



BATABRIKKHA

বটবৃক্ষ

Annual News Bulletin, Department of Botany

Vol.-II : September 2019

Department of Botany
Guwahati College
Guwahati



GOODWILL MESSAGE



It is a pleasure to write a note of appreciation on 2nd volume of "BatabrikKha" published by the Department of Botany, Guwahati College. This Annual News Bulletin is a reflection of the rich flora surrounds our region, research and departmental activities.

I hope the Department of Botany will continue to do well in the future by using their latest laboratory and classroom facilities.

With Best Wishes

Dr. Pranab Sandilya
Principal
Guwahati College

HOD'S COLUMN

Botany Department of Guwahati College is one of the oldest Departments of Science Stream and passed glorious 24 years.

The Department started Major Course in B.Sc. in the year 1995 with only six numbers of students. The first batch of major students completed their

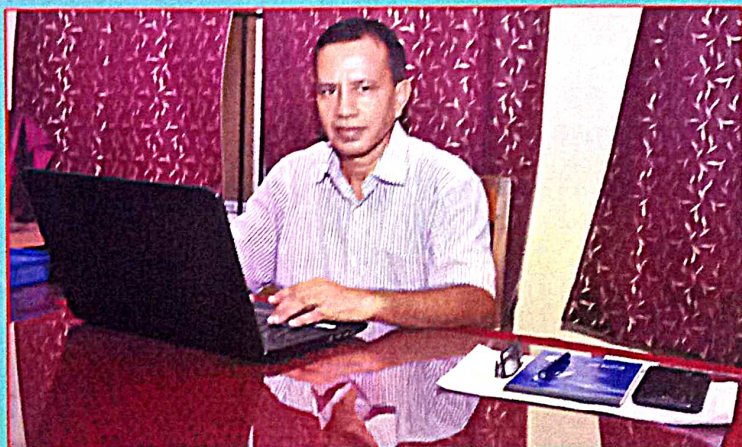
course in 1998. Till then the story of success has been continuing and students have come out with flying colours. This year all students (19 numbers) have obtained First Class in the final semester examination.

The Department has a Departmental Library comprising of Text Books, Reference Books and Journals, Herbarium section, Tissue culture laboratory and a newly constructed an Orchid House.

To provide exposure to the potentiality and talents of students, the Department has a hand written wall Magazine "Aparajita" and every year it is released by students on the day of annual lecture given by the distinguished personalities.

From this year department will celebrate 'BOTANY DAY' on every year on 20th September to expose the talents of the students in different field. To encourage the student's to show their academic performance 'Departmental Best graduate' award has been introduced on the basis of results of final year semester examination. Last year Departmental award was given to Nabajit Bhattacharya.

Department of Botany has now completed 24 glorious years of Major Course and in this occasion, an initiation has been taken to release the 2nd volume of Departmental News Bulletin "BatabrikKha" to reflect the growth, activities of the Department as well as to discover new scientific research in the field of Biological Sciences.



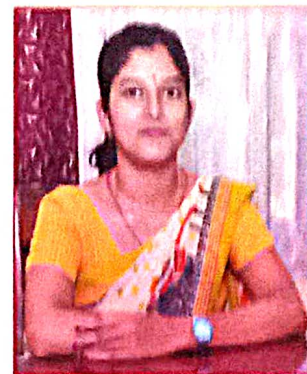
Dr. Mrinal Kumar Das
HOD
Department of Botany

A WETLAND PLANT: I: IPOMOEA AQUATICA

A wetland is a land where water stands near the land surface for a long period to support the aquatic life. There are various types of wetlands such as marshes, peat lands, river and lakes etc. These water lands are diversified with rich plant resources. One of the most important wetland plants is *Ipomoea aquatica*. The scientific details of *Ipomoea aquatica* and its valuable importance are enumerated below-

Botanical name- *Ipomoea aquatica* Forssk, Family-Convolvulaceae

Vernacular name-Water spinach (English), Kolmou (Assamese)



Nilashree Borah

Assistant Professor, (Guest Faculty)
Dept. of Botany, Guwahati College

Distribution of the plant- *Ipomoea aquatica* was first documented as a vegetable in 304 A.D. during the Chin Dynasty. The plant is native to India and Southeast Asia, where it is a dominant vegetable in food cultures throughout the region. It has since naturalized in South America, Australia, the Pacific Islands, Africa and Asia. Water spinach has been introduced as a non-native crop to the United States in 1973 with much less fanfare. It has grown so prolifically in waterway regions of Florida that it is listed locally and federally as a prohibited plant and "noxious weed". It is declared as noxious weed in the South eastern United States.

