Zigzag cuts along the tree trunk stimulate the thick white juice inside to drip out, that can be collected in small bags. At the factory this chicle is boiled with corn syrup, glycerin, sugar and flavoring. It is then dried, rolled and cut into bite-size pieces. This is how chewing gum was originally made, though not everyone makes it from natural chicle these days.

The dried latex was chewed by the Mayan people and was introduced into the United States by General Antonio Lopez de



Santa Ana about 1866 while he was on Staten Island awaiting clearance to enter this country. He had a supply in his pocket for chewing and gave a piece to the son of Thomas Adams. The latter at first considered the possibility of using it to make dentures, then decided it was useful only as a masticatory. He found he could easily incorporate flavoring and thus soon launched the chicle-based chewing-gum industry. In 1930, at the peak of production, nearly 14,000,000 lbs (6,363,636 kg) of chicle were imported. Efforts have been made to extract chicle from the leaves and unripe fruit but the yield is insufficient. It has been estimated that 3,200 leaves would be needed to produce 1 lb (0.4535 kg) of gum.



The Wrigley Company was a prominent user of chicle until the 1960s, when it was replaced by a less expensive material that made chewing gum cheaper to manufacture. There are only a few companies today that still make chewing gum from natural chicle and other natural gums. Today, most chewing gums are derived from man-made materials that provide highly consistent chewing quality. But, the chicle legacy remains and "chicle" continues to be the common word for chewing gum in Spanish and, of course Chiclets gum, which is named after chicle.



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THE LEGEND AND LURE OF LAVENDER

By R.O.B.Wijesekera

Historical & General Aspects.

The story of lavender goes back in time to ages prior to recorded history itself. Its alluring perfume was matched by its reputed curative powers. The ancient civilizations of Greece, Arabia, and Rome, and right down through the middle ages, the periods of the Renaissance and even to modern times witnessed the lure of Lavender grow into the legend it has become today. Its romantic touch may have also been provoked by an ancient lyric which was symbolized by the modern song called "Lavender Blue". The classical Lavender is botanically identified as: *Lavandula angustifolia*, and also referred to as *Lavande officinale*. A related species has also similar characteristics and this is botanically identified as *Lavandula latifolia*, also called Lavande aspic or spike lavender. Both species possess spectacular purple flowers with the alluring fragrance.

History records that the flowers of Lavender were used by the ancient Egyptians for their traditional embalming processes and this has been confirmed by modern archeological research into the tomb of Tutankhamen. It was used in the Indian civilizations in Kashmir



as a scent. The Greeks followed the Egyptians and used it as a fragrance particularly for over-

coming unpleasant odors. The Greek Physician Theophrastus wrote a volume on the curative properties of scents in which Lavender was a significant extract for anointing the head and feet. The ancient Romans were aware of the healing properties of Lavender, as well as its usefulness as an insect repellent and antiseptic. A Greek military physician Dioscorides, (circa 77 AD) wrote a five volume treatise entitled: De Materia Medica, in which he extolled the efficacy of lavender. He wrote that when taken internally Lavender relieved indigestion, sore throats and headaches.

It was well known even in China where it was used as cure-all medicinal oil known as White Flower Oil. Externally it was a wound healer and was effective in combatting burns. The Roman soldiers took lavender with them to heal war wounds. Pliny the Elder the reputed Greek writer also noted the health benefits of Lavender on a wider scale in combatting stomach problems, menstrual disorders, kidney ailments and suchlike. It was also noted that women hung lavender next to their beds to incite their passions! So Lavender continued its dominant role throughout the ages and into the Middle Ages as well. In England, during the times of the Tudor Monarchs, Lavender, had a pre-eminent position. Its efficacy, in regard to countering ill odors, was well recognized; as well as its insect repellent properties. Lavender waters were a popular choice for herbal baths, both with the Romans as well as the Greeks since ancient times.

In France and in the area of Provence, Lavender was the foremost aromatic plant grown. Grasse now regarded as one of the world's centres of the perfumery industry, was even in the middle ages a prosperous town. It was well positioned for trade with Italian cities. The region of Provence was believed to have had a "rich endowment of fragrance and an incredible palette of colours and scents" throughout the year. Assorted fragrant flowers were in bloom from Violets in March, orange blossoms in May, Tube roses from June to September, and finally Jasmines from August to October, while all summer long there was Lavender. The lovely fragrances emanating from the hills and valleys of

Provence were termed: A Symphony of Perfumes.

However there was a period when the leather and Tanning Industry intervened. The industry although enhancing the prosperity of the region cast unpleasant odors in the region due to the offensive smelly wastes from the tanneries leaking into the nearby rivers. The citizens while temporarily faced with this danger soon utilized the properties of lavender to counter this, and developed a new trade too in scented garments and gloves.

Culpepper in his book (1652) wrote: "Lavender is so well known being an inhabitant of every garden, that it needeth no description." He summed up its value as: "Two spoonful's of the distilled water of the flowers taken helpeth them that have lost their voice; as also the tremblings and passions of the heart; and faintings and swoonings"

Essential Oils and Distillation of Lavender

The Oils from the several species of Lavender have been since medieval times extracted by the method of steam distillation. This method overtook the ancient technique that was identified as enflourage, where the fragrant component was absorbed into an oil or waxy substance. In the distillation method which is now universally used, the fragrant ingredients of the flowers being volatile in steam are taken along with the vaporized steam, and when the vapors condense the oil settles on top as a separate layer which can conveniently be removed. This is the principle of the methodology used in the processing of essential oils in commerce. (Vide LNP Digest 2010 Vol.5, issue 1, p 17, 24, for a detailed discussion on Essential Oils).



Sketch of ancient steam distillation



An Alembic : Home distillation unit



Loading Operation of the Distillation stills



A modern commercial Lavender Distillation Assembly.

The chemical composition of the essential oil varies with the particular species of Lavender. The species that are of commercial importance are native to the regions near the Mediterranean. The true lavender is botanically identified as *Lavandula angustifolia*, or *Lavande officinale*, and the variety Spike lavender is identified as *Lavandula latifolia*.

The comparative approximate composition is as follows:

| Compounds | <i>L. angustifolia</i> | <i>L. latifolia</i> |
|----------------------|------------------------|---------------------|
| Linalool | 28-29% | 49-50% |
| Linalyl acetate | 33% | |
| Terpene alcohols | 5-6% | 2-3% |
| Terpene esters | 6-7% | |
| Terpene hydrocarbons | 7-8% | 1% |
| Sesquiterpenes | 7-8% | 2-3% |
| Ketones | 1-2% | 13% |

NB : The Above values are variable from one situation to another.

There are many cultivars of Lavender but in the main only three species are used for the production of the oil on a commercial scale. They are : *L. angustifolia*, *L. latifolia*, and the hybrid *L. angustifolia x L. latifolia*. What is termed "True Lavender Oil" is obtained from *L. angustifolia* syn. *L. officinalis* = *L. vera* = *L. spica*.

What is referred to as Lavandin Oil is distilled from the hybrid species *L.angustifolia x L.latifolia*. French Lavender oil is distilled from the species *L. dentata* and Spanish Lavender Oil from the species *L. stoechas*. The oil distilled from *L. latifolia*, syn *L. spica* is referred to a Spike Lavender Oil.

The world production of Lavender oil is around 200 metric tonnes per year and the production of lavandin is fivefold more. In price lavandin fetches a lower sum but the yield of oil is higher. True Lavender oil used mainly in the fragrance industry is mostly of French origin although Lavender is widely cultivated and the essential oils distilled in Bulgaria, USSR, USA, England, and the Balkan and upper Mediterranean regions and recently in Australia and South Africa.

Agronomic Aspects of Lavender

Lavender is a perennial bushy shrub and usually has a compacted bushy growth form.

The aromatic evergreen leaves are opposite and reaches up to around 5-6 cm in length. Lavender can be propagated by seed, cuttings, layering, tissue culture, and division of roots. Propagation by seed is not popular where genetic uniformity is a primary consideration. Cuttings are made from young top shoots of selected plants grown outdoors, and inserted into a growing medium of compost and sand. Once rooted the plants are transplanted onto prepared beds. High quality oils are generated by plants that are nursed on natural soils and such crops fetch the premium prices globally. Regular pruning and expert harvesting techniques are applied in the production of quality raw material for distillation of oils.

Lavender as a Fragrance

Lavender is one of the most widely used fragrance materials in modern perfumery. The complete bouquet of the essential oil of Lavender contains a myriad of fragrance notes which attract the olfactory senses. This is the reason that lavender has been used for centuries as a fragrance material in various forms.



A Lavender Balm

Today it is a constituent of a large number of commercial perfumes. Its perfume is acceptable to most and brings a sense of wellbeing and relaxation which had been recognized through the ages. Furthermore, in the modern milieu it is used for a variety of applications such as: deodorants, body lotions, scenting of linen, atmospheric sprays, colognes, massage oils, and has contributed towards this modern age lifestyles.

Lavender as a Therapeutic agent

Since medieval times Lavender has been systematically used for a variety of ailments. Published

recognized texts on what is this day termed “alternative medicine” mention the use of lavender to counter many ailments. Treatment of burns and scalds come down to us from ancient times when it was satisfactorily used for such conditions. It is deemed to be a natural antibiotic, an antiseptic, and anti-depressant, a sedative as well as a detoxifier. For all of these there is plenty of clinical evidence that comes through when it has been used with confidence by folk during the past several centuries. Recently there has been evidence that Lavender promotes the healing of wounds and prevents scarring by stimulating the immune system to contribute to the healing process. It causes the cells of the wound to regenerate swiftly. It’s most popular use today is in its role as an agent that contributes towards combatting stress, allaying the effects of traumatic shock and bringing about psychological and mood balance. In this role it is a significant addition to the therapeutic armory of modern “Aromatherapy”.

