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TEA

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From the Editor's Desk

Dear Readers,

We are pleased to inform you that May issue of **Times of Agriculture magazine** is being released on the occasion of **International Tea Day**. In this issue, we have covered various aspects of tea industry. Indian tea is renowned worldwide for its uniqueness and Flavor. Tea holds a special place in our country; it is one of the most consumed beverages globally, second only to water. Tea plays a unique role in our daily lives, with people consuming different types of tea from morning to night in their own ways. In this issue, we have deeply explored various dimensions of tea. Additionally, we have covered the export scenario of **Indian tea** and its position in the international market.

Apart from that, we have focused particularly on the emerging trend of **tea tourism** and its contribution to the Indian tourism industry. Touring tea gardens, visiting tea factories, and understanding different methods of tea tasting is a unique and interesting experience that is attracting tourists. In this issue, we have described the major tea tourism destinations, their experiences, and possibilities, which you will find not only informative but also may include in your travel plans.

Our constant effort is to provide you with the latest and most interesting information. We believe this issue will be a source of both knowledge and entertainment for you. Your feedback and suggestions are extremely valuable to us. Please write to us and let us know how you found our effort.

Thank you and best wishes,

Editor-In-Chief

CONTENT

Agriculture Updates

UN Declare 2026 As International Year of The Women Farmer

The United Nations General Assembly is declaring 2026 as the International Year of the Woman Farmer. The resolution was proposed by the US A and adopted by consensus. It aims to increase awareness of the crucial role that women farmers around the world play in agrifood systems, as well as their contributions to food security, nutrition and poverty eradication.

The International Year of the Woman Farmer 2026 will serve as a platform for the adoption of effective policies and actions against the barriers and challenges that women farmers face across agrifood systems, as well as to promote gender equality and the empowerment of all women in agriculture.

“From the field to the factory, from the classroom to the boardroom, women are fundamental to the future of agriculture. As leaders, it is our responsibility to make sure the next generation of women farmers have equal access to economic, educational and leadership opportunities, and that we dismantle the unique barriers they face so they can continue to take on the challenges of meeting the world’s growing food, fuel and fiber needs,” stated Deputy Secretary Torres Small in a USDA news release.

This initiative spotlights the role of women in producing up to 80 percent of food in some regions and also aims to elevate their position in leadership, enhancing their representation in decision-making processes. The USDA release stated that the agency continues to transform the national food system, focusing on resilient local production, fair markets, and comprehensive community support.

IFFCO receives FCO approval for Nano Zinc, Nano Copper Liquid fertilisers

In a significant breakthrough for the agricultural sector, IFFCO has obtained approval for its Nano Zinc and Nano Copper liquids under the Fertiliser (Inorganic, Organic, Mixed) Control Order. These innovative nano-formulations aim to combat zinc and copper deficiencies in agriculture, with the goal of enhancing crop yields, improving crop quality, and mitigating micronutrient malnutrition on a global scale. This approval underscores the remarkable achievement of IFFCO's research team, underscoring their unwavering commitment to driving forward agricultural technologies that benefit farmers worldwide. Through the introduction of Nano Zinc and Nano Copper liquids, IFFCO is taking substantial steps in harnessing nanotechnology to tackle critical agricultural challenges.

The approval by the FCO marks a significant achievement for IFFCO, as these innovative products are poised to benefit farmers globally. The specifications for Nano Copper liquid, as per the FCO notification, include a minimum copper content of 0.8 per cent by weight and a pH range of 3.0-6.50. The particle size analysis indicates that a minimum of 50 per cent of the material shall be in the range of 10-80nm. These specifications ensure that the Nano Copper liquid meets the quality standards required for effective micronutrient supplementation in agriculture.

After this notification now 5 liquid fertilizer products of IFFCO based on nano technology will be available to the farmers. After IFFCO Nano Urea, Nano DAP, IFFCO's liquid fertilizer IFFCO Nano Urea plus was notified by the government and now IFFCO nano zinc (liquid) and IFFCO nano copper (liquid) have been notified for three year.