Description of the plant- It is a semi-aquatic tropical and a very fast growing plant which grown as a leafy vegetables. The stem is hollow allowing the plant to float in water. The leaves sizes are sagittate to lanceolate type which is 5-15cm long and 2-8cm broad. The flowers are trumpet shaped and usually white in color with a purple centre.

Nutritional properties of Water spinach:

Water spinach contains plenty of vitamins, lead in addition to rich in antioxidants and minerals. Hence it is very low in calories and fat. For this reason it is recommended by the dieticians in the cholesterol controlling and weight reduction programs. The leaves and young shoots are cooked in various ways to make many dishes. The youngest shoot can be added to salad and sometime can be cooked to make mild -flavored spinach. Water spinach is utilized in many standard Asian cooking methods, particularly stir fry with garlic and chilies, steamed to accompany soup, even tempura battered and fried. The hollow stems can also be cooked on their own as a crunchy side dish. Store refrigerated in a plastic bag, and use within 2-3 days of purchase. Beside this, the roots of this plant are also edible. Some recipes of Water spinach are given below-

1. Casa Veneration-	A Vegan Stir Fry with Mushroom Balls and Kangkong
2. Thai Table-	Chinese Water spinach Curry- gang Tay Po
3.What is Thai Food-	Chinese Water spinach Curry
4.Real Thai Recipes-	Stir Fried Water spinach
5.80 Breakfasts-	Coconut Water spinach-stems
6.Filipino-Food-Recipes- -	Crispy- Fried Spinach Appetizer
7.Jen Reviews-	Water Spinach Crepes with Coconut with Coconut Cream Sauce
8.Delicious Asian Food-	Stir Fried Water Spinach With Garlic

Medicinal properties of Water spinach:

It contains excellent levels of vitamin C or ascorbic acid which is a powerful water soluble antioxidant. Vitamin C protects the human body from various diseases. It is one of the abundant sources of vitamin A which is essential for mucosal integrity, health of skin, hair and vision etc and also acts as anticancer and anti-aging factor at cellular level in the humans. It is rich in minerals such as Iron, Potassium, Magnesium, Manganese and Phosphorus. Magnesium and calcium is important in bone, teeth and heart function. Spinach juice is useful for skin as it rejuvenate it and eliminates harmful toxins from the body. The wide array of nutrients contained in water spinach juice is beneficial for hair growth and prevents hair loss by improving the quality and texture of hair.

Detrimental effect of Water spinach:

If *Ipomoea* is harvested from contaminated areas and eaten raw, it will transmit *Fasciolopsis buski*, an intestinal fluke parasite of human and pigs, causing fasciolopsiasis. Hence the wetland plant *Ipomoea aquatica* is very important plant for various aspects and its conservation is necessary for well being of us. ♦

MICROPROPAGATION OF MEDICINAL PLANT BACOPA MONNIERIL

Dr. Mrinal Kumar Das
Associate Professor
Department of Botany, Guwahati College

Micro propagation or in vitro culture technique refers as the in vitro cultivation of plant seeds or various parts of plant organs, embryos, tissues, single cell and protoplast. The cultivation process is carried out in a nutrient medium under aseptic conditions. The first concept of micro propagation was developed by German Botanist Gottlieb (1902). According to Debnath et.al. (2006) and Benniamin et.al. (2004) micro propagation is the tool for production of high quality plant.