It is the French chemist Rene Gattefosse who is credited with having initiated the modern techniques of therapy now popularly identified as “Aromatherapy”. In this the oil of lavender played a significant role as Gattefosse is supposed to have discovered at first hand the efficacy of the oil when he accidentally dipped a scalded hand into it and gained instant relief. In the new field of Aromatherapy, Lavender is one of the oils that is extensively used. It is credited with the attribute of combatting the symptoms of stress so common in modern day life. Several of the therapeutic oils, combinations of essential oils and fixed oils, do contain lavender as a constituent. The lavender scented waters too are utilized today as constituents of herbal baths. Lavender added to other constituents is believed to synergize the total curative effects of the bath.



A herbal bath in granite (Mihintale)

Herbal baths were a technique of therapy extensively employed in the older systems of medicine the world over. They are common to the Ayurvedic system as well, and with the renewed faith in these older systems, herbal baths with fragrant materials included in them have gained credence and popularity. They have become a component of modern therapy as well.

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A sustainable fragrance industry cannot add man made waste to the earth’s crust, deforest its surface, harm its water supplies, nor rely indefinitely on petrochemicals. What the industry must do is to harness green chemistry to find new sustainable ingredients, improve yields in natural and synthetic ingredients production, and use less biomass to produce more material. Most of all a sustainable industry must meet the needs of the earth’s people.

*Costino Policastro, Executive President,
Gioaudan, Manhattan*

ASAVA'S & ARISHTAS - THE HERBAL WINES OF THE AYURVEDIC THERAPEUTIC ARMOURY.

by Vikrama

Introduction

Ayurvedic therapeutic agents are of diverse types. They include herbal teas, infusions, decoctions, tinctures, capsules and powders, infused oils, ointments creams and lotions as well as *Asavas* and *Arishtas*.

Asavas and *Arishtas* are the fermented biomedicines of the Ayurvedic system, and their production process is unique. It is called *Sandana Kalpana* or autofermentation. In these auto-generated fermentations based on traditional Ayurvedic technology, the herbal juices as in the case of *Asavas* and the aqueous herbal extracts as in the case of the *Arishtas*, are permitted to undergo fermentation generating alcohol in situ, to enable completion of a progressive extraction process.

Asavas are prepared by directly using fresh herbal juices and *Arishtas* are made with decoctions of herbal materials in boiling water. In both instances fermentation is promoted by the addition of a supplementary source of sugar and facilitated with the flowers of *Woodfordia fruticosa* Kurtz, or sometimes, sans any agent to force the development of the yeast to aid the fermentation process.

The diverse physical nature of herbs which include leaves, fruits and flowers which are soft and juicy and roots, barks and heartwoods make the technological aspects difficult, particularly in the comminution of the material.



These medicinal wines or herbal tonics as they are called in modern terminology, generated from the diverse mixtures of herbs by auto-fermentation, generally contain 10-12% alcohol. They are named after a major plant or group of plants that characterize the mixture from which the preparation is made. Many of them contain various spices too, added for flavor or to augment the medicinal value by synergistic action. They are generally sweetish with a pleasant agreeable taste and aroma. The medicinal wines are used as tonics and do have several advantages over other Ayurvedic preparations. They

are deemed to have superior keeping qualities and are to possess better bioavailability and thereby better therapeutic value. It is argued that the fermentation process wherein alcohol is generated in situ in slow fashion in progressively increasing quantity, enables better extraction of the drug molecules from the plant material, and further it is felt that the preparation is a more facile drug delivery system into the human body. They are an important part of Ayurvedic therapy.

Features of the Therapeutics of Ayurveda.

According to Ayurvedic theory the main objective of a health care system is to enable the individual to attain the body's own characteristic state of optimal health. This is known as *Swasthiya*. This state presupposes that several states of equilibria are achieved namely the following:

- Structural & Physiological equilibrium or *Samadasa*
- Equilibrium of metabolic processes or *Samagni*.
- Equilibrium of body tissues or *Samadhatu*
- Equilibrium of the elimination systems or *Samamalkriya*
- Equilibrium of the senses or *Prasannandriya*
- Equilibrium of the mind or *Prasanamana*
- State of contentment or *Prasannathma*

Ayurveda also recognizes a mandatory daily routine and a seasonal routine for the prevention of disease known respectively as: *Dinacharya* and *Ritacharya*.

Ayurveda recognizes the variations between individuals and the diagnosis is based on its main *Tridosha* theory or the theory of the equilibrium of the three humours. *Vata*, *Kapha* and *Pitta*. Disease results from the disturbance of the equilibria. (Vide Link Natural Digest No.2-2011)

Technology of Asava and Arishta Processing

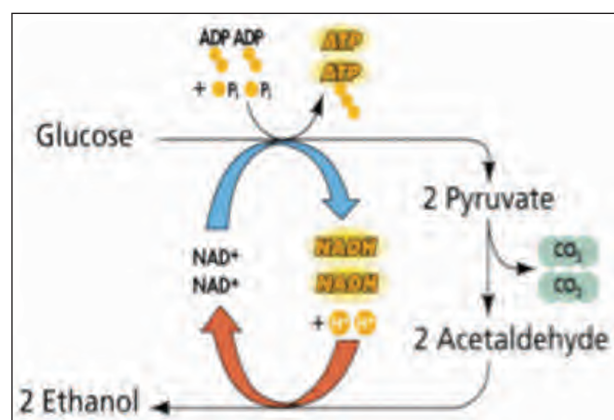
The preparation of *Arishtas* and *Asavas* by traditional technology was originally carried

out using clay vessels with a glazed exterior and later replaced with porcelain vessels. The vessels had suitable lids as covers with a paddle as a stirrer. The main process is an auto-fermentation with simultaneous extraction of the medicinal factors into an aqueous alcoholic medium. It is known in Ayurvedic terminology as: *Sandana Kalpana*. In modern factories the process of *Sandana Kalpana*, has been carefully simulated with modern process technology. Now the process is conducted in stainless steel equipment and the fermentation technology observes the modern trends developed as in the case of the production of wines.

Briefly the original Ayurvedic technology of *Sandana Kalpana* consisted of the following operations:

- Making a decoction or cold infusion of the coarsely powdered, prescribed herbs.
- Addition of a measured quantity of a sugar source such as jaggery, (from molasses or Kithul palm), together with flowers of *Woodfordia fruticosa* as an inoculum to initiate fermentation.
- The substrate mixture is placed in a vessel - a Clay Pot in the traditional mode, (now a stainless steel vessel in the modern mode), for fermentation by anaerobic method.
- After fermentation followed by maturation, flavoring agents are added.
- The substrate is stored for a time in a cool room, filtered, and bottled, and ready for the consumer.

Principle of the Sandana Kalpana technology.



Science of the Process of fermentation



Sorting & checking the herbs before extraction

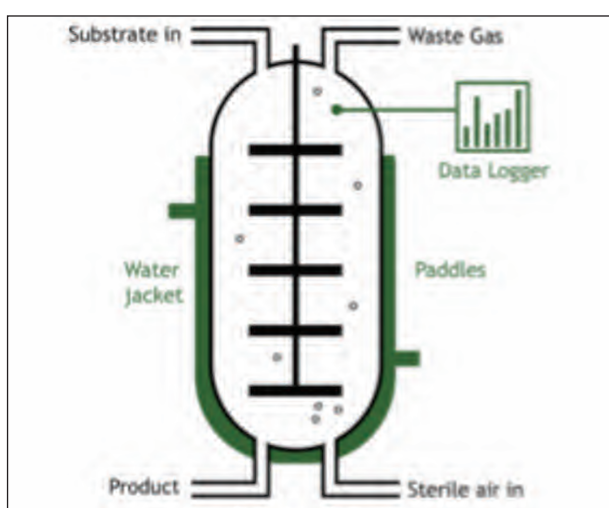


Diagram of a modern Fermenter vessel



Fermentation in a modern factory (LINK)

The process of *Sandana Kalpana* is characterized by the four types of components employed. In each *Arishta* or *Asava*, there is a characteristic assembly of prescribed herbs by which the preparation is therapeutically identified and known. The decoction or infusion is

made from these main herbs. They are believed to yield the therapeutic agents which are important in the medicine. Then the flavoring agents which are added are also herbs and spices, which besides contributing to the overall flavor also have a role in synergistically enhancing the therapeutic effect of the main herbs. The fermentation initiator, in the form of flowers of *Woodfordia fruticosa*, which provides the inoculum is then introduced, and this will start the fermentation process. Finally the sugar medium, which is required for the fermentation is added. This is generally in the form of molasses jaggery, palm jaggery, or sometimes even sugar itself. The process of fermentation is similar to that which occurs in any form of alcohol production from a sugar base. In the case of *Arishtas* and *Asavas* the slow auto-production of the alcohol in situ with the herb is believed to bring about a smooth and continuous extraction of the biologically active plant metabolites which have the required therapeutic properties. In the Ayurvedic system the texts describe further details of the technology of the *Sandana Kalpana*. These include the relative ratios of herbal material, water, sugar medium and inoculum, which should form the substrate to be loaded into the fermentation vessel. Something that is unique in the preparation of alcoholic medicaments in the Ayurvedic system is that the inoculum of yeasts needed for fermentation comes from the flame red flowers of *Woodfordia fruticosa*. These contain a wild species of yeast and its chemical constitution with the presence of an array of polyphenolic substances is believed to be uniquely favorable to the growth of yeasts. There are however instances where the fermentation is allowed to go ahead without any inoculum but these are for special cases.



