

Prof. S. Kannaiyan Memorial Oration

Delivered during

Inaugural Function of National Seminar on

"Microbes and Human Welfare"

20 July, 2013

University A/C Auditorium, Bharathidasan University, Tiruchirappalli, Tamil Nadu



Noni (*Morinda citrifolia* L.)- A Treasure for Wellness

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Chairperson, World Noni Research Foundation, Chennai

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Former Chairman, Agricultural Scientists Recruitment Board (ICAR), New Delhi

Former Vice-Chancellor, NDUAT, Faizabad (UP), HPKV -

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Dignitaries, delegates, invitees, media, Ladies and Gentlemen,

Divine Noni Morning to you all. I love you and I thank you.

Today I feel emotionally moved to deliver Prof. S. Kannaiyan Memorial Oration at this Inaugural function of National Seminar on "Microbes and Human Welfare". Prof. Kannaiyan was a very close friend of mine and associated with me very intimately. We also had worked together in many committees of ICAR, Agricultural Universities and also in the World Noni Research Foundation. His contributions in the field of agriculture and particularly in his own discipline are well known and I do not want to go into details now. His active involvement in building up of the World Noni Research Foundation was a great support to me. I selected the topic, 'Noni (*Morinda citrifolia* L.) - A Treasure for Wellness' for which we were working together. Even though we lost him prematurely, his contributions to the cause of the society remain green and memorable forever. I selected this topic because this crop is dearer to him in the recent past and more over many of us do not know this miracle underexploited crop which has great potential in providing wellness to all. Your National Seminar, which is very vital and timely, also includes human welfare in the theme.

Morinda citrifolia L. called Noni has been known to ancient Indians from the time they began examining plants not only for food but also to treat diseases and for enhancement of health. They developed a medical system based on plants and natural treatments called Ayurveda. Ancient physicians held Noni in high esteem and used to protect the skin from drying and cracking. The potential of *M. citrifolia* was recognized to the extent that once upon a time, this tree was recommended to be planted compulsorily near temples along with Tulsi (*Ocimum sanctum*), in Tamil Nadu because people believed that all Goddesses and Gods abode on it.

Noni has traditional medicinal uses

Noni is an ancient medicinal ever green fruit tree. Most historians and researchers have postulated Noni to have originated in Southeast Asia and was subsequently distributed to the islands of the Western

Pacific by various dispersal mechanisms including introduction by humans during ancient migration to colonize new lands, first to Micronesia and then to Polynesia. Polynesia has a rich healing heritage and knowledge about medicinal uses of Noni transferred down from generation to generation.

Noni- a tropical plant distributed all over Asia Pacific

Noni is distributed to tropical countries of Asia, South America, Caribbean and Polynesian Islands. In India, twelve species of Noni (*Morinda*) exist. It is distributed in coastal areas and in forests of tropical regions in India. Its habitat ranges 1 to 800 m above MSL, mean annual temperature 20 to 35°C, annual rain fall 250 to 4000 mm and an extremely wide range of soils. The tree is a coastal land protector. There are 80 species of *Morinda* and the most useful one is *Morinda citrifolia* popularly called as Noni.

The family Rubiaceae to which the genus *Morinda* belongs is one of the families represented by more than 500 species in India, of which 205 (41.0%) are endemic taxa. Occurrence of *Morinda* species is also wide spread with *M. angustifolia* habitat to tropical Himalayas, *M. villosa* a climber found in Khasi hills of Meghalaya, and *M. pubescens*, *M. reticulata*, *M. citrifolia* etc. in South Western Ghats.

Vernacular names of Noni

Noni is known in different names in different parts of the world. It is called as Awl tree, Indian Mulberry, Togari wood, Ach and Nuna. In India, this plant is known with different names in different states. Some of the names are:

Tamil	: Vennuna, Manjanathi, Manjanuna, Nuna
Telugu	: Bandamaddi, Maddicettu, Mogali, Molugu
Malayalam	: Kakaipalam, Kattapitalavam, Mannanatti
Kannada	: Haladipavete, Tagatemara
Hindi	: Ach, Al, Ak, Barraal, Achchi
Sanskrit	: Paphanah, Achchhuka, Asnyuk
Marathi	: Aseti, Nagkura, Mundari, Salidaru

In other countries, this plant is called Mona, monii (Tahiti); Head ache tree (St.Croix); Nonu (Samoa); Noni (Hawaii); Nino (Phillipines); *Morinda* (Australia).

Noni under natural condition to organised cultivation

Noni being an underexploited/ underutilised crop was seen in the coastal lands, deforested areas, road sides and also in the house compounds. Systematic cultivation in an organised manner was taken up very recently and India would be the first country to do so. It is the brain child of Prof. P. I. Peter, currently Chairman of Noni Biotech.