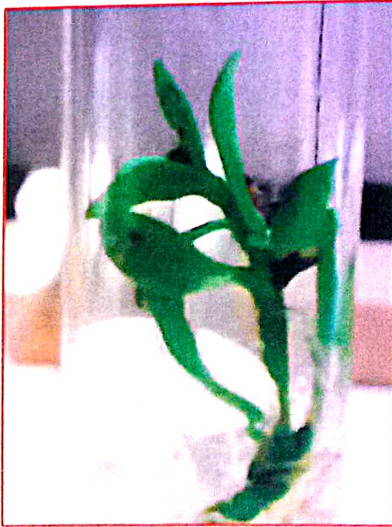
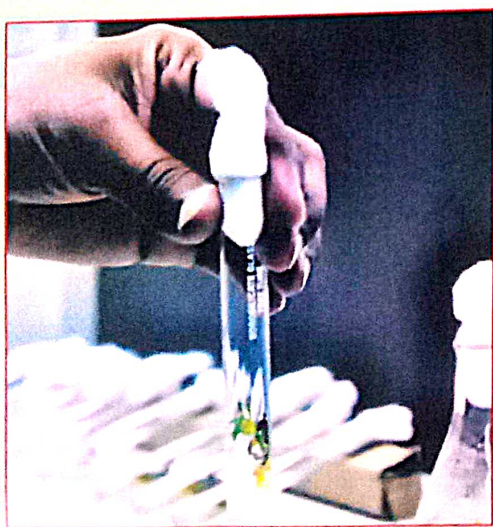
Plant tissue culture is one of the most rapidly growing areas of Biotechnology because of its high potential to develop improved crops and ornamental plants. Development of tissue culture has helped to produce several pathogen free plants, besides the synthesis of many biologically important compounds.

In micro propagation system the highly mature and differentiated cells can retain the ability of change to meristematic state and differentiate into a whole plant. According to Vochting (1878) polarity is a characteristic feature for guiding the development of plant fragment. In India a lot of work has been done in micro propagation. Tiwari et.al. (1998), had done shoot regeneration and somatic embryogenesis from different explants of *B. monnieri* L. Sahoo and Chand (1998) worked on micro propagation of *Vitex negundo* L., a woody aromatic through nodal segments from mature plant. Quraishi (2004), worked micro propagation in *Azadirachta indica* by culture of buds from branches of mature tree.

In 1999, Rajanul and Shrivastav studied shoot regeneration on *Bacopa monnieri* L through tissue culture. They induced adventitious shoots from leaf and stem explants of *Bacopa monnieri* L. through MS medium, supplemented with Benzyl adenine and kinetin.

Tiwari et.al. (2005), worked in vitro propagation of *Bacopa monnieri* L. In their investigation they used a range of cytokines for multiple shoot induction from node, internode and leaf explants.

Medeiros et.al. (2006), worked on the in vitro propagation of *Notoctatus magnificus*, where the main aim was to establish in vitro culture for regeneration of *Notocactus magnificus*. The callus formation was observed when explants were cultured on MS medium supplemented with 2% sucrose.



Mahapatra and Rath (2006), worked on in vitro study of *Bacopa monnieri* L, an important medicinal plant with reference to its biochemical variation. In the experiment they found that in *Bacopa monnieri* L, micro propagation was achieved on MS medium and B5 medium with BAP and using leaf explants and nodal segment. Debnath et.al. (2006), worked micro propagation as a tool for production of high quality of plant mainly based on medicinal value.

Micro propagation as a method for propagating plants in mass and also grows plants in large numbers and aseptic and controlled environment. In a traditional stem cutting method only two or three new plants can be produced. But under micro propagation techniques by taking few square centimetres of meristematic cells can produce thousands of new plants and also can produce disease free medicinal plants.

MATERIALS METHODS

Bacopa monnieri L. commonly known as "Brahmi", is a perennial creeping herb, belongs to family *scrophulariaceae*, whose habitat includes wetlands and muddy shores.

Internodes of the *B. monnieri* L plants are used as explants for micro propagation under aseptic condition after sterilising the explants with proper treatments and culture under in vitro condition.

RESULTS

In *Bacopa monnieri* L. after 15 days of inoculation at BASAL medium direct organogenesis occurs but formation of lateral shoot, length of lateral shoot and number of roots is less. In BAP medium after 15 days of inoculation induction of callus formation occurs from leaf and internodes. It is found that internodes and leaf segments cultured on MS media supplemented with plant hormone induces organogenesis from callus.