Bayer to launch First Bio-Insecticide for arable crop

Bayer announced that it has signed an agreement with UK-based company AlphaBio Control to secure an exclusive license for a new biological insecticide. The new product will be the first available for arable crops, including oilseed rape and cereals. Targeted for initial launch in 2028 pending further development and registration, this new insecticide was discovered by AlphaBio, with whom Bayer distributes FLiPPER® an award-winning bioinsecticide-acaricide. As a leader in the research and development of crop protection solutions derived from natural sources, AlphaBio Control provides farmers and growers with effective and sustainable solutions for each stage of the crop production cycle, thereby improving agriculture and horticulture one spray at a time. Its first product was the award winning bioinsecticide-acaricide, FLiPPER®.

The new bioinsecticide has potential for use against coleoptera insects like the cabbage stem flea beetle (CSFB), a pest insect that can damage oilseed rape crops throughout the growing season and even cause seedling death. The beetle is widespread in the United Kingdom and throughout much of Europe, and damage caused by adult CSFB feeding gives rise to ‘shot-holing’ symptoms which affect young plants and early leaves, resulting in stunted growth and poor plant health.

Ratnagiri Farmers Launch Aamoré: D2C Alphonso Mango

The Ratnagiri farmers, as well as Konkan Ratnagiri Bhoomi Agro Producer Company, are proudly introducing Aamoré, a novel direct-to-consumer brand of Alphonso mangoes owned collectively by 300 smallholder farmers. Aamoré is built around a community of 300 small-holder farmers, striving to bring highest standard of quality and freshness to alphonso mango enthusiasts worldwide. This ground breaking initiative aims to uplift local farmers by providing them with the necessary tools and knowledge to cultivate export-grade fruit. It includes the establishment of cutting-edge packhouse operations, the implementation of advanced scanning technology for each mango, the adoption of strategies to mitigate spongy tissue and ensuring comprehensive traceability from farm to table.

In its inaugural year, Aamoré Alphonso mangoes will be available to consumers in the USA, Europe, the UK, Abu Dhabi, and select cities in India. Residents of Delhi, NCR, can already place orders for these premium mangoes via aamore.co.in.

Aamoré focuses on the two core pillars of the community, the farmer and the consumerFor Farmers, it is an opportunity to realise significantly higher incomes, sustainably and independently. On the other end, for consumers worldwide, Aamoré delivers an unparalleled experience of the highest quality of Alphonso Mangoes; a fruit that is authentic GI Certified and lives up to the promise of being the King of Fruits.

BASF launches Efficon® insecticide to control sucking pests

Chemical solutions company BASF has launched Efficon, a new insecticide, in India to help farmers tackle sucking pests. Classified under the new IRAC group 36, the product represents a new class of insecticides (Group 36 — pyridazine) with no known cross-resistance with existing products, making it a superior insecticide resistance management tool. **Efficon Insecticide** was first launched in Australia in 2023. India is one of the earliest countries in the world to obtain this new novel chemistry that will help support farmers manage tough sucking pests.

A valuable aspect of Efficon Insecticide is its unique mode of action. It is highly effective on multiple life stages of target pests like Aphids, Jassids and White flies. Upon application, Efficon quickly stops insects from feeding and plant injury. It provides long lasting residual control due to its systemic properties. Piercing and sucking pests pose a significant threat to crops in India, causing extensive damage amounting to 35 to 40 per cent loss in productivity and yields. Farmers in the country can now manage this challenge with Efficon.

Due to its systemic properties, Efficon provides long lasting residual control even to the new crop growth. This innovation reaffirms BASF's commitment to help farmers across boundaries in managing a variety of existing sucking pests. Efficon will help Indian farmers in effective and long duration protection against insect pests in wide variety of crops like cotton and vegetables. Efficon is also highly compatible with non-target organisms and beneficial insects, including pollinators, when applied according to label instructions.

BASF
We create chemistry

Chinta Mango a farmer's variety make history to registerd in PPVFRA

ICAR-Central Island Agricultural Research Institute, Port Blair, Andaman & Nicobar Islands facilitated Shri. Chintaharan Biswas, a progressive mango farmer with 100 mango trees from Shaheed Dweep and supported him in registering his farmer variety, 'Chinta Mango,' with the Protection of Plant Varieties and Farmers' Rights Authority, New Delhi.

This is the first mango variety from this island to be registered in the PPVFRA and will be known as Chinta Mango. The certificate was handed over to Mr. Chintaharan Biswas by Dr. Himanshu Pathak, Hon'ble Secretary, DARE & DG, ICAR during his recent visit to ICAR-CIARI, Port Blair. "Chinta Mango" belongs to the species *Mangifera indica*, a cultivated mango species. The special feature of this genotype is the characteristic purple color in the peel during unripened stage. ICAR-CIARI has made efforts for the morphological and biochemical characterization of this genotype. Fruits are large in size weighing between 300-400 grams, and the individual fruit weight ranges from 300-400g. The fruits are delicious with yellow pulp, sweet with less fibre content and the average TSS recorded is 19.6 ^{o}B.