Woodfordia fruticosa flowers



Jaggery from the Kithul Palm

The fermentation process takes about a week to ten days but the process parameters in a modern factory situation are worked out scientifically and an optimized process protocol for the entire operation for each type of preparation is compiled. This is based on examination of the final product by modern analytical techniques such as TLC-densitometry, and HPLC to ensure that the product itself is no different from that which results from the original methodology.

The final preparation after filtration, is bottled and labeled for consumer distribution but although it is time dated, there is a belief that the effectiveness is enhanced with ageing and maturation.. However other factors such as sedimentation may occur as with all plant extracts and the efficacy enhancement is not established. Here again the factory depends on its scientifically optimized methodology.

Merits of the Herbal wines

There are some established beliefs in regard to Ayurvedic herbal wines, and some of the attributed characteristics could indeed have a scientific basis. As regards the therapeutic efficacy the time honored usage is a most significant factor in support of the preparations. The merits of the process and the products are summarized as follows by Prahst. (2007).

- Fermentation extracts a wider range of active ingredients from the herb than any other method since the menstruum undergoes a gradient of rising alcohol levels.
- Fermentation ruptures the cells of the plant material exposing it openly to the

menstruum and the bacteria have enzymes that can break down the cell walls to further assist the leaching process. Thus an active transport system is created that can move the dissolved constituents from the herbal material to the menstruum.

- Fermentation removes most of the undesirable sugars from the plant material and renders the product more bio-available, eliminating side effects such as gas and bloating.
- The fermentation method removes any contaminating heavy metals, and lowers the toxicity of some of the toxic components in plants.
- The fermented products have much longer shelf life periods under severe conditions.

Concluding Observations

Arishtas and *Asavas* are dominant therapeutic products used within the Ayurvedic system. Given the established merits of this class of products, and the well-established process technology that is associated with their production, they form an important class within the armory of Ayurvedic therapies. Technologies for the processing of these herbal wines have now been modified on modern lines to ensure better and more efficient extraction of the inherent chemical metabolites. The use of stainless steel equipment falls in line with modern processing trends although the technology itself is carefully adapted to simulate the original principles required by the Ayurvedic system of *Sandana kalpana*. There is a large variety of *Arishtas* and *Asavas*, based on the combination of plant species selected to each formulation. This category of therapies, are available to address almost all ailments recognized within the system of Ayurveda. What is now well recognized is that the combination of herbs can cause amazing synergistic effects whose benefit it is not easy to evaluate. Accordingly the research now known as “synergy research” is a step in the correct direction. Research in regard to the mode of action of this class of therapeutic agents is by no means simple but indeed most warranted. It would be in the interests of all mankind.

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Some of my cousins who had the great advantage of University education used to tease me with arguments to prove that nothing has any existence except what we think of it. ... These amusing mental acrobatics are all right to play with. They are perfectly harmless and perfectly useless. ... I always rested on the following argument... We look up to the sky and see the sun. Our eyes are dazzled and our senses record

the fact. So here is this great sun standing apparently on no better foundation than our physical senses. But happily there is a method, apart altogether from our physical senses, of testing the reality of the sun. It is by mathematics. By means of prolonged processes of mathematics, entirely separate from the senses, astronomers are able to calculate when an eclipse will occur. They predict by pure reason that a black spot will pass across the sun on a certain day. You go and look, and your sense of sight immediately tells you that their calculations are vindicated. So here you have the evidence of the senses reinforced by the entirely separate evidence of a vast independent process of mathematical reasoning. We have taken what is called in military map-making "a cross bearing." ... When my metaphysical friends tell me that the data on which the astronomers made their calculations, were necessarily obtained originally through the evidence of the senses, I say, "no." They might, in theory at any rate, be obtained by automatic calculating-machines set in motion by the light falling upon them without admixture of the human senses at any stage. When it is persisted that we should have to be told about the calculations and use our ears for that purpose, I reply that the mathematical process has a reality and virtue in itself, and that once discovered it constitutes a new and independent factor. I am also at this point accustomed to reaffirm with emphasis my conviction that the sun is real, and also that it is hot--in fact hot as Hell, and that if the metaphysicians doubt it they should go there and see.

Winston S. Churchill, My Early Life, Fontana, London, 1972, pp 123-124. (1) Newer edition available from Amazon.com

ASAVAS AND ARISHTAS AVAILABLE FROM LINK NATURAL

Several *Asavas* and *Arishtas* are produced in the state-of-the-art factory of Link Natural Products, following the traditional formulations substantiated by scientific knowledge.

• ASAVAS

Aravindasavaya

Aravindasavaya is a tonic herbal preparation used for the treatment of loss of appetite and malabsorption disorders. It is especially good for children.

Chandanasavaya

Chandanasavaya is used for the treatment of spermatorrhea, gonorrhoea, leucorrhoea and urinary disorders. It is also used as an appetizer, depurative and as a tonic herbal preparation.



Processing of Asavas & Arishtas at Link Natural Factory

Chavikasavaya

Chavikasavaya is a herbal preparation used to treat loss of appetite, anorexia, cold, cough, catarrh, ascites, hernia and Prameha.

Kanakasavaya

Kanakasavaya is a haemostatic herbal preparation used for the treatment of asthma, cough, bronchitis, consumption and other respiratory ailments and chronic fever. It is also used as an anti-spasmodic in the respiratory system.

Kumaryasavaya

Kumaryasavaya is used for treating udararoga, all types of prameha, epilepsy, dysuria, biliary calculi, hepatic disorders, intestinal worms and raktapitta. It is used as a tonic, stomachic, digestive, appetizer, aphrodisiac and anthelmintic herbal preparation.

Lauhasavaya

Lauhasavaya is used for the treatment of anaemia, oedema, ascites, anorexia, fistula, haemorrhoids, skin diseases, splenomegaly and malabsorption disorders. It is used as an appetizer, digestive and is a tonic herbal preparation.

Pippalyadyasavaya

Pippalyadyasavaya is used for the treatment of anorexia, indigestion, cold & cough, catarrh, loss of appetite, acites, anaemic disorders and haemorrhoids. It is used as an appetizer and as a digestive herbal preparation.

Punarnavasavaya

Punarnavasavaya is used specially for the treatment of oedema, ascites, splenomegaly, hyperacidity of the stomach and skin diseases. It is used as a depurative and diuretic herbal preparation.



Sharivadyasavaya

Sharivadyasavaya is used for the treatment of carbuncle, all types of Prameha, skin diseases, gonorrhoea, burning sensation all over the body and fistula. It is used as a depurative herbal preparation.

Ushirasavaya

Ushirasavaya is used for the treatment of haemoptysis, burning sensation, anemic diseases, skin diseases, bleeding piles and oedema. It is used as a refrigerant, haemostatic and is a tonic herbal preparation.

Vasakasavaya

Vasakasavaya is used for the treatment of cough and asthma. It is used as a depurative and expectorant herbal preparation.

ARISHTAS

Abhayarishtaya

Abhayarishtaya is specially used for the treatment of hemorrhoids. It is also used to treat malabsorption disorders, constipation, anemic disorders, anorexia, skin diseases, dropsy, jaundice and flatulence. It is used as an appetizer, mild laxative, and body tonic.

Amurtharishtaya

Amurtharishtaya is used to treat fevers, rheumatism, muscular and joint pains. It is used as a febrifuge, anti-inflammatory and anti-rheumatic agent.

Arjunarishtaya

Arjunarishtaya is used for the treatment of heart diseases, (especially weakness of the heart muscle), fractures and ulcers. It is used as a tonic and also has a cooling effect.

Ashokarishtaya

Ashokarishtaya is used for the treatment of dysmennorrhoea, bleeding disease, loss of appetite, 'Prameha' and oedema. It is used as a depurative and astringent agent.



Ashvagandharishtaya

Ashvagandharishtaya is used for the treatment of apoplexy, insanity, nervous diseases, debility from old age, lack of energy, low vitality, sexual debility, infertility, insomnia, arthritis and weak immune functions. It also could be administered on emaciated children. It is used as a tonic, alterative, aphrodisiac, nutritive, rejuvenative and antirheumatic agent.

Balarishtaya

Balarishtaya is used for the treatment of nervous diseases and general debility. It is used as an appetizer and body tonic.

Danthayarishtaya

Danthayarishtaya is used to treat hemorrhoids, malabsorption disorders, anemic diseases and anorexia. It is used as an appetizer and digestive agent.

Dashamoolarishtaya

Dashamoolarishtaya is used for the treatment of general debility, flatulence, and in nervous and cardiovascular disorders. It is used as a tonic, alterative, nutritive, rejuvenative and antirheumatic herbal preparation.

Drakskarishtaya

Drakskarishtaya is used for the treatment of cough, asthma, bronchitis, hoarseness, anorexia, loss of appetite and general debility. It is used as an expectorant, appetizer and digestive herbal preparation.

Kadirarishtaya

Kadirarishtaya is used for the treatment of skin diseases, eczema, psoriasis, wounds, tumors, speleanomegally, intestinal worms, ascites and anemic disorders. It is used as a depurative, appetizer and anthelmintic herbal preparation.

Musthakarishtaya

Mushtakarishtaya is used for the treatment of indigestion, loss of appetite, malabsorption disorders, diarrhea and anemia. It is used as an appetizer, digestive and antidiarrhoeal herbal preparation.

