

Keynote Lecture

THE HEALING TOUCH OF BAMBOO: SOUL, MIND AND BODY

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Bamboo is a plant that is intricately associated with humans from time immemorial fulfilling all human needs, particularly in East and South East Asian region. It is a plant which is revered as God, teacher, friend, soul mate to food and medicine for body, weapon for hunting and protection from enemies, shelters and utensils for cooking and eating. Since centuries, bamboos are intermingled deeply with the daily life of rural and tribal populations and are an indispensable part of their cultural, traditional, social, and economic requirements (Tiwari 1988; Madhab 2003; Liese and Kohl, 2015). People often consider bamboo as a good luck charm bestowing populace with youth, flexibility and love (Piper 1992). Bamboo became a symbol for consistency and integrity because it grows straight and upright and is green every season. In days of yore, writers wrote about nature and enjoyed the bamboo, and poets used it in their poems. Bamboo makes us feel invigorated and refreshed through the clean warm wind. It also looks commanding and dignified, and so it was popular with painters.

It is a common belief in several Asian cultures that humanity emerged from a bamboo stem. In some parts of India, bamboo is also called Kalpavirksha (divine tree in Indian mythology fulfilling all the needs and desires) due to its numerous uses in daily life in physical as well as in spiritual form. First direct reference to bamboo Indian literature is in "Rig Veda" (5000 BC) "Bestow upon us a hundred bamboo clumps". Bamboos are symbolic of constancy, fidelity, integrity, and purity (Farrelly 1984) and also inspire the emotional and spiritual life of many people. In China, bamboo is considered friend of the people symbolizing gentleness, modesty

and serenity and the people consider it as one of the four noble plants along with plum, orchid and chrysanthemum. There are several folk tales, stories, dramas, cultural activities, myths, beliefs and even superstitions associated with bamboo highlighting the intricate relation of this wonderful plant with the culture and tradition of several Asian societies. Bamboo has always been an emotional, motivational and inspirational plant for poets and writers. Some feel peace and tranquility in writing on bamboo, whereas many others like to write and sing about bamboo. Bamboo painting and calligraphy are the oldest art forms in China, Korea and Japan to express the thoughts, feelings and artistry of a person, where bamboo has played a very significant role right from providing pens for writing on bamboo strips and paper to the inspiration and ideas for art and calligraphy. Drawing of nodes, internodes and leaves in black ink gave artists a deep satisfaction and mental peace. There was a time in these countries when bamboo painting and calligraphy flourished to its highest level. Wen Tong (1018-1079), Wang Fu (1362 – 1416), Guan Daosheng (1262-1319), Hasegawa Tohaku, Katsushika Hokusai, Yi Chong , Yu Tok Chang and Sin Wi are some of the famous bamboo painters and calligraphers of the region. Sakutaro Hagiwara (1886-1942) who is known as father of modern colloquial poetry in Japan has written many beautiful poems on bamboo.

The importance of bamboo in Chinese culture is reflected in the words of Su Dongpo, a revered literary figure of Song Dynasty (960-1270) who said that without bamboo, people of China would lose their serenity as well as culture (Yang *et al.* 2008). Chinese were the first to appreciate the beauty and utility of bamboo with poets extolling this versatile plant and artists painting it, cherishing its grace and beauty (Tom 1989). Oriental scholars, artists, and epicures have praised admirable qualities of bamboo in painting, rhymed couplets, and lyrical tributes. Bamboo is intricately associated with the social, cultural and religious life of the Karbis, a hill tribe of the state of Assam in India where bamboo is an indispensable part of the Karbi society of North East India and there is a popular proverb which says “A Karbi is born with bamboo in his hand and leaves the world holding a bamboo (Teron and Borthakur 2012a). In Karbi society, when a mother conceives, the family performs certain rituals in honor of the unborn baby using rice grains wrapped with banana leaves and tied with bamboo. During the life time of the

person, he/she uses bamboo mat tied to a bamboo culm with bamboo and taken to the cremation ground. Hence, for the Karbis, life begins with bamboo and ends with bamboo. In Meetei community of Manipur, India planting of bamboo plant in the court yard is considered lucky, a symbol of prosperity (Singh *et al.* 2003). At Karang, an isolated island in Loktak lake Manipur, people used to put up tall straight bamboo poles with a lovely cluster of small branches and leaves at the tip in their courtyard (Ghosh 2008). These totems signify that the marriageable daughter in the family is engaged to her future husband. Bamboo has also remained a fascinating material for artists, writers and poets particularly in countries like China, Korea and Japan. There are books like “The Book of Songs” from China “Leaves Collection”, “Taketori Monogatari” from Japan and “Bamboo Window” “Bamboo Forest” from Korea written on bamboo or about bamboo describing it in many ways like symbol of a gentleman and person of noble virtue (Jia Yan 2014).