Another unique feature of this genotype is the occurrence of polyembryonic seedlings. This is an additional advantage of this mango as the purity of the genotype can be maintained by seed propagation. The phytochemical characterization of fruit pulp showed its richness in carotenoids, flavonoids, ascorbic acid, and antioxidant activity.

COVER STORY

TEA INDUSTRY IN INDIA

About the Author

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With a rich history spanning 172 years, the tea business in India holds a unique and prominent place in the country's economy. The tea products can be broadly segmented into crush, tear and curl (CTC), orthodox and green tea. In India, nearly 80% of all families consume tea, making it the most popular beverage in the country. Majority of tea plantations in India are located in rural hills and backward regions of the Northern, Eastern, and Southern states. In India, tea is traded and purchased through private selling and auctions. **The majority of tea trading is conducted through auctions in six major cities: Calcutta, Guwahati, Siliguri, Cochin, Coonoor and Coimbatore.** With more than 13,000 gardens and over two million workers, the Indian tea industry is one of the largest in the world. The Indian tea sector provides the government with substantial foreign exchange earnings in addition to significant revenue. Indian tea is regarded as some of the best in the world because of its strong regional indications, large investments in tea processing facilities, continuous innovations, expanded product mix, and strategic market growth.

The world's second-largest producer of tea is India. It cover 6.19 lakh hectares of land for the cultivation of tea as of 2022. Eighty percent of the tea produced in India is consumed domestically, making it one of the **world's top consumers of tea**. India's tea production in 2022–2023 was 1,374.97 million kg, up from 1,344.40 million kg in 2021–2022.

History of Tea cultivation in India

The tea industry in India is about 170 years old. It occupies an important place and plays a very useful part in the national economy. **Robert Bruce in 1823 discovered tea plants growing wild in upper Brahmaputra Valley**. In 1838 the first Indian tea from Assam was sent to United Kingdom for public sale. Thereafter, it was extended to other parts of the country between 50's and 60's of the last century. However, owing to certain specific soil and climatic requirements its cultivation was confined to only certain parts of the country.

Tea discovery in India

Tea was introduced formally to Indians by the British. The British were determined to overthrow China's monopoly on tea, having found that Indian soil /weather was eminently suitable to cultivate these plants. So they decided to develop a tea garden in India. In 1776, Sir Joseph Banks (the great English botanist) recommended that tea cultivation be undertaken in India. In 1780, Robert Kyd did the experiments with tea cultivation in India with seeds from a consignment stated to have arrived from China. A few decades later, Mr. Robert Bruce discovered tea plants growing wild in Upper Brahmaputra Valley. In May 1823, the first Indian tea from Assam was sent to England for public sale.

The tea industry in India

The tea industry in India started to take shape by the early 1840s. The tea plants, which were first tried out in Assam, were tested in higher elevated regions like Darjeeling, and Kangra valley. After successful testing, tea plantations in Darjeeling officially began in 1841. Post-British era, the tea industry in India has flourished. The Tea City of India Dibrugarh is the fourth largest town after Guwahati. This city is situated on the banks of the Brahmaputra River in upper Assam, India. This city accounts for almost 50% of India's Assam tea.