DISCUSSION

Medicinal plants need conservation for their existence and future availability. The success of in-vitro culture is largely depending on explants choice, medium composition and control of physical environment. Status of plant materials reflects the endogenous level of hormone which has an important effect on the formation of cell division. In micro propagation MS media is also supplemented with auxins and cytokines for regeneration of bud and roots because they are important plant hormones. ♦

DNA Barcoding- Technology in Species Identification

(Use of Bioinformatics in DNA Barcoding)

DNA Barcoding is a new tool for characterizing species of organisms of all life forms using a short DNA sequence from a standard and agreed-upon position in the genome. It is a new innovation of genomic era that uses molecular genetic methods for species identification, based on nucleotide sequence. This method requires a little amount of tissues from the organism to be identified. Gene regions have been recognized for barcoding animals, plants and fungi for identification species. DNA Barcoding is very much useful for identifying small organisms like insects that are difficult to identify with morphology and for specimens where diagnostic morphological features that are typically employed for species identification have been lost or removed. Once a DNA barcode sequence is generated from an unidentified specimen, it can be matched to a database of barcode sequences derived from reference specimens. For the beginners, it may be difficult to work on DNA Barcoding if not exposed to the application of molecular biology laboratory methods like gel electrophoresis, PCR and DNA sequencing. Demonstrating a link between protocols and applied questions of socio-economic importance can make these techniques more accessible and more interesting, facilitating science and technology learning objectives. Barcode of Life Data System houses over 4 million barcode sequences and corresponding metadata from approximately 250,000 different species. Data is entered into BOLD as a project where sequence information, as well as metadata such as collection location, is organized. BOLD project can be contributed by anyone. The International Barcode of Life Initiative (iBOL.org) is a multinational campaign to add DNA barcodes from species of the highest socio-economic importance around the world to BOLD, creating a digital library for species identification. This library is publically accessible and supports a number of analytical tools used for validating the reference library. DNA barcoding is particularly useful for illustrating the

Florina Brahma

Assistant Professor (Guest Faculty)

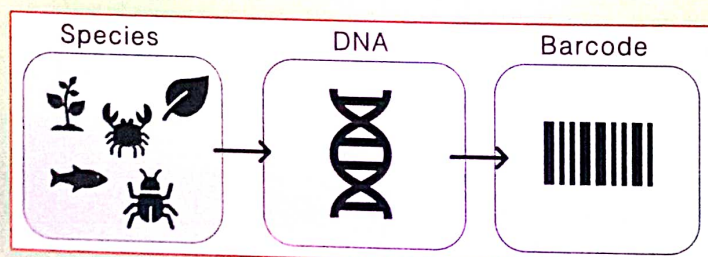
Department of Botany, Guwahati College



links between these laboratory methods for three reasons:

1. DNA barcoding has been used to investigate a number of socio-economic issues, such as food authenticity, conservation and epidemiology and in general is useful to explore the linkages between science and society.
2. It involves a standardized workflow that includes sample collection, DNA extraction, PCR amplification, agarose gel electrophoresis, Sanger DNA sequencing and bioinformatics. All these basic tools of molecular biology cover all the necessary curriculum points and also shows how these exact laboratory methods are integrated and used by research scientists.
3. A public reference library of DNA barcode sequences already exists to aid in sample identification which means that anyone can easily assign identifications to unknown specimens from DNA barcode sequences. Though the library is not complete, it has reached a stage where many species of socio-economic importance are represented, something that just 10-15 years ago would not have been possible. The existence of this database allows these kinds of projects to be undertaken.

The DNA Barcoding process gives the opportunity to see the combination and application of molecular biology tools to these real-world problems and questions. Clearly, DNA Barcoding has great potential for enhancing ecological and evolutionary investigations if the right genetic markers are selected. If carefully considered and implemented DNA Barcoding will allow a rational selection of a plant or animal DNA barcode based on a comparative and quantitative analysis. ♦



MICROBIOLOGY IN EVERYDAY LIFE

Plaban Mithi Baidya

Asst. professor (Guest Lecturer)
Department of Botany



A formal microbiology definition states that microbiology studies "microorganisms, or microbes, a diverse group of generally minute, simple life-forms that include bacteria, Achaea, algae, fungi, protozoa and viruses." Microbiologists also study the structure, function and classification of these microorganisms and how to use and control them. "Micro" means small in size or extent. Biology breaks down to the Greek bios, meaning life, and -logy, meaning study of. The word microbiology literally means the study of small life.