Bamboo is gaining increased attention as an evergreen plant with multiple functions and benefits; and has the brightest prospect and potential in the 21st century. Today, bamboo is recognized as an important asset in eradication of poverty, economic and environmental development and remains highly important as a basic livelihood crop and material for rural people living in Asia, Latin America and Africa, as well as a growing number of higher income people who purchase green bamboo products throughout the world.

Bamboo shoots for good health

Bamboo shoots have been frequently assessed for various bioactivities due to their nutritional and therapeutic importance and overall application in food and pharmaceutical industry. In traditional cultures of Chinese, Tibetan, Korean and Japanese, bamboo is considered as healthy food and medicine. In Japan bamboo shoot is called “King of Forest Vegetables” and in China it is a treasure dish and it was considered that, “there is no banquet without bamboo”. Presently, bamboo shoots have taken the status of health food as they are low in calories, have negligible fats and have more minerals, bioactive compounds and

dietary fibers. The juvenile bamboo shoots are rich in nutrients, health promoting bioactive compounds (phenols, phytosterols, dietary fiber), vitamins (vitamin A, vitamin B1, vitamin B3, vitamin B6, vitamin C, vitamin E), amino acids, and minerals, hence, play a significant role in maintaining good health and projected as health food (Kumbhare and Bhargava 2007; Hiromichi 2007; Park and Jhon 2009; Nirmala *et al.* 2011). Bamboo shoots are rich source of minerals like silica, potassium, calcium, magnesium, selenium, etc. Calcium and silica are essential for making of bones, hairs, ligaments, nails and skin. Bamboo shoots have around 17 amino acids including all the essential ones. It contains arginine and tyrosine as the major amino acids that otherwise is a minor component in common fruits and vegetables (Kozukue *et al.* 1999). Arginine plays a key role in the synthesis of glycoproteins, and tyrosine is a major precursor of several neurotransmitters and may directly affect processes in the brain including cognitive function. Bamboo shoot also contains selenium, an important antioxidant in trace amount (Nirmala *et al.* 2018), and lysine which lacks in cereals, plays an important role in growth and development. Fresh bamboo shoots have also been found to be rich in potassium which helps to prevent blockage of blood vessels. Dietary fiber from bamboo shoots is a common ingredient in bakery, dairy, and meat products. Bamboo shoot fibers are used to make pills and tablets for sliming and weight loss. Young shoots are rich in phytosterols which help in preventing of the absorption of cholesterol due to similar structures and thus protects from various cardio-vascular diseases. Bamboo is one of the richest source potassium which called as heart protecting mineral. Bamboo leaf tea is famous in South Korea, considered as the store house of antioxidants. The Korean people also produce a type of salt called 'bamboo salt' rich in minerals extracted from bamboo.

Bamboo as medicine

It is known that a sound mind lives in sound body and importance of bamboo for keeping healthy body is known since centuries in East and South East countries. Bamboo plays a significant role in traditional Asian medicine and their therapeutic applications have been well described in all the ancient Pharmacopoeias of the world. The medicinal applications of bamboo were first mentioned around 500 AD wherein the therapeutic applications of bamboo

sap and stem shavings were described (Berky and Borolet 1990; Huang and Wang 1993). In ancient literatures of India (Bhavprakashingshantu) it is written that, "Bamboo by nature is laxative, frigid seminal curative, palatable, bladder purifier and full of astringent juice. It splits cough, subsides bile and cures leprosy, flux, wounds and swellings" (Tiwari 1992). Bamboo medicinal applications were first mentioned in India around 10,000 years ago for preparing Chyawanprash, a health tonic prepared from a number of herbs, including bamboo manna to impart youth, beauty and longevity. "Chyawanprash" is named after Rishi, or a sage by the name of Chyawan, who was the first person to prepare this tonic and he regained his youthfulness and vitality with the use of this herbal tonic. It is now famous in the world for its anti-stress and anti-aging properties.