Tea Production

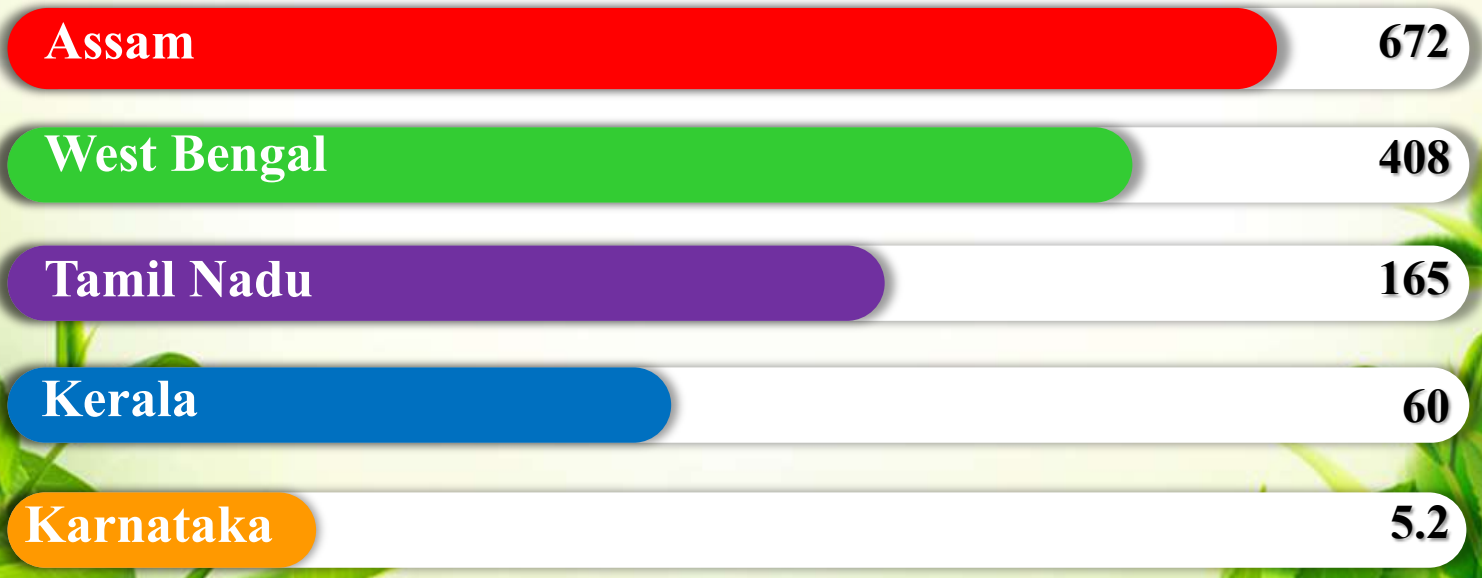
The northern part is India is the biggest producer at about 83% of the country's annual tea production in 2021-22 with the majority of the production coming from the West Bengal. The Assam valley and Cachar are the two tea producing regions in Assam. In West Bengal, Dooars, Terai and Darjeeling are the three major tea producer regions. The southern part of India produces about 17% of the country's total production with the major producing states being Tamil Nadu, Kerala and Karnataka.

Assam is largest tea producing state of India. On average, the state utilises 307.08 thousand hectares of land to grow 672.14 million kg of tea. Assam commercial tea farming is helped economically as it is rich in flavor. Also, Assam contributes more than 50% of total tea production in India. West Bengal holds the second position on the list of top states based on the largest producer of tea in India. The land use for tea production is about 140.44 thousand hectares, and the tea produced is about 408.73 million kgs. Also, West Bengal is famous for the production of green tea, oolong tea, black tea, white tea and others. Apart from Assam and West Bengal, the other major tea-producing states in India are Tamil Nadu, Kerala, and Karnataka. Tea is also grown in other states of India such as Sikkim, Uttarakhand, Meghalaya, Manipur, Nagaland, and Mizoram.

Tea Export

India is among the top 5 tea exporters in the world making about 10% of the total exports. From April-February 2024, the total value of tea exports from India stood at US$ 752.85 million. Indian Assam, Darjeeling, and Nilgiri tea are considered one of the finest in the world. Majority of the tea exported out of India is black tea which makes up about 96% of the total exports. The types of tea exported through India are black tea, regular tea, green tea, herbal tea, masala tea and lemon tea. Out of these, black tea, regular tea, and green tea make up approximately 80%, 16% and 3.5% of the total tea exported from India.

State wise tea production (Million Kg)- 2021-22



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India's total tea exports during 2022-23 in quantity were 228.40 million kg and worth US$ 793.78 million. During the financial year 2021-22 period, India exported tea in quantity were 200.79 million kg worth US$ 726.82 million. In 2022-23, the unit price of tea was US$ 3.48 per kg. From April 2023-January 2024, quantity of India's total tea exports stood at 199.84 million kg.

India exports tea to more than 25 countries throughout the world. Russia, Iran, UAE, USA, the UK, Germany, and China are some of the major importers of tea from India. During 2023-24 (Until January 2024) UAE, Iran and USA imported US$ 120.29 million, US$ 80.23 million and 69.20 million of tea from India. Iran, UAE, and the Russia are among India's top tea export destinations. During 2022-23, the three countries imported 16.51 million kgs, 42.44 million kgs and 43.11 million kgs respectively from tea from India. The value of total exports to these countries combined was US$ 314.27 million during the same period.