Nimbarishtaya

Nimbarishtaya is used for treatment of leprosy, skin diseases, eczema, leucoderma, pruritis, wounds, ulcers and tumours. It is used as a depurative, liver tonic, anti-helminthic and urinary astringent herbal preparation.

Sarasvatharishtaya

Sarasvatharishtaya is used for treatment of insanity, hoarseness, loss of memory and infertility. It is used as a tonic (Physical and mental) and rejuvenative. It has the ability to enhance skin complexion and improve memory power.

ASHWAGANDHA – *Withania somnifera* A SHEET ANCHOR IN AYURVEDIC THERAPY.

By A.A.Leslie Gunatilaka* and R.O.B.Wijesekera

Overview

Withania somnifera Dunal, is commonly known as “Ashwagandha” which in Sanskrit means the odour of horses. Curious though this may, be the roots of this plant which are the main parts used in therapy, happen to simulate the sweat odor of horses. It is a plant which belongs to the family SOLANACEAE which also produces such commonly known food plants such as the tomato, the aubergene or brinjal, and another similarly popular vegetable well known in Sri Lanka as Batu or Elabatu. Like the tomato, Ashwagandha bears yellow flowers and a red fruit which is berry-like in shape. It is also called the “Winter Cherry” a name which amply suits its appearance. In Sri Lanka and Malaysia, and also in Tamil Nadu in India, it is known as “Ammukkara” or “Ammukkaran”. This name may also apply in the Indonesian region.

In the North American region it is available as an OTC (Over The Counter) supplement and is recommended for stress conditions and as a rejuvenative agent.

Ashwagandha grows prolifically in the Indian subcontinent and in Sri Lanka and is used in the Ayurvedic system of medicine as treatment for a wide variety of musculoskeletal conditions such as: rheumatoid arthritis, and as a constituent of general tonics. The Latin name for the species, *somnifera*, means “sleep inducing” which indicates that it was considered a sedative in some parts where it was used. Herbalists refer to Ashwagandha as “Indian ginseng” possibly on account of the multiple curative properties attributed to the plant. Legend has it that during the conquests of the Greek general Alexander the Great, it was found that the plant had been used to prepare wine. It had been also recorded that in the Old English Herbarium it was called “apollinaris” and also “glofwyrt”,

and that according to legend it was first discovered by Apollo who gave it to the healer Aesculaptus.



Its wide and varied use in therapy is such, that today it has been extensively domesticated from the spontaneous flora, and in India five different improved cultivars have been developed for enhanced size of root, and adaptation to different climatic conditions. The appeal of the plant is manifest in the fact that several companies from the USA and Japan have filed patents for formulations containing extracts of the herb for uses such as skin conditions, promoting reproductive fertility, and arthritis.

* Dr. A. A. Leslie Gunatilaka is Professor, School of Natural Resources & the Environment and the Director, Southwest Centre for Natural Products Research and Commercialization of the University of Arizona.

Uses in Ayurvedic Medicine

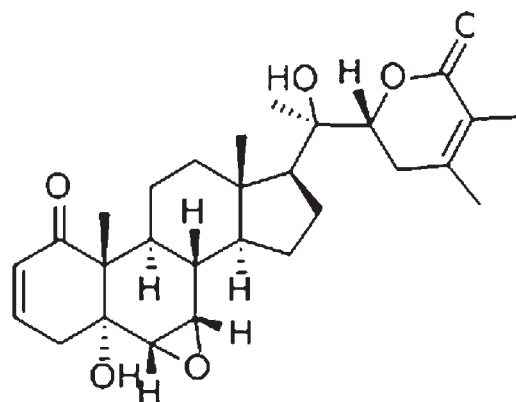
Ashwagandha is one of the most valuable medicinal plants in the Ayurvedic pharmacopoeia. It is primarily employed in preparations prescribed for conditions of stress, anxiety, depression, insomnia and also in the treatment for rheumatoid arthritis and related conditions. In arthritic conditions it is the concept in Ayurveda that the pains in the joints that are characteristic of this disease, are the result of the body's degenerative process. Ashwagandha is prescribed as a long term treatment for the process of ageing and is regarded as a rejuvenating agent. A popular Ayurvedic preparation is the herbal wine or Arishta known as Ashwagandha arishta which is prescribed for regular use as a rejuvenating agent to counter the effects of the body's degenerative process with time. The plant is also considered useful in boosting the body's resistance to infections.

Chemical studies

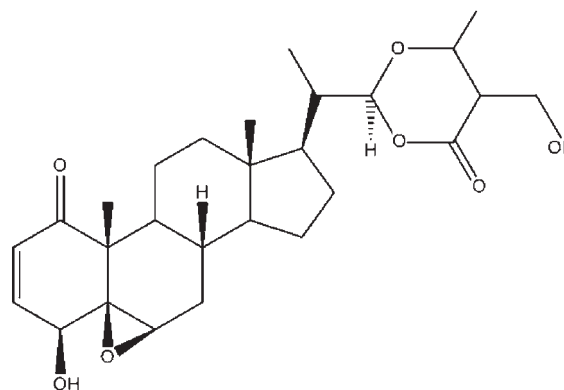
In the half century following the World War II there was considerable worldwide interest in the medicinal plants used in Ayurvedic therapy; and Ashwagandha was one of the primary candidates for chemical examination. During that period phyto-chemists conducted their researches primarily to isolate new chemical entities with interesting chemical structures and interest in biological activity was merely the shadow behind the exercise. As a consequence many of Ashwagandha's biological effects have not been completely scientifically searched. This may have given rise, understandably, to skepticism when considering a herb with so many claims to usefulness. During this period the term "Adaptogen" was used to describe such herbs that cause adaptive positive reactions to disease and had proved useful in cases of many unrelated illnesses. Ashwagandha was such a case that showed itself, (in terms of western concepts), as being able to produce "a state on non-specific increased resistance." Since then the chemistry of *Withania somnifera* had been studied extensively. Now well over 45 constituents have been isolated and characterized in terms of their chemical structures. The biologically active chemical entities are:

- Twelve Alkaloids - including: tropanol, isopelletierine, anaferine.
- Thirty five Steroidal lactones (Now called Withanolides, and Withaferins)

- Withanosides, ie. Withanolides with a sugar attachment.
- Saponins, containing an additional acyl entity, (Sitoindosides),



Withanolide



Withaferin A

Current scientific research has been able to corroborate some of the biological activities that have been attributed to the plant Ashwagandha.

Pharmacological studies

Antiinflammatory activity

Ashwagandha has proved itself to be effective in a number of conditions related to arthritis and rheumatism. There is ample clinical evidence for this. Researchers attribute this in part to the anti-inflammatory properties of the extracts which have been studied recently in animal models. They have recorded considerable reduction in inflammation, and found it was more effective than phenylbutazone under comparative conditions.

A double blind placebo controlled clinical trial has supported the possible use of Ashwagandha as therapy for arthritis. The study involved 42

osteoarthritis patients who were randomized, to receive a preparation of Ashwagandha or a placebo over a period of three months. The usual precautions and conditions for such a study were observed. It was found finally that the herbal formula, which contained about 70% Ashwagandha together with turmeric, an oleo gum resin of *Boswellia*, with a zinc complex, significantly reduced the pain levels.

Anti-tumour properties

Anti-tumour effects of extracts of Ashwagandha, have been observed in a variety of animal studies by different laboratories but no clear mechanisms have been postulated. A growth inhibitory effect has been recorded in sarcoma S-180, a transplantable mouse tumour. Other studies with promising indications have been recorded with some of the isolated constituents of Ashwagandha like Withaferin A, and the studies were promisingly suggestive of anti-tumour activity.

Anti-stress effects

Experiments on the anti-stress effects of the extracts of Ashwagandha, as well as the isolated individual compounds abound, but apart from positive indications which point to the need for further studies, no mechanistic postulates are available as yet. The extracts as well as the Sitenosides displayed considerable effects in tests with mice and rat models. With mice in a swimming performance test in water the extracts approximately doubled the time in comparison with controls. The Sitenosides exhibited significant anti-stress activity in mice and also displayed other positive responses. The inevitable conclusion is that if the effects recorded in animal models could be reproduced in humans, Ashwagandha would be an effective therapy in the treatment of a variety of stress conditions.

Anti-oxidative effects

It is believed that free radical damage of nervous tissue contributes to neuronal loss in cerebral ischemia, and also contributes towards neurodegenerative diseases and ageing. Examples are Alzheimer's disease, Parkinsonian syndrome etc. The traditional usage of Ashwagandha seems to be associated with diseases resulting from free radical oxidative damage, and it is likely that its beneficial effects may

be due to a degree of anti-oxidant activity. The active constituents such as Sitenosides and Withaferin A, have indicated in experiments on animal models, that the plant has an effect on the brain which may account for its diverse pharmacological properties.

Immunomodulation

Experiments conducted with preparations of Ashwagandha on animal models leads to the conclusion that there is more than substance in the contention that it boosts the immune system. It produced significant anti-stress activity in mice and rats and augmented learning acquisition and memory retention in both young as well as old specimens. Researchers have recorded significant increases in hemolytic antibody responses towards human erythrocytes which indicated immunostimulatory activity.

Clinical studies on male volunteers gave reason to infer that Ashwagandha was a useful tonic for both young and old. All subjects in the study aged 50-59 displayed significantly increased haemoglobin and RBC counts, and improvements in hair melanin and seated stature. Over 70% reported increased libido.