In general, Noni is not cultivated on large scale in India. Indian Noni Cultivation Council (INCC) under the ambit of World Noni Research Foundation, (WNRF) Chennai, Tamil Nadu, India is helping farmers to take up cultivation on contract basis. This is the first attempt of cultivation of Noni on large scale. INCC introduced cultivation of Noni in 2006 and since then the area under cultivation is slowly increasing. The latest data on area under cultivation is 653 ha as furnished below :

Area and Number of Cultivators involved in Noni Cultivation

S.No.	State	No. of Cultivators	Area (acre)
1.	Maharashtra	34	166
2.	Karnataka	22	120
3.	Odisha	6	43
4.	Andhra Pradesh	6	30
5.	Gujarat	8	42
6.	Tamil Nadu	1	5
7.	Madhya Pradesh	9	45
8.	Andaman & Nicobar Islands	260	192
Total		346	643

Crop production technologies are now available through our research efforts.

Noni is relatively easy to propagate from seeds, stem or rooted cuttings and air layering or by tissue culture. The preferred methods of propagation are by seeds and cuttings made from stem verticals. However, seeds are to be pre-treated to break the dormancy. Technologies have been developed by World Noni Research Foundation for treating the seeds and to enhance germination. Ideal season for planting is June to October. It can also be planted during January to March when water is available.

Noni can also be profitably grown in coconut and areca nut gardens as intercrop. Vegetables and other annuals can be grown in Noni orchards utilizing the inter space available.

Noni yields high

As a cultivated perennial crop with irrigation, it is possible to find fruits at different stages of maturity on the same plant at the same time. It yields up to 250-300 kg after 9-10 years of planting under better management conditions in the initial stages, yield ranges from 30-40 kg / plant and the well grown tree produces an average of 90 - 100 kg. Productivity of the trees will be up to 40-50 years and the harvest can be done 6 - 7 times a year. It flowers and fruits round the year- a unique feature of this plant.

Noni Research Outcome

World Noni Research Foundation through its outsourced projects and its own experiments conducted in National Research Centre for Noni at Salavakkam, Chenglepet, Tamil Nadu developed several technologies for adoption. The centre has identified about ten elite clones of Noni and shortlisted to release as a variety for cultivation for the first time in the history of Noni.

WNRF through its outsourced research activities could come out with a number of accessions having desired traits which are under evaluation. Recently several accessions were deposited to NBPGR, New Delhi. The Indian Noni Tissue Culture laboratory under WNRF played a vital role in establishing an exclusive Tissue Culture Laboratory for Noni and standardized mass multiplication protocol of Noni.

WNRF developed exclusive descriptors for Noni (*Morinda citrifolia* L.), for first time which will be of great help to scientists to follow a standard description of variations occurring among Noni plants at national and international levels.

For the first time, explorative surveys were made and existence of pests and diseases was brought out including a few noni diseases. (Root knot nematodes, *Alternaria* leaf blight, anthracnose on leaf and fruit, dry and wet rot of noni). Excellent ecofriendly management strategies were also developed to manage important pests and diseases.

Noni in Nutraceutical and Pharmaceutical

I would now like to highlight some of nutraceutical and health benefits of noni. A plethora of phytochemicals- anthraquinones, glycosides, terpenes, sterols, amino acids, sugars, enzymes, vitamins etc., have been identified in leaves, bark, stem, flowers, fruits and seeds. Fruit juice is a powerful detoxifier removing the toxins from metabolism, infections and cellular aberrations. Researchers discovered more than 160 nutraceuticals in noni fruits alone. The fruit juice stimulates production of T- cells and thymocytes enhancing auto-immune system and function.

Polynesians identified the medicinal uses of Noni fruits. It is not uncommon for a single medicinal plant to be used in treatment of many diseases, but noni is unique. The list of diseases that noni could be useful is several times more than other medicinal plants. Though all parts of the Noni tree are used in treatment of various diseases, fruit is considered important because of its wide range of therapeutic potentials like antibacterial, antiviral, antitumor, antihelminthic, analgesic, hypotensive, anti-inflammatory and immune enhancing effects. Use of ripe and unripe fruits for extracting juice is of recent innovation and is amply exploited commercially.

The reported amino acids (basic units of protein) in leaves are alanine, serine, threonine, tryptophan, tyrosine, valine, arginine, aspartic acid, cysteine, cystine, glutamic acid, glycine, histidine, isoleucine, leucine, methionine, phenylalanine and proline. Glucose and fructose are the abundant monosaccharides in fruit while hexose and pentose are reported in root bark. Carotenoids-colouring pigments having antioxidant property are in substantial quantity in leaves, bark and fruits and have the potential to treat vitamin A deficiency leading to short/long sightedness. Noni seed vegetable oil (12.49%) contains unsaturated edible fatty acids with medicinal properties.