During 2022-23, the exports to USA, Russia, Iran, UAE, and UK rose to 89%, 121%, 65%,195% and 103% respectively. Some of India's other tea export destinations are Poland, Canada, Saudi Arabia, Egypt, Afghanistan, Bangladesh, China, Singapore, Sri Lanka, Kenya, Japan, Pakistan, and Australia, etc.

Government Initiatives

The Tea Board of India was set up in 1953 for the development of the tea industry in India. It started functioning in 1954. The board is located in Kolkata and has 17 offices across India. Being the regulatory body, the board exerts control over the producers, manufacturers, exporters, tea brokers, auction organizers and warehouse keepers through various control orders notified under the Tea Act. The responsibilities of the board are increasing production and productivity, improving the quality of tea, market promotion, and welfare measures for plantation workers, and supporting research and development.

Besides the development and regulatory framework, the Tea Board of India also undertakes direct promotional activities, including organizing joint participation in international fairs and exhibitions, arranging buyer and seller meets, and sending & hosting trade delegations.

6.9
Lakh ha.

Total Tea Area in India

Total Tea production in India

1.37
Million tons

Leading Tea Producing Countries (Tonns)

China	India	Kenya	Sri Lanka	Turkey
2,400,000	1.370,000	432,000	340,000	214,000

Did You Know?

Assam contributes over 50% of India's total tea production, making it the largest tea-producing region in the country.

To help the Indian exporters to market tea of Indian origin in overseas markets on a sustained basis, the Tea Board of India started a scheme: Promotion for packaged tea of Indian origin. The scheme assists in promotional campaigns - up to 25% of the cost reimbursement, display in international departmental stores, product literature and website development, and inspection charges reimbursement of up to 25% of the charges.

Tea Development and Promotion Scheme

This scheme was launched in November 2021 by the Tea Board of India for the period of 2021-26. The objective of this scheme is to enhance the productivity and quality of tea production in India.

Conclusion

India being the second largest producer of Tea has numerous opportunities to develop the Tea Industry as it is providing employment to a huge number of people in the north eastern states. The Indian tea industry has many chances to develop further due to the sheer magnificence of the production capacity and because it employs so many people in the northeastern regions. Beside this some suggestive measures such as The One District and One Product (ODOP) program can aid in promoting Indian Tea's fame, Promote GI tea and organic tea using brand marketing and promotion etc. should be added to enhance the tea production in the country.

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TEA TOURISM IN INDIA

Tea, a very cheap and stimulating drink is one of the most widely consumed non-alcoholic beverages throughout the world and is grown in more than 32 countries due to its refreshing, revitalizing and medicinal values. Although tea cultivation began in China about 4000 years ago, it was not until the 8th century A. D. Tea cultivation started in India in the middle of 19th century when the plantations were established in Assam by the British.

Cultural significance of tea

Despite being a diverse country, yet we have one thing in common when it comes to tea. In India, tea is a symbol of hospitality and is served at various occasions, including gatherings and weddings. Chai, is seen as a sign of friendliness and warmth, fostering meaningful conversations. In the past, tea drinking was a habit among Buddhist monks.

In religious rites and ceremonies, tea is often an important component. Tea is served as a type of prasad in certain Hindu traditions, which is a religious offering given to devotees as a blessing. It a symbol of love to get to know each other through sipping of tea and talk about life. In India, tea has an extended history of political significance.

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Popular Tea Tourism destinations in India

Tourism is one of the most rapid growing industries in the world, from nature exploration to metropolitan cities, from underground cave to monuments and much more that catch the attention of the tourist, and one such thing is a tea garden where tea leaves are produces. Over the years, nature-loving travellers from all over the world have been captivated by the rich fragrance of tea leaves, lush green tea plantations, gorgeous valley filled with curling clouds, and flowing streams from the mountains combined to create a sensory experience. Here are some of the major tourist destinations you don't want to miss out in India.