Similar trials enhanced the reputation of the drug as a relaxant. Ashwagandha seems to produce many effects. They include anti-inflammatory, antitumour, and immunomodulatory properties as well as exerting an influence on the endocrine, nervous and cardiopulmonary systems. Accordingly the experimental evidence indicates that the plant may be effective in the treatment of ailments such as arthritis and similar musculoskeletal disorders, stress-induced nervous disorders, and hypertension.

New water-soluble analogue of the anti-cancer drug Withaferin A.

Researchers of the University of Arizona, headed by Leslie Gunatilaka, have found many other virtues of Ashwagandha. Besides developing a new quick-growing method to produce Ashwagandha in bulk and hence substantial quantities of its major chemical constituent Withaferin A in a water soluble form (Withaferin A sulfate), they have found that this compound and Withaferin A have potent anti-cancer activity against pancreatic cancer and brain tumors. The research has been con-

ducted at the Southwest Centre for Natural Products Research and Commercialization of the University of Arizona. (Presentation made by Prof. Gunatilaka at Link Natural Products Pvt. Ltd, Dompe, on 28 th September. 2011)

Agronomy



Ashwagandha cultivation

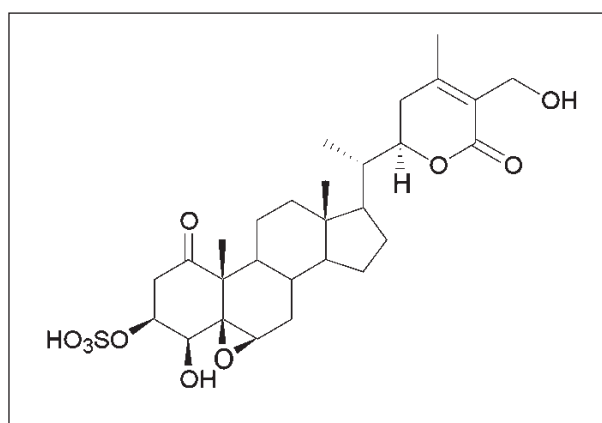
In the spontaneous state *Withania somnifera*, is a plant that grows profusely and occurs in the entire Indian sub-continent as well as in Sri Lanka. Planned cultivations are carried out mainly in India where it is a sheet anchor for therapy within the Ayurvedic system of Medicine. Fields with good water drainage and with a slightly basic soil are deemed ideal for such cultivations. Regions with around 500-700 mm of rainfall, and altitudes ranging from 600 - 1200 meters, and temperatures ranging from 20-32 degrees centigrade, are the climatic zones ideally suited for the crop. It can be a profitable cash crop in fields that are not well irrigated such as the marginal lands in arid areas of the island in the case of Sri Lanka. In the method developed in Arizona by the team led by Gunatilaka, the roots of the plants are artificially irrigated within an aeroponic chamber, and a profusion of root as well as foliage results, enabling the generation in turn, of comparatively large quantities of the active substance Withaferin A. This method represents a paradigm change in agro-technology of medicinal plants, and may come to be applied in other similar cases as well. It also represents maximizing the use of water now regarded as one of the crucially scarce commodities of the world.

Propagation from seeds

The seeds are first allowed to germinate in a nursery bed and then the seedlings are



Ashwagandha cultivation under an innovative aeroponic technique developed by Gunatilaka et al. at the University of Arizona



Water-soluble form (prodrug) of Withaferin A (Withaferin A sulfate) present as a major constituent of aeroponically grown *Withania somnifera*.

planted in rows in prepared field beds which have been well ploughed and aerated. The seedlings are generally about a month old when they are ready to be transplanted. Given the ultimate medicinal use of the plant there is a general reluctance to use artificial fertilizer. In extreme conditions where the soil is poor, the use of organic manure is recommended but in general the crop is managed without any addition of fertilizer. It is also a crop which can thrive in rain fed conditions only. Watering may be considered if conditions of severe drought prevail and the crop itself is endangered. Otherwise it is a crop that sustains itself where other food crops do not.

Harvesting

The crop can be harvested after about 40-48 weeks generally. By this time the red cherry-esque berries have begun to appear. The whole plant together with the roots is removed.

The berries are handpicked and separated. The whole plant is washed and the roots are cut off about 20-30mm. distance from where the aerial part commences. The roots and berries are dried. The roots which form the major drug are chopped to smaller dimensions and stored. The dried berries are used to generate the seeds for further propagation. About 350-400kg of Ashwagandha root can be expected from a single hectare.

Concluding Observations

The evidence is heavy in regard to the beneficial effects of Ashwagandha. Research into the mode of action of its chemical constituents is now the focus that is receiving worldwide scientific attention. Clarification of these and the effect of the multiple Ayurvedic prescriptions involving the plant will enlighten the scientific community in a manner that will focus even greater attention on the therapies of Ayurveda as a goldmine in reserve to combat the diseases that now dominate mankind.

Withania somnifera is written as "Ashwaganda" as well as "Ashwagandha" in English texts.

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Everyone wants to have a shot at changing the world – and of course, get credit for doing so.

Richard Schrock Hon. FRSC, Nobel Laureate

CLINICAL TRIAL WITH SAMAHAN

Daily use of Link Samahan reduces incidence and severity of upper respiratory symptoms in healthy volunteers: an open label, randomised controlled clinical trial

By Chandani Rupasinha, Chamari Wickramathilake, Ranjith Gamage, Samantha Tennakoon, Roshini Sooriyarachchi and Colvin Goonaratna

Efficacy of a daily intake of one sachet of Link Samahan in reducing the incidence and severity of 15 upper respiratory symptoms associated with catarrh and colds, has been firmly established in a clinical trial of a cohort of over 950 volunteer participants conducted by an expert research team in Sri Lanka. The study has been approved by the Sri Lanka Medical Association's Ethical Review Committee (ERC/10-14), and registered by the Sri Lanka Clinical Trials Registry (SLCTR/2011/001). This study compared the effect of taking one sachet daily of Link Samahan in warm water for 84 consecutive days, on 15 CLINICAL upper respiratory symptoms, previously validated for reliability, responsiveness, importance-to-patients, and convergence with other measures, in a cohort of healthy volunteers (test group, n=465), with a similar cohort taking only plain tea at approximately the same time of day (control group, n=491). Both cohorts were derived from 1020 volunteers by random allocation.

Participants of both study groups completed a daily log, to document the incidence and severity of the 15 upper respiratory symptoms (excess sneezing, runny nose, blocked nose, scratchy eyes and tearing, scratchy throat, sore throat, hoarseness, feverishness, tiredness, headache, scratchy ears, blocked ears, loss of appetite, body pains and difficulty in accomplishing daily tasks) on a 4-point scale (0 = no symptom, 1 = mild symptom, 2 = moderate symptom, and 3 = severe symptom). Log sheet analyses were performed by professional statisticians who were blinded to the identity of the group to which volunteer participants belonged. The results of this study show that at the end of 84 days, when compared to the control group, the average incidence of all 15 symptoms in the test group showed significant reductions at $P<0.001$ for 6 symptoms, at $P<0.005$ for 3 symptoms, and at $P<0.05$ for the remaining six.

Reduction of average incidence over time also was highly significant ($P<0.001$) for 2 symptoms and ($P<0.005$) for 7, and significant ($P<0.05$) for 4 symptoms, but only marginal for the balance two. Severity was significantly reduced ($P<0.05$) for 7 symptoms, and reduced also for the other 8 according to descriptive analysis, though not significant at the 5% level.

The results of this clinical trial indicate that taking one sachet of Link Samahan significantly reduces average incidence, incidence over time, and severity of 15 upper respiratory symptoms in healthy adults. Findings of this trial are published in Ceylon Medical Journal 2012;57: 21-32. Full details of the trial can be found on <http://www.sljol.info/index.php/CMJ/article/download/4197/3441>.

Upper respiratory tract inflammation occurs commonly in both children and adults, and is a major cause of morbidity. These troublesome inflammations consume resources from individuals and from the society, as they are responsible for frequent absenteeism from school and employment, and for obtaining medical care. So the results of this study indicate another dimension for investigation apart from Link Samahan's clinical efficacy ie. the probable effects of Link Samahan in curbing absenteeism and increasing output among employees in highly productivity-oriented industries by reducing incidence and severity of distressing upper respiratory symptoms.

Link Samahan is an over-the-counter standardized preparation widely used for over 15 years, both in Sri Lanka and overseas. Presently the total local sales and exported sales exceeds 100 000 000 sachets annually. It is a 100 % herbal health product made from a time-tested efficacious formula comprising *Adhatoda vasica*, *Alpinia galanga*, *Carum copticum*, *Coriandrum*

sativum, Coscinium fenestratum, Cuminum cyminum, Evolulus alsinoides, Glycyrrhiza glabra, Hedyotis corymbosa, Piper longum, Piper nigrum, Premna herbacea, Solanum xanthocarpum, and Zingiber officinale. The efficacy and the probable pharmacologic basis for beneficial effects of these individual components in upper respiratory tract symptoms associated with catarrh and colds, have been extensively previously reported in the scientific literature. However, the present study is the first ever demonstration by a randomized controlled clinical trial of the clinical efficacy of a time-tested standardized ayurvedic preparation, harmoniously blended on the advice of a panel of senior and clinically experienced ayurvedic physicians.

The men of experience are like the ant, they only collect and use; the reasoners resemble spiders, who make cobwebs out of their own substance. But the bee takes the middle course: it gathers its material from the flowers of the garden and field, but transforms and digests it by a power of its own. Not unlike this is the true business of philosophy (science); for it neither relies solely or chiefly on the powers of the mind, nor does it take the matter which it gathers from natural history and mechanical experiments and lay up in the memory whole, as it finds it, but lays it up in the understanding altered and digested. Therefore, from a closer and purer league between these two faculties, the experimental and the rational (such as has never been made), much may be hoped.