All parts of the bamboo plant such as rhizomes, culms and bark shavings, resin, shoots, leaves, and seeds have clinical applications (Wang *et al.* 2002; Zhang *et al.* 2005a; Tripathi *et al.* 2009). On the basis of the knowledge of their therapeutic applications, bamboo has been used for medicinal purposes and many beneficial effects of bamboo leaves, shoots, shaving and oils on metabolic disorders and cardiovascular diseases have been reported. In ancient Chinese medicine, leaves are used as a component to reduce the energy of "fire" (related to inflammation) and treat hypertension, arteriosclerosis and cardiovascular disease (Yaun 1983). Bamboo is considered cooling, calming and phlegm resolving and is used for epilepsy, fainting and loss of consciousness in feverish diseases and a variety of mental disorders that develop with aging. Bamboo shoot decoction is used for treating infections, cleaning wounds, maggot infected sores and ulcers. In Java, sap from shoots is used for curing jaundice. Culm shaving of *Bambusa breviflora* is used to clear phlegm and heat in the lungs with thick sputum, a stifling sensation in the chest. Following traditional practices, there was continuous usage of bamboo in modernized Chinese medicine such as "Zhu Li Kou Fu Ye", an extract of bamboo leaves inhibiting inflammation in the throat. The important biological and therapeutic properties of bamboo leaf extracts including anti-oxidant, anti-microbial, anti-inflammatory, anti-helminthic, anti-diabetic and anti-ulcer have been confirmed by several *in-vitro* and *in-vivo* experiments (Tripathi *et al.* 2015; Daswad *et al.* 2017). According to Chinese medicinal books such as "Ben

Chao Qui Zheng”, “Ben Jing Feng Yuan”, “Yao Pin Hua Yi” and “Jing Yue”, bamboo shoots are beneficial to human health notably by promoting the peristalsis of the stomach and the intestine, helping digestion, preventing and curing cardiovascular disease and cancer and promoting the excretion of urine (Lu *et al.* 2010).

Ayurveda, the ancient Indian system of medicine recommends bamboo and its products such as Banslochan, Tabasheer and Sitopaladi Churna for treatment of various ailments. Tabasheer or banslochan has been used since ancient times as a cooling tonic and aphrodisiac and in asthma, cough and other debilitating diseases. It is a siliceous secretion found in the culms of bamboos and occurs in fragments or masses, about an inch thick. A bamboo derived Ayurvedic remedy, Sitopaladi Churna is prescribed for pleurodynia, intercostal neuralgia, cold cough associated with bronchitis, pneumonia, tuberculosis, viral respiratory infection, digestive impairment and pharyngeal or chest congestion (Makhija *et al.* 2012). In Tibet, it is used for treatment of various lung diseases. It is a powder made with tabasheer as the main ingredient, plus small amounts of long pepper, cardamom, and cinnamon in a base of sugar. In Chinese traditional medicine, bamboo is generally considered cooling, calming, and phlegm resolving and is incorporated in many traditional formulas to treat lung and stomach heat, febrile disease and correct up flowing qi (qi is a fundamental concept in traditional Chinese medicine referring to the energy flow in a living being). Leaves are the part of the plant which is triggering the most intensive interest possible because the leaves comprise a significant portion of the total biomass of the plant, are easy to harvest and process and can be obtained as a waste of bamboo timber industry. Studies have revealed that bamboo is a rich source of antioxidants and regular consumption of bamboo-based products may reduce the risk of age-related chronic diseases including cardiovascular diseases, Alzheimer's disease, Parkinson's disease, cancer and diabetes. The main antioxidants in bamboo leaves and shoots are phenols, vitamin C & E and mineral elements such as selenium, copper, zinc, iron and manganese. At present, natural antioxidants are in great demand as synthetic antioxidants being used in food and pharmaceuticals may be deleterious to health. Bamboo a fast growing plant with huge biomass can serve as an alternative for the production of natural antioxidants.

Supporting traditional practices, modern research has scientifically validated most of the health claims of bamboos and it is still attracting huge interest from researchers to unearth even more potential health benefits (Panee, 2015; Gong *et al.*, 2016; Nirmala and Bisht, 2017; Ying *et al.*, 2017). Biomedical investigations on health beneficial effects of different parts and species of bamboos have been carried out since 1960s and a wide range of protective effects of bamboo derived products have been documented such as protection against oxidative stress, inflammation, lipotoxicity, cancer and cardiovascular disease. Several *in vitro* and *in vivo* experiments on animals have confirmed important biological and medicinal properties of bamboo extracts such as antioxidant, anticancer, antimicrobial, anti-inflammatory, anti-ulcer, anti-helminthic and anti-diabetic (Muniappan and Sundararaj 2003; Lu *et al.* 2005, 2010). Thus, bamboo is a plant that not only caters to the need of more than 1.2 billion people for their livelihood but also provides a healing touch to the soul, mind and body of humans.

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