Darjeeling Tea garden

True Darjeeling tea possesses a flavour and quality, which sets it apart from other tea. Darjeeling hill station where the entire hills are coated with the lush green and smoothness of the tea garden that is very appealing and a calling place to calm one mind and enjoyed the serene beauty and a majestic view of the garden. Nature Walks in the resplendent tea gardens is the most loved activity when in Darjeeling. Due to the location and climatic condition of Darjeeling, Darjeeling tea cannot be grown or manufacture anywhere in the world. Here are some of the popular tea gardens located in the hills station of Darjeeling that give you an awe experience and lasting memory such as Glenburn Tea Estate, Gopaldhara Tea Estate, Happy Valley Tea Estate, Makaibari Tea Estate, Okayti Tea Estate and Puttabong Tea Estate.

DID YOU KNOW?

Tea is the second most consumed beverage in the world, after water.

Temi tea garden-Sikkim

The state of Sikkim nestles amidst the picturesque and scenic Himalayas in the North east India. At Temi Tea Garden, everything revolves around gloomy mornings, strolls along verdant terraces, and of course, sipping your favourite beverage. In November, the cherry blossom trees surrounding the plantation blossomed to an unprecedented degree, making the ascent extremely pleasant and an excellent place for hiking and trekking. When these trees are in bloom it seems as though you are traveling in a pink mist.

Assam Tea Garden

Assam boasts numerous tea gardens and heritage bungalows, attracting travellers for its rich, deep-amber tea with a brisk, strong, and malty character, making it a popular breakfast tea. It gives travellers a unique experience of Indian culture and heritage and involve many other things such as touring around tea fields, tasting tea, and picking tea in the garden. Assam, a state that has acquired the title of **"Tea Estate"**. Some popular tea garden destination in Assam were Amchong Tea Estate, Mangalam Tea Estate, Manohari Tea Estate, Nagrijuli Tea Estate.

Munnar Tea Gardens

Extensive tea plantations can be found in the Munnar region of the Western Ghats. Munnar is one of the most picturesque tourist destinations in India, and a very popular hill station as well. The tea grown here adheres to special flavour and freshness. Munnar is a popular hill station in Kerala known for its tranquil environment, pleasant weather, and scenic natural beauty, as well as its tea gardens.

Nilgiri Tea Plantations

Nilgiri Hills known for their 'Fragrant Ones', renowned for their high-altitude cultivation. Activities include picnics, visiting tea auction centers, and trekking and hiking. One of the famous attractions of the Nilgiri Hills is the ‘Tea and Tourism Festival’, which draw people from different part to sample the different types and flavors of tea that are offered there. Nilgiris tour highlights popular tea estates like Craigmore, Pascoes Woodlands, Nonsuch Dunsanadale, Parkside, Glendale, Tiger Hill, Colacumby, and Corsley.

Darang Tea Estate of Himachal Pradesh

Darang tea estate known for its exotic tea. The tea plantation adds a spectacular view to it making it one of a tourist destination. If you crave calmness and peaceful experience with a low capped mountains beautiful sight. Darang tea estate provides a soul nourishing tranquillity and unparalleled natural splendour in a relative unexplored part of the state. Nested among the estate are cottages, with a view of snowcapped mountains range of Himalayas.

Challenges

The potential of tea tourism has not yet been fully realized as the industry is still in its infancy. It is necessary that based on need tea tourism policies be developed in order to boost tea tourism in a country.

- The local population doesn't seem to be sufficiently informed, educated, or publicized about the economic, social, and cultural benefits associated with tea tourism.

- ❖ Soil erosion, landslide and other disaster could also be one of the factors that lead declining of tea tourism in India, which may cause in the declining of area of production.

- ❖ Improper management of the tea garden, resulting from lack of technical knowledge and labour, can negatively impact its attractiveness and attract tourists.

- ❖ India has an enormous amount of promise for providing a satisfying tea-tasting and traveling experience. However, there's lack on an appropriate framework, guidelines, and marketing campaigns about promoting tea garden to most of the outside world.

- ❖ Climate fluctuation can damage tea crops, reduce yield quality, and alter the chemical composition of leaves, potentially affecting the beauty of gardens.