Research on Noni

Research regarding natural antioxidants from foods and plants, particularly from folk medicinal plants is gaining increasing attention throughout the world. Nowadays, the scientific community shows interest in *Morinda citrifolia* L. and its products as its benefits become known.

A recent study made by WNRF was focused to evaluate *in vitro* antioxidant potential of ethanolic extract of *Morinda citrifolia* (Noni) fruits at various maturity stages.

Preliminary phytochemical screening revealed that the ethanolic extract of Noni possessed phenols, flavonoids, alkaloids and steroids. Quantitative estimation of total phenols, total flavonoids, alkaloids and saponins were also done using standard procedures. The results showed that the harvesting at

maturity and ripening had greater antioxidant capacity among various maturity stages of Noni fruits. Hence, Noni fruits at these maturity stages could be a potential source of natural antioxidant.

The anti-inflammatory, antimicrobial activities of Noni are established.

The scopoletin isolated from *M. citrifolia* L. fruit juice had anti proliferative effect against retinoblastoma Y 79 cell line which is the first report in India.

The effect of noni fruit juice on checking the proliferation of cancer cells (glioma) was established.

Anti HIV activity and hepato-protective activity of noni fruit juice were established.

Noni juice increased proliferation of lymphocytes in young Wistar rats indicative of immune-enhancing effects of Noni fruit extracts.

Noni juice was found to reverse the age-associated decline in Catalase, SOD and GST in middle-aged and old rats when compared with age-matched controls.

The age-associated increase of lipid peroxidation and glutathione peroxidase activity were significantly reduced in middle-aged and old rats following noni juice treatment. Treatment with Noni juice significantly reduced the activity of glutathione peroxidase in all the three age groups probably because of the reduction in free radicals due to scavenging effect of Noni.

Let me now say something about wellness which everybody talks every day. Wellness is a broad term which encompasses Intellectual wellness, Emotional wellness, Physical wellness, Spiritual wellness, Occupational wellness and Social wellness. So one has to look at wellness on holistic angles to provide Sustainable wellness and it is a continuous process.

As we all know that Wellness is the right and privilege of everyone. Achieving wellness is a dynamic process which states that every individual becomes responsible for their life and wellbeing. It is an ongoing journey in the pursuit of optimal health in all dimensions of life. Positive health through wellness which is governed by the law of nature can retain the state of health and progressively improve the overall wellness of man kind. Wellness involves taking good care of our physical self, using our mind constructively, expressing our emotions effectively, being creatively involved with those around us and being concerned about our physical, physiological, psychological and spiritual environment. The different areas of wellness can be well explained as physical, emotional, spiritual, financial, social, cultural, intellectual and environmental wellness. For all these, healthy living is a must. Though wellness is not the opposite of illness, a healthy life is necessary to have all other wellness's listed above.

Divine Noni for Wellness is made from the fruit of *Morinda citrifolia* combining a few other powerful Indian herbs. Noni for Wellness is a universally well accepted health drink. Noni for Wellness is a natural health drink. Noni for Wellness is Nature's gift to humanity at all ages of life process as could be seen below:

Elderly Care

Controls blood sugar level

Helps in lowering the blood cholesterol level

Helps in lowering Blood pressure
As an adjuvant in cardiovascular and respiratory diseases.
Relieves constipation & regularizes bowel habits
Depression, Insomnia & Other psychological problems

Women Care

For purifying blood and improving the texture of skin
For healthy & shiny hair growth
To relieve pre menstrual problems like depression, pain, mood swings and back ache
Protects from toxins and pollutants

Men Care

Rejuvenates the body
An effective anti-oxidant
Works as tonic and protector for regular smokers and drinkers
Stimulates immune system
Helps to enhance sexual activity

Child Care

Improves memory, attention and concentration
Strengthens the immune system
Stimulates appetite

International Society for Noni Science

In order to expedite promotion of Wellness properties of Noni, the need was felt to bring all stakeholders, farmers, scientists, industry, health and family welfare people noni users and others at a single platform, where wellness for all can be addressed. International Society for Noni Science (ISNS) was established in October 2010 with major objectives to cultivate and promote research, education and development of Noni and to recognize and support excellence achieved in scientific research and development in the field of Noni by individual scientists, interdisciplinary teams, recognized institutions, learned societies, industries, progressive farmers and others interacted on any aspect of the plant. At present there are more than 725 members of the society who are enjoying wellness through Noni. I am sure you will also become part of such movement by becoming a life member of the society and promote wellness besides enjoying the wellness by yourself.

Let us all move together to develop a wellness world.

Finally, I would like to thank Prof P. I. Peter, Dr. K. V. Peter, Dr. Brahma Singh, Dr. P. Rethinam and Dr. T. Marimuthu for helping me in providing information and preparing this invaluable Oration - a humble tribute to Late Prof. S. Kannayan.

I love you. I thank you.

Jai Hind



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