Sometimes studying microscopic organisms may seem unimportant. However, microorganisms impact many aspects of everyday life. Understanding these impacts may help understand why microbiology importance cannot be underestimated.

Food and Food Safety

The natural processes of microorganisms impact food in both positive and negative ways. The existence of the Food and Drug Administration (FDA) emphasizes the importance of microbiology in everyday life. Among his many discoveries, Louis Pasteur discovered that fermentation of wine and beer depends on microbial processes. Fermentation also develops the flavours of cocoa beans, tea leaves and coffee grains. In Africa products from fermented

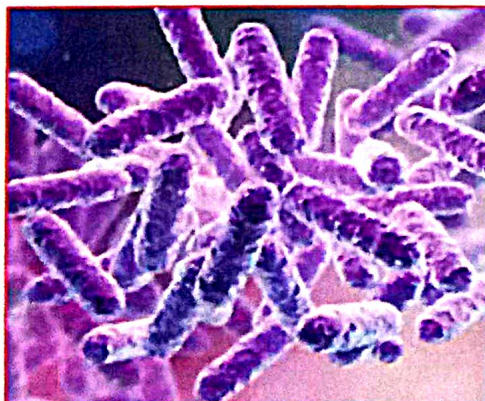
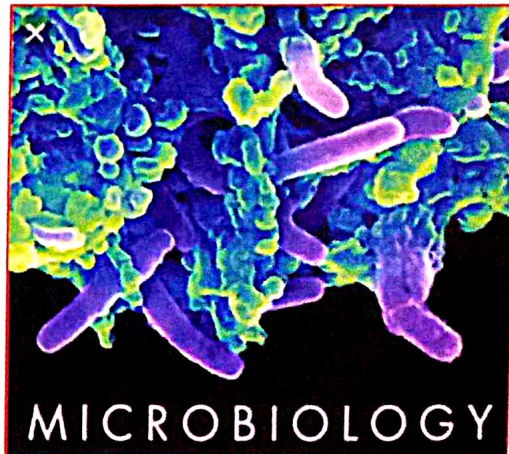
manioc provide dietary staples. Fermented soy and fish items are consumed daily in many Asian countries. Pickles, sauerkraut, yogurt and kimchi all require microbial activity. Bread rises because of the carbon dioxide released by yeast as the yeast grows. The transformation of milk to cheese requires microbes. Cheeses like blue cheese develop with the introduction of nontoxic mould.

Food-borne illnesses

Some microorganisms, however, thrive in food while making that food unsafe for human consumption. In 2011, food-borne illnesses impacted an estimated 48 million people in the U.S. The estimated annual cost of food-borne illnesses, \$7 billion, comes from medical treatment and lost work time. Food-borne illnesses can be caused by bacteria, viruses, parasites, natural toxins (often a by-product of microorganism activity) and environmental toxins. Food spoilage occurs when microorganisms decomposed food. Pasteur demonstrated that heating food and beverages before sealing them into a container killed the microorganisms that caused foods to spoil. Safe food preservation methods let food be stored and shared over time and distance.

Environment and Ecosystems

Microorganisms fill many niches in environments. Microbes like the chemosynthetic bacteria at deep sea vents and phytoplankton (floating photosynthesizing microorganisms) form the base of many aquatic food chains. Fungi, bacteria and protists perform the important task of decomposition that releases nutrients back into the environment. A gram of soil contains an estimated one billion microorganisms from possibly thousands of species. Microbiological studies of bacteria, viruses, protists and



fungi in soil ecosystems led to understanding the carbon, nitrogen, phosphorus and sulphur cycles. Since these nutrient cycles in soil allow the continued existence of life on Earth, learning about these microorganisms seems worthwhile.