Francis Bacon, Novum Organum, Liberal Arts Press, Inc., New York, p 93. (5) Available from Amazon.com

..The paradoxical and unfortunate mix of the modern and the mystical is understandable in terms of public trust of the scientific community. Debates on the environment, energy, and defense, engage apparent experts on every side of the issues. Hotly contested cases in court proceedings and legislative hearings may make it seem that scientific evidence is less reliable, less certain than was previously believed. Seeing this pattern students lose the natural curiosity about truthful explanations, become cynical about the motives of experts and wonder whether science and mathematics are worth the time and effort to master.

Rodney Nichols, 2001

The most ordinary things are to philosophy a source of insoluble puzzles. With infinite ingenuity it constructs a concept of space or time and then finds it absolutely impossible that there be objects in this space or that processes occur during this time... the source of this kind of logic lies in excessive confidence in the so-called laws of thought.

Ludwig Boltzmann. Populaere Schriften Essay 19, Ludwig Boltzmann, Theoretical Physics and Philosophical Problems, B. McGuinness (ed) Reidel, Dordrecht, 1974, p 64. (7)

TYPES OF SCIENTIFIC RESEARCH PERSONNEL – A CLASSIFICATION

by Kofi

Category A - Hands on follower variety.



This is the type that generally carries out what another body tells them to do. E.g. “Run this reaction following the procedure given using the recommended starting materials” or “ Make the analogues of the structure given using the standard synthesis”. This type of research is nowadays often outsourced to developing country scientists.

Category B - Hands on pilot type.



This category is granted the liberty to make choices within limits such as: What reaction to use, the methods to choose, and which analogues to make. Many of these are research students going for Ph.D. The limited decisions though are often subject to the vicissitudes of a supervisor’s fancy. These scientists require laboratory skill of a high order, imagination, innovative ability and reliability. They form the nucleus of leadership in the future.

Category C - The Productive lot



This category is above the Category B. They have the liberty to select the structures they

synthesize, and they are free to select the methods they use. However their decisions too have to be subject to the views of a supervisor. They are selected from the best performers in the category B and will form the frontrunners for future leadership and would move into Category D.

Category D - Aspirants to Leadership



This category is independent in operation. They are needed to synthesize a targeted active structural entity. They have a broader mandate and are entrusted with a team of scientists. They are expected to exercise leadership and judgment towards goal oriented work.

Category E - Project Leaders



Leadership of research groups and directing research towards the pre-determined goals is the work of project leaders. This involves working across several discipline areas and leading personnel with different specialties. Often the requirement is to direct the work performed by biologists, chemists, analytical personnel, and economists etc. towards a common objective such as the preparation and launching of a new drug. This may involve coordinating work on bio-assays, scale-up pilot plant operations, conducting studies on formulations of drugs, patent applications and a host of others. Skills of leadership, diplomacy, team management, and psychology are paramount in this position of ultimate scientific and technological leadership.

PROFESSOR NORMAN R. FARNSWORTH

by R.O.B. Wijesekera

Within the past couple of years the world has lost three of the foremost scientists in the specialized area concerning medicinal plants. The first to leave us was the great Hungarian taxonomist and longtime Director of the Institute for Medicinal Plants Research, at Budakalasz, Peter Tetenyi. (Vide Link Natural Digest. Vol:3 (1)) Then it was the “Flying Finn” Sandberg of Sweden (Vide Digest: Vol 7.(2)), and as briefly noted in the same issue, - we record the sad departure of yet another great, the inimitable Norman Farnsworth.

What feature characterized these three great men? It was not just their interest in the subject area of their research, but their concern for the development of the related scientific capability in the countries of the third world, and this reason endeared them to the community of scientists globally.

The author first met Norman in 1975, when he came to Sri Lanka as a member of the US Team of scientists sponsored by the National Academy of Sciences under the leadership of Professor Carl Djerassi. The man with the cigar in his mouth was easily recognized as he cleared the airport immigration. The US-NAS team also included such stalwarts as Ernst Theimer an expert in essential oils from the company IFF, Richard Schultes - famed botanist of Harvard University, the Ghanian-born botanist Eddie Ayensu, William Dauben, the Geunther -Award winning essential oils chemist from the University of California, and Paul Schauer of Hawaii, a pioneering expert on marine natural products. They were accompanied by Noel Vietmeyer of the NAS, and they compiled a report on: Natural Products for Sri Lanka's future. (1975). Norman was responsible for the area of medicinal plants.

Since that time the author kept in touch with him and worked with him, during 1978-80, in the capacity of the Task Force manager for the WHO Programme on Plants for fertility regulation. Norman was a stalwart member of the



Norman Farnsworth sporting his characteristic cigar

WHO steering committee for that programme. Stationed then in Geneva at WHO Headquarters as Task Force Manager, the author travelled widely with him during that period, visiting the several centres that were part of the WHO programme, ranging from South Korea, Hongkong, London, Leeds, Recife, and Peradeniya. A decade later, as it so happened we spent time together in Chicago, writing some of the history and literature relating to this trail blazing WHO initiative.

In all of these places, and all the time, his trade mark - a Marsh Wheeling cigar, stuck in his mouth, unlit, but often chewed only, became the feature with which he was recognized, besides his genial exuberant nature, and his colossal knowledge of the multidisciplinary aspects of the subject of medicinal plants and natural products.

Norman was a colorful personality in almost every respect; a raconteur supreme who would hold an audience spellbound for hours with his stories related with a flavor, gusto and a passion that only he could command. Much has been written about his many activities and the world's researchers on medicinal plants owe a deep debt of gratitude to him, if only for the unique contribution to the world of pioneering the NAPALERT database.

Endless stories too about him can be told and retold, but two episodes that this author fancies are the following.



Norm and the Author in the Lab at Chinese University of Hong Kong in 1979

The first took place during the visit to Sri Lanka of the team from the National Academy of Sciences led by Carl Djerassi in 1975. The team decided to visit the CISIR, -Ceylon Institute for Scientific and Industrial Research, in Colombo, and they were accompanied by the US Ambassador to Sri Lanka who was Christopher van Hollen. When the team entered my Natural Products Laboratory at CISIR, they witnessed from the windows and directly on the opposite side of the road, the newly completed imposing building of the BMICH - or the Bandaranaike Memorial Conference Hall, which had been gifted to Sri Lanka by the Chinese government. Everybody just took a look at this, but Norm dared to ask the US ambassador what he was doing while this was being put up? Ambassador van Hollen smiled diplomatically and let it pass. Norm then quipped that the US should have put up a similarly imposing building for research at the CISIR just opposite. When I politely told him that the Ambassador might have felt the question was impertinent Norm remarked loudly that he had a right to ask that, as he was a taxpayer.

On a much later occasion when we were both working for the WHO we were on a mission to Peradeniya to review the WHO project performance there. We were returning from Kandy to Colombo by train, and had not reserved our seats; hence we were in a community compartment which although in the first class, was somewhat crowded with holidaying families. Norm in characteristic fashion soon got friendly with a little boy, and offered him one of

his ball point pens. The boy gleefully grabbed the pen and was seen showing it to his mates in the compartment. Soon there was a queue of small boys expectantly awaiting the great man's response to their inquiring looks. Norm was more than equal to the situation, as he carried in his now familiar fawn leather "Pilot Bag style brief case", sufficient pens to open a small shop. He handed one each to the several little passengers who had by then assembled around this queer "Santa Klaus". Ultimately he was left with only his valuable pen, and a little girl, who had missed out. He made a sign of "no-hope," and as the little girl was about to leave in disappointment he promptly gifted this pen too to the girl, and told me to explain in Sinhala to her parents accompanying her, that it was not a cheap one and that they should look after it for the little girl.

Norman was a generous soul and large hearted in every way. He was an authority on every aspect of the subject of medicinal plants and wrote profusely within the subject area.

In his lifetime he had mentored more than a hundred doctoral students and many graduate students, and they had come not only from the US but from many parts of the globe. He was also the founder together with Professor Hildebert Wagner, of the Journal of Phytomedicine, and remained to the end at the helm of his department of Pharmacy and Pharmacognosy, at the University of Illinois Medical Centre.

His many colleagues throughout the wide world will mourn his passing, and record it as a deep loss to the entire community of scientists engaged in research in the area he adorned.

The Link Natural Products Digest sends the condolences of all our colleagues to Mrs Priscilla Farnsworth, and his longtime colleague Professor Harry Fong. His place in the annals of scientific inquiry is well assured far and wide.

We shall not cease from exploring,
And the end of our exploring
Will be to arrive where we started
And know the place for the first time.

T.S. Eliot (1888-1965)

A RAPID TEST TO DETECT HIV VIRUS

With the growing threat of the spread of HIV, a quick method of detection would be a boon to society, especially in rural areas of some developing countries where electricity is not available. The material used for detection is the prosaic quick lime.

HIV antibody tests can be performed away from the laboratory but they lack the ability to detect recent infection, while tests that detect nucleic acids from HIV can confirm the presence of the virus much sooner after infection. However until now, these tests have required costly equipment and needed to be carried out in a laboratory.

The new device developed, uses the exothermic reaction between quick lime and water to perform isothermic amplification of the viral DNA with a fluorescence label, allowing for visual identification of infection. Although the heating device has been previously described it has never been used for HIV detection before and could prove a cheap and simple method for point of care HIV diagnosis.