Studies of microorganisms in extreme environments suggest the possibility of life on other planets, in environments completely inhospitable to human life. Microorganisms on Earth live in environments ranging from underground oil reservoirs to salt lakes and other extreme saline environments, from boiling hot springs to ice cold habitats and in environments with pH ranges from very acidic to very alkaline. These extreme environments show that microorganisms could survive elsewhere in the universe.

Health and Medicine

Robert Hooke's observations of cell walls in cork mark the beginning of microbiology, the study of small life forms. Others continued those studies. Studies in the 1700s eventually led to Louis Pasteur's final blow to spontaneous generation, the then-prevalent belief that living things could arise from nonliving materials. These studies showed that microbes had to have travelled from place to place. Understanding vectors, those methods of transport, led to many health practices, including washing one's hands before eating and after using the bathroom.

Germ Theory

Germ theory, the idea that microorganisms could cause diseases, seemed ridiculous to many, at first. The practice of washing hands and equipment just to get

them dirty again met resistance among many, including butchers and surgeons. But changes in medical procedures by then-radical thinkers like Joseph Lister led to improved surgical outcomes. The reduction of infection-related deaths convinced many to accept the possibility that microorganisms could, in fact, kill humans. Studies of mould in a Petri dish of bacteria led to Fleming's discovery of penicillin. Similar studies in soil ecosystems led to discoveries of additional antibiotics. For example, two antibiotics (chloramphenicol and streptomycin) came from studies of soil microbiology by Mildred Rebstock and others. The rise of antibiotic resistant and flesh-eating bacteria shows the continued need to learn microbiology.

Research and Teaching

Microbiology research provides answers (and questions) about microorganisms. Pasteur's research into spoilage of beer and wine led to health practices like pasteurization of beer, wine and, after 1886, milk. Pasteur's techniques led to the discovery of viruses by the Russian microbiologist Dmitry Ivanovsky. Vaccinations and treatments for diseases ranging from rabies to smallpox to HIV and AIDS came from microbiology research. Researchers test microorganisms to understand their behaviours and interactions. Information about minute organisms may seem trivial, but microbiology research has led to improved crop yields, bioremediation of pollutants like oil and diesel and techniques to cure diseases, reduce food-borne illnesses and prevent infections. ♦

মাবফং গুৱাহাটী কলেজ

মৃদুস্মিতা ডেকা, প্রাক্তন ছাত্রী

জীৱনৰ জৰ্জলা বগাওঁতে

প্রতিটো খটখটিত একোখন ঘৰ সাজে

নজনা কৈয়ে...

উদ্ভিদ বিজ্ঞান বিভাগ এখনি ঘৰ

টিকনা- মাবফং গুৱাহাটী কলেজ।

ইয়াৰ মানুহবোৰ অভ্যাস

এক এবাৰ নোবৰা অভ্যাস...

কালিৰ পৰা অভ্যাসবোৰ সলনি হ'ব;

হয়তো হৈছে

গতানুগতিক ব্যস্ততাবোৰ কমিব

সেউজ দোপাট্টাখনে আলনাৰ পাহফালে উচুপিব।

তিনিজি বসন্ত সাক্ষী হৈ ব'ল

আমাৰ হাঁহি কান্দেনা অভিমানে কাজিয়াবোৰ

সৰাপাতবোৰ সৌৰবশী হ'ল।

তথাপিও মনত পৰিবনে বাক

খিলঙৰ শেষ নোহোৱা বাটটো?

অথবা ঠিকিম ঠাক বৰফৰ দেশৰ কাহিনী?

আৰু লাচুঙৰ উমাল সাজিয়াটো জানো পাহৰো বুলি পাহৰিব পাৰি?

নোৱাৰি।

অপৰাজিতাভাল যে বটবৃক্ষ হৈ বুকুবেদি শিপাইছে, নীৰবে...

বিদায়... উফ চেপা কান্দোনটোৰে ভিঙিটো সোপা মাৰি ধৰিছে

শেষ বুলিলে জানো শেষ?

'বিদায়' মাথোঁ আনুষ্ঠানিকতাহে হ

তথাপিও চেন বুকুখন বিষায়।

সকলোৰে জীৱনৰ ষ্টেচনবোৰ বেলেগ বেলেগ

নামো বুলি ক'লে জানো বাৰি ধ'ব পাৰো?

নহ'লে লগত নামি যাওঁ বুলি জানো নামি যাব পাৰো?

ওহো... নোৱাৰো।

ষ্টেচনবোৰ যে বেলেগ বেলেগ

কোনোবাটো কেঁকুৰিত আকৌ লগ পোৱাৰ প্রতিশ্রুতি

ডায়েৰীৰ পাতত শব্দ হৈ ওপঙি থাকে প্রতিশ্রুতিবোৰ।

শেষ আলিঙ্গনটোৰে দ'কৈ সাঁচ বহুৱাই পুনৰ লগ নোপোৱালৈ হাঁহিৰ পৰ্য্যটক...

ডায়েৰীৰ পাতখিলা হালধীয়া নপৰালৈ প্রতিশ্রুতিবোৰ সেউজীয়া হৈ থাকক!

RICE BEER : CAN IT BE USED AS MEDICINE ?

Mridusmita Deka
MSc 1st semester (Botany)
Central university of Sikkim
Ex-student of Guwahati college



Assam is a homeland of various local or tribal communities like Boro, Karbi, Ahom, Rabha, Deori, Missing, Dimasa, Kachari etc. Since the beginning of human civilization fermented foods have occupied an integral part in the culture and traditions of many ethnic communities throughout the world. Fermented food is very significant to human diet specially in developing countries as it is an inexpensive technique used by world communities across the world for food preservation along with enhancement of nutritional sensory values of food. Fermentation is brought about by microorganisms that transform the raw materials into biochemically and organoleptically useful products with the harmful products like phytales, tannins and polyphenols being destroyed or detoxified. Every single food is synergy with distinctive group of microflora which increases the level of proteins, vitamins, essential amino acid, fatty acid and other nutritional constituents.

States of North East India have a huge reserve of traditional fermented foods owing to rich ethnic diversity. A variety of region specific fermented beverages have been documented. Ethnic tribes are characterized by their native language, rituals, costumes and housing patterns. Rice is the staple food and home brewed rice beer is a must in the items of diet of almost all the tribes of NE region. Rice beer is a traditional alcoholic beverage that plays a major role in the socio cultural lives of people. Rice beer prepared from rice through fermentation process using yeast and various plant materials. Raw materials and microbes involved in this brewing process have wide variability. It is believed to possess many medicinal and therapeutic properties possibly contributed by various indigenous herbs used in starter cake

preparation. They prepare these beverages at home using round flattened solid ball like mixed dough inocula or starter and these contain amylolytic and alcohol producing yeast, starch degrading moulds and lactic acid bacteria.

In the North eastern states of India, every state has their indigenous alcohols prepared from the traditional process of brewing. In Assam, Apong is prepared on the eve of bhogali Bihu in every household of Missing tribe of Assam and Aho tribe of Arunachal Pradesh. People of this tribe come together to drink the ceremonial beer to put an end to their communal conflict and restore peace and harmony. Angami Nahas of Nagaland brew a rice wine called zutho and they are secretive of their recipe. A forthy drink with sweet and sour taste often served in the bamboo grasses. Xaj is the drink of Ahom's which you won't find anywhere in the world. It is made of fermented rice and mix rare species of herbs. Zawlaidi is Mizoram's locally brewed grape wine. Puar tribe of Jaintia hills brews an alcoholic drink Kiad-um served in bamboo tumbler with charcoal piece at the bottom to preserve its tart. It was used as remedy for cuts and wounds. Sekmai yu is considered as speciality of the Meitei community of Manipur. It tastes smooth as vodka. Chuwarak is distilled alcohol. Apart from rice it is also prepared from pineapple, jackfruit and local ingredients like 'tokshis-eleng' leaves and 'thakotor' leaves

Rice beer plays an important role in the socio cultural life of the tribal people. The preparation and consumption of this type of liquor emerged mainly due to climatic conditions. Various plants are used in the preparation of rice beer.