Chemistry World, April 2012

...man will occasionally stumble over the truth, but usually manages to pick himself up, walk over or around it, and carry on.

Churchill, Winston S.

An inventor is a person who makes an ingenious arrangement of wheels, levers and springs, and believes it civilization.

Ambrose Bierce,

INTELLECTUAL PROPERTY SHARING PROGRAMME TARGETS NEGLECTED TROPICAL DISEASES.

The World Intellectual Property Organization, (WIPO) has pioneered a new consortium of partners drawn from both private and public sectors with the aim of sharing intellectual property that may help develop a range of new drugs. The primary targets of this initiative are diseases like malaria, tuberculosis, and similar Neglected Tropical Diseases (NTD's). WIPO is to provide the accessible database which will include the available Intellectual Property assets.

The Director-General of WIPO Francis Gurry has declared that by bringing together companies and researchers, the IP assets will be made available under royalty-free licences to authentic qualified researchers worldwide. Such a commitment will act as a driver for the development of therapies for NTD s. These NTD's will effect mainly countries of the third world. Since the profit potential is minimal in this regard,, there is no commercial incentive to conduct intensive research to develop treatment for these NTD's.

R&D knowhow from pharmaceutical companies and researchers, as well as information from compound libraries will be included in the proposed database.

Eight leading global pharmaceutical companies have already joined the WIPO venture together with BIO Venture for Global Health, the US National Institutes of Health, University Research Groups and a range of non-profit organizations. The lack of experienced personnel and facilities for leading-edge research in laboratories of the third world has also been noted with a view to addressing the shortcomings.

Chem. World 2011 Dec p 06- Sarah Houlton

EARTH ESSENCE GALLERY OPENS IN COLOMBO

Link Natural opened its 'earth essence' Gallery' on the 8th December, 2011 at Deal Place, Colombo, to offer the consumers its latest range of herbal cosmetics. This is the second outlet in Colombo, the first being at Crescat Boulevard. The 'earth essence' range of cosmetics constitute Skin Care, Hair Care, Bath and Body Care products, and its specially formulated Anti wrinkle and Stretchmark creams, as well as the brand's Spa Range.

The event was graced by the crème of the fashion world, including those from the silver screen, clients, media and well wishers. The calm, soothing ambience of the Gallery created the ideal environment for customers to detach from their busy lives, converse with the therapists and select the products that were most suitable for them.

The outlet had in addition to the sales counters, limited spa facilities where foot and head massages were offered. At the opening a high demand was felt for the foot massage. Gift packs incorporating some of the earth essence products were given to all invitees.

The Gallery is now ready to provide its customers comprehensive information and advice on the healing and restorative properties of the products, for body and soul, as well as the opportunity to sample and experience the products for themselves. Unlike most cosmetics that give the outward appearance of beauty and health, 'earth essence' products promote a genuine sense of mental well-being that enhances the natural radiance of the body. This is why the brand targets a niche clientele that truly understands the functions of earth essence products and the importance of long-term use

The earth essence Gallery is located at No. 4, Deal Place A, Colombo 3, and is open seven days of the week from 10.00am to 6.30pm



Chairman Link Natural with invitees



The First sale of product by Manager Personal Care, Ms Achini Dharmasiriwardene



Foot massage room

By three methods we may learn wisdom: First, by reflection, which is noblest; Second, by imitation, which is easiest; and third by experience, which is the bitterest.

Confucius (551-479 BC)

LINK NATURAL SPONSORS BOOK LAUNCH

Link Natural Products sponsored the launching of the book 'Clouds are not Spheres nor Mountains Cones' authored by Dr. R O B Wijesekera, one of the most eminent scientists in Sri Lanka, and one of Link Natural's senior consultants. The event was held at the Sri Lanka Foundation Institute on the 9th January 2012. The Chief Guests at the occasion were Hon Senior Minister of Scientific Affairs Prof Tissa Vitarana, and Deshamanya Charitha de Silva. To give a brief review of the book was Prof Manique Gunasekera, Professor of English at the University of Kelaniya. Her erudite interpretation of the book, with her mastery of language, and ready wit, held the audience spell bound. She hailed the author as being a man for all seasons, a scientist, administrator, an international figure and touchingly a family man and gentleman. The book was a fascinating travelogue and biography according to her, and the authors appreciation of the beauty of the exotic places visited was indeed amazing.

Dr Azeez Mubarak, Director of ITI gave a brief resume of the author, highlighting his academic, research and professional achievements, while giving amusing anecdotes of his personal association with him. Prof Tissa Vitarana spoke of the contribution made by Dr R O B towards the development of science in the country, having led the National Science and Technology Commission and also the leading research institute of the country, the ITI. Mr Charitha de Silva gave a touching and sincere tribute to his oldest friend Dr R O B Wijesekera, by expanding on the childhood memories and anecdotes of days in school and University.

The author while acknowledging the contributions of all who assisted him in publishing the book, also gifted copies to his long time friends and associates, Dr. Stanley Dissanayake, Dr. Douglas Nethsinghe and Dr. Willie Samarawickrema. The guests were hosted to refreshments and cocktails at the conclusion of the proceedings, with the compliments of Link Natural. The author also signed copies of his book (Published by Sarasavi Publishers) which were available for purchase at the launch.



*Standing l to r Dr. A M Mubarak,
Deshamanya Charitha de Silva,
Dr R O B Wijesekera, Prof Tissa Vitarana,
Prof Manique Gunasekera,
Dr Devapriya Nugawela,
Prof Ramani Wijesekera, Dr Ranil Gunaratne*



Chairman Link Natural giving the Welcome address



The Author autographing copies of his book

OUT OF BOX SALES TRAINING BY LINK NATURAL

Training of its human resources is an area where Link Natural places much emphasis on. Training is provided at all levels of staff, enabling the company to maintain a competent and reliable team.

Recognizing the dearth of quality sales professionals, the company recently conducted a unique training for its newly recruited sales staff. This training was a three month programme, where 20 youths from all over the island including Embilipitiya, Polonnaruwa, Monaragala, Hambantota, Matara, Dickwella and Kuliyaipitiya participated. A brain child of Dr. Devapriya Nugawela the Chairman of Link Natural, it was an special residential programme. As a sales representative needs to be in good physical condition to make several sales calls per day, the initial month was spent on developing the endurance of the participants. The participants had to undergo drill and physical training under an ex-military instructor during the day time, commencing in the early hours of the morning. The rest of the time was spent on developing English competencies of these rural youth who had joined with little English knowledge.

Religious activities and self studies were also part of the daily routine which ended up at 10.30 p.m. As voiced by one of the participants, "The outbound training at Wariyapola gave us a unique and adventurous experience," There we learnt to dream, to achieve the impossible and challenging".

After the initial month of training the candidates were exposed to soft skills, selling skills, product and process knowledge and company related knowledge training programmes.

"The applicants from all over the island were selected from a 3-round screening," said Rohana Wijesooriya the HR Manager who was the key driver of the project. In the initial round of screening the candidates had to face an interview, undergo aptitude test, General Knowledge test and English tests. Second round was a physical fitness test.

The final round included a medical examination and reference checking.

"We came here with very little knowledge, but today we have gathered many competencies and realized the importance of continuous learning" said a candidate. He was further grateful to the company for giving them an opportunity to enter a growth oriented profession, Sales, with which they were not much familiar.

These types of programmes not only help a company meet its people requirements, but also fulfill social responsibility, which provide opportunities for rural youth to join the private sector companies and grow. All the 20 trainees who had joined the programme initially, completing the programme successfully is another a notable achievement.

"This is a unique program which many companies are thinking of implementing, but only Link Natural could get it off the ground," said the Link Natural National Sales Manager, Dinesh Angamma addressing the parents and company participants at the passing out ceremony of the Sales Competency Development programme of Link Natural Products.



EXPO 2012

Link Natural participated in the EXPO trade exhibition 2012 organized by the SL EDB after 14 years, with a primary objective to showcase its range of products offered at both domestic and export levels. As stated by the Director Export and Business Development, Mr Fazal Mushin, " It is a learning curve for our staff as we cannot afford to take them all abroad for such events. It is also a new experience for us to deliver on such a set up in the local market ".

This exhibition was a much awaited event for all the exporters in the country from all the sectors. There were totally 360 stalls at the exhibition representing various export sectors.

At the inception, the EDB indicated that 1,200 numbers of total foreign buyers were expected to visit the event consisting 400 visitors from China, 200 from India, 60 from United Kingdom and 75 from USA.

Samples of Herbal health care products including SAMAHAN and SUDANTHA were freely distributed among all the foreign visitors at the stall.