Tribe	Name of rice beer	Local name of the plants used	Plant parts used
Boro	Jou bishi	Dhapat tita	Leaves, roots
		Dhan	Grain
		Senikuthi	Leaves
		Agara	Whole plant

Tribe	Name of rice beer	Local name of the plants used	Plant parts used
Karbi	Harlong	Themra	Bark
		Kathal	Leaves
		Mahudi	Leaves
		Dhan	Rice grain
		Titaphool	Leaves
		Bhekuri tita	Leaves

Tribe	Name of rice beer	Local name of the plants used	Plant parts used
Ahom	Xaj	Bar manimuni	Whole plant
		Patihanda	Leaves
		Tubuki lota	Leaves
		Dhapat tita	Leaves, roots
		Lota mahudi	Leaves
		Kopou dhekia	Leaves
		Bihlogoni	Fron, root
		Jaluk	Seed
		Sonborial	Leaves

Tribe	Name of rice beer	Local name of the plants used	Plant parts used
Mising	Apong	Anaras	Bark
		Kathal	Leaves
		Tejpat	Leaves
		Bar manimuni	Leaves
		Jamlakhuti	Leaves
		Lai jabori	Young leaves
		Soru manimuni	Whole plant
		Kopou dhekia	Leaves
		Banjaluk	Leaves
		Posotia	Leaf, root, twig
		Dhan	Rice grains

Nutritional analysis shows that rice beer is highly nutritious beverage that contains amino acid , sugars and organic acid as well as vitamins and minerals. It contains many strains of lactic acid bacteria, often considered as probiotic. Plant extract used in drink could have an anti cancer effect. It has an antioxidant effect and help with destruction of free radicals. Rice wine has antibacterial effect too. It also helps to increase skin's protective function. It may be potential protectant from UV induced skin aging. It is linked to better blood circulation. Citric and lactic acid in rice beer help with food digestion.

The method of preparation of rice beer followed by different ethnic tribes residing in different areas in Assam is more or less similar. The only difference is the ingredients used in preparation of starter cake. Rice beer produced in North East India is nutritionally rich and have high therapeutic values. The presence of antiradical activity suggest possible medicinal properties. There is scope to validate beneficial properties and to standardise various parameters of fermentation for the commercialization of this staple drink. ♦

DEPARTMENTAL ACTIVITIES



INAUGURAL MOMENT OF WALL MAGAZINE
'APARAJITA' BY: DR. RANJITA DEVI,
DEPARTMENT OF PHYSICS

INAUGURAL SONG
PRESENTED BY
1ST SEMESTER MAJOR
STUDENTS ON THE
OCCASION OF
INVITATIONAL LECTURE



INAUGURATION OF SEMINAR LECTURE BY
DR. K.K.SARMA, SCIENTIST NESAC

RELEASE OF FIRST VOLUME OF
DEPARTMENTAL BULLETIN 'BATABRIKKHA'



DEPARTMENTAL ACTIVITIES



GROUP DANCE PRESENTED BY
BOTANY MAJOR STUDENTS

FELICITATION TO DR. NILAKSHI DEVI,
HOD. GAUHATI UNIVERSITY ON THE
OCCASSION OF 'BOTANICAL
ILLUSTRATION AND HERBARIUM
TECHNIQUE' WORKSHOP



DR. NILAKSHI DEVI, HOD. GAUHATI
UNIVERSITY ON THE OCCASSION OF
BOTANICAL ILLUSTRATION WORKSHOP
GIVING ADDRESS TO PARTICIPANTS/
ADDRESSING PARTICIPANTS



GATHERING OF PARTICIPANTS OF
DIFFERENT INSTITUTION OF
GUWAHATI ON THE OCCASSION OF
'BOTANICAL ILLUSTRATION AND
HERBARIUM TECHNIQUE'
WORKSHOP



GATHERING OF PARTICIPANTS WITH
RESOURCE PERSONS DURING
WORKSHOP

BOTANY MAJOR STUDENTS



1st Semester 2019



5th Semester 2019



3rd Semester 2019



*BATABRIKKHA : An Annual News Bulletin, Department of Botany, Guwahati College,
Published by Department of Botany, Guwahati College, September 2019*

*Printed at Kaziranga Printing House
Chandmari, Guwahati-21*