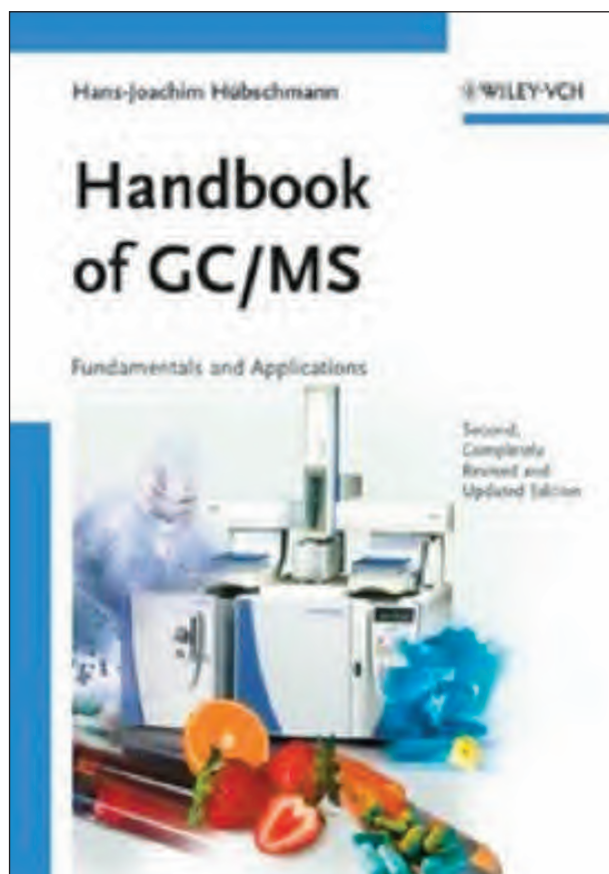
For this event the company set a target of getting a minimum 10 new customers, from all product categories displayed. Out of nearly 70 discussions had at the stall, 26 firm inquiries from the buyers was short listed from total 18 countries. The BDD intends to scrutinise these and all other inquiries, in order to expand its foreign customer base



When the war finally came to an end, I was at a loss as to what to do... I took stock of my qualifications. A not-very-good degree, redeemed somewhat by my achievements at the Admiralty. A knowledge of certain restricted parts of magnetism and hydrodynamics, neither of them subjects for which I felt the least bit of enthusiasm. No published papers at all... Only gradually did I realize that this lack of qualification could be an advantage. By the time most scientists have reached age thirty they are trapped by their own expertise. They have invested so much effort in one particular field that it is often extremely difficult, at that time in their careers, to make a radical change. I, on the other hand, knew nothing, except for a basic training in somewhat old-fashioned physics and mathematics and an ability to turn my hand to new things... Since I essentially knew nothing, I had an almost completely free choice...

*Francis Crick,
Nobel Laureate*

HANDBOOK OF GC/MS – FUNDAMENTALS AND APPLICATIONS SECOND, COMPLETELY REVISED AND UPDATED EDITION



by Hans-Joachim Hübschmann
Thermo Fisher Scientific Advanced Mass
Spectrometry, Hanna-Kunath-Stasse 11, 28199
Bremen, Germany
ISBN: 978-3-527-31427-0

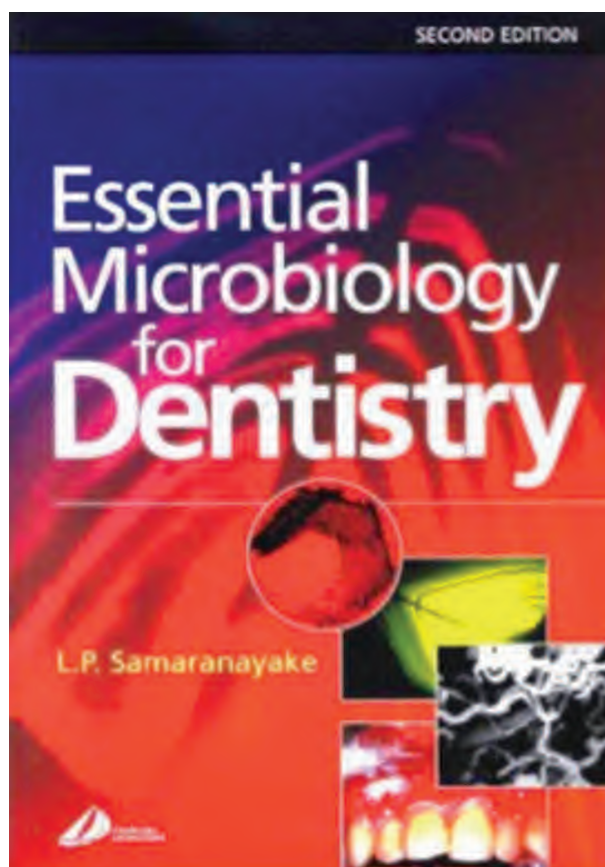
This is the first comprehensive reference work for GC/MS. It offers broad coverage, from sample preparation to the evaluation of MS data, including library searches. Fundamentals, techniques and applications are described.

A large part of the book is devoted to numerous examples for GC/MS applications in environmental, food, pharmaceutical and clinical analysis. These proven examples come from the daily practice of various laboratories.

The book also features a glossary of terms and a substance index that helps reader to find information for his particular analytical problem.

The author presents in a consistent and clear style his experience from numerous user workshops which he has organized. This is a thoroughly revised and updated English edition based on an edition which was highly successful in Germany.

ESSENTIAL MICROBIOLOGY FOR DENTISTRY SECOND EDITION



by L. P. Samaranayake
Churchill Livingstone Publishers, UK
ISBN: 0-443-06461-X

This is a popular textbook which is ideal for the dental students, dental researchers and for those who are interested in dentistry and other related aspects such as microbiology and immunology.

At the beginning, the book describes general microbiological features of bacteria, viruses and how they cause human infections. The book focuses on the basic immunology followed by mechanisms of disease. The major infections of each organ system are discussed with emphasis on those that are most relevant to dentistry. The book specifically focuses on the microbial interactions in the orofacial region. Finally the book focuses on the cross-infection and control relevant to dentistry.

Using illustrations and colour photographs the book provides a concise coverage of all aspects of the microbiology that are relevant to dentistry.

'HERBAL DRUGS - A MODERN APPROACH TO UNDERSTAND THEM BETTER, 2011

Edited by Subhash C Mandal
Department of Pharmaceutical Technology
Jadavpur University, Kolkata 700 032, India
ISBN: 978-81-7381-653-6

Published by NCBA , (UK)

This book is a robust attempt to furnish the latest scientific information for any multidisciplinary research team engaged in plant drug research. It focuses on the roots of research in medicinal plants, highlights some of the striking features of commonly known metabolites, and presents a few of the newer aspects of herbal research. The utility of the book lies in its versatility through which it has covered a wide spectrum of research activities in the field of herbal drugs.

INSIGHTS INTO COSMETIC MICROBIOLOGY

Author : Donald S. Orth
ISBN : 978-1-932633-62-7
Publisher: Allured Business Media, USA



Cosmetic microbiology plays an essential role in product development, plant sanitation, product testing and research. Manufacturers continue to have microbiological issues with product preservation, house organisms, deionized water quality and contaminated batches of product. This book illustrates the proper way to deal with these issues.

Within the pages of this book, the requirement of microbial growth and the principles of preservation are presented to give the reader an understanding of what is needed to control microbial growth in the manufacturing plant, as well as in the products. Microbial injury is discussed to let people know that metabolically-injured microorganisms may not be recovered from product samples using routine plating techniques and what may be done to recover these microorganisms during product release testing so they do not suddenly appearing in shipped.

DIGEST MAIL BAG

Extracts from Letter 1

Dear Dr Wijesekera

I was immensely pleased to read your warm and personal article about Finn in Natural Products Digest.

Finn would have been proud and happy to hear your acknowledgement of his scientific and personal support to developing countries with emphasis in Sri Lanka. The island and its people always held a special place in his heart.

I hope we can keep in touch

Warm regards to you and your wife

Ilse Grebe Sandberg

Extracts from Letter 2

Dear Dr Wijesekera

I am presently High Commissioner in Malaysia, having being pulled out of retirement to serve the country .

I wonder whether you would recall our meeting at the home of Dr Brendon Gooneratne and his wife some years ago. My reason for writing to you is to obtain a copy of a study done on Heenbovitia which was published in a copy of the Link Digest some years ago.

I do sincerely hope that your archival section would be able to recover this

*Yours sincerely
K Godage.*

Response

Your Excellency K Godage,

Thank you for your letter. Yes, of course I do recall our meeting some years ago.

I am herewith sending you a copy of the issue containing the article you requested, and also the address of the author of the article, Dr Ira Thabrew. I am sure she will give you more details of the research done on this plant. I am also sending you a copy of the latest issue of the Link Digest. If you so wish we could

send you future copies as well for the edification of any others who might be interested.

*With best regards
R O B Wijesekera.*

NOTE TO POTENTIAL CONTRIBUTORS

Link Natural Products Digest

The DIGEST is a popular publication, albeit a scientific one, dedicated to medicinal plants, herbal healthcare and personal care products, essential oils, aromatherapy, herbal therapy and Ayurveda, and related healthcare systems. It is published bi-annually.

The DIGEST welcomes contributions in English in the category of reviews, brief communications, ethno reports in brief, phytomedical and phytochemical communications, book reviews, and reports on safety and efficacy of phytomedicines.

Potential authors may consult the Editor-in-Chief prior to dispatch of communications, reports and reviews.

Authors may submit manuscripts by
By email to :

Dr. R. O. B. Wijesekera
Editor in Chief
Link Natural Products Digest
robw@linknaturalproducts.com

or

Dilmani Warnasuriya
Co-Editor
Link Natural Products Digest
dilmani.warnasuriya@gmail.com

By post to:

Dr R O B Wijesekera

or

Dilmani Warnasuriya
Link Natural Product (Pvt) Ltd
P O Box 02
Kapugoda

Please forward to the editor one original hard copy and a soft copy in the form of a PC compatible diskette (Microsoft Word).

All manuscripts must include the following :

Title (in brief), author(s), address(es) of affiliated institutions. The authors' names must include initials and/or forenames as required in publication. All papers and submissions are subject to peer review, but the editors reserve the right to regulate the content. No proofs can be sent prior to publication. The decision of the Editor-in-Chief will be final in all matters.