Tea is not just a drink, but it bagged with a long history and engraved in our culture right from the time immemorial, it has that sense of simplicity but it plays a very deep love and warmth, it acts as a way to welcome and acceptance of people from the one who serve the tea. Tea garden added majestic beauty to the nature making it more appealing providing a sense peaceful and calmness, it also provided a place to escape from the chaos of city life to experience tranquility and relaxation before the next step in their journey of life and these draw people from different part of the world to enjoyed this scenic beauty of the garden in the country that are indirectly contributing in the economy of the people and the world.■

Previous Issues

Website Statistics (April 2024)

151K	65K	1.8M
Monthly Pageview	Monthly Visitor	Monthly Impression

Social Stats

6.5K	5.1K	5.6K	1.7K	2K

THE STATUS OF FOODGRAIN PRODUCTION IN INDIA

AUGMENTED REALITY THROUGH STATISTICAL DATA

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Foodgrains are considered to be of paramount importance for the food and nutrition security of the nation. It can be attributed to the fact that cereals and pulses are generally staple foods in India and there is no perfect substitution between staple foods and other foods. Also due to the fact that foodgrains are the cheapest source of energy and protein, they play a vital for the food and nutrition security of the low-income population. Because of these reasons, foodgrains continue to be the main pillars of food security in the country and any deficit in their production translates into a price shock and will have an adverse impact on common people.

India is the major producer of the foodgrains. Since the onset of the Green Revolution in the late 1960s, India has been treading on a path towards self-sufficiency in food. With the introduction of short-duration high-yielding varieties of rice and wheat, new technologies, and better irrigation facilities during the mid-1960s there has been a quantum jump in the production of Rice and Wheat, which largely contributed to enhancing the food grain production and achieving the food self-sufficiency and food security in India.

Total foodgrain production

The foodgrains include rice, wheat, pulses, and coarse cereals. The foodgrains production in India has increased from 52 million tonnes in 1951-52 to 330 million tonnes in 2022-23. The production of wheat, rice, and pulses also increased during the same period. The foodgrain production in 2022-23 is higher by 14 million tonnes than the production of foodgrains achieved during 2021-22. Further, the production during 2022-23 is higher by 31 million tonnes than the previous five years (2017-18 to 2021-22) average production of foodgrains. Uttar Pradesh, Madhya Pradesh, and Punjab are the major foodgrain-producing states which account for about 39 % of the country's total foodgrain production.

Rice

Rice is one of the most important food crops and feeds more than 60% population in India. Rice is the main staple food in the eastern, northeastern, and southern regions. Rice is grown in

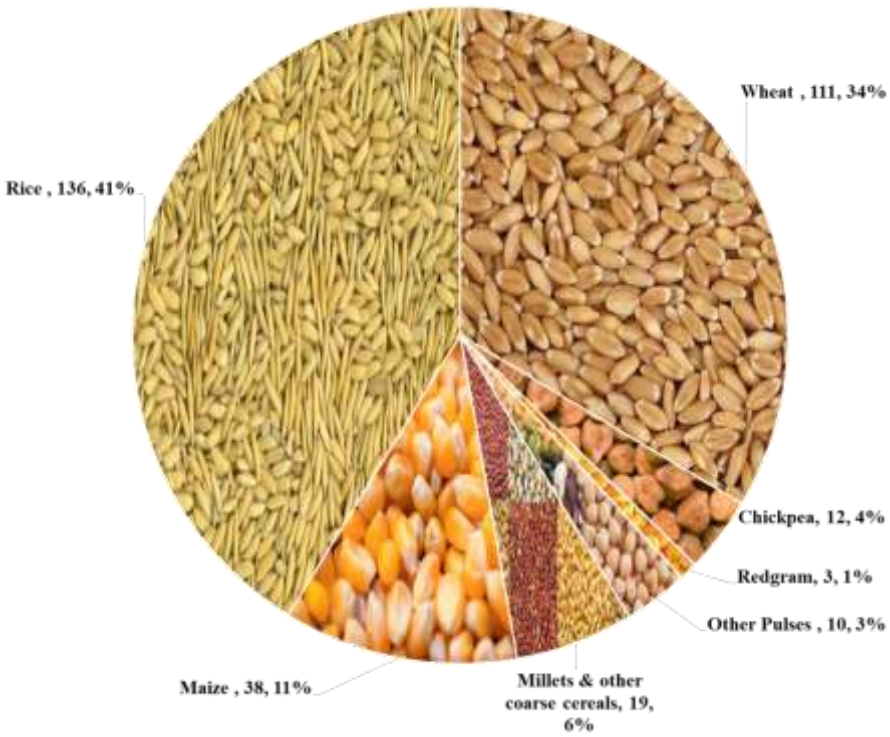

Fig. The share of different foodgrain crops toward total foodgrain production

almost all the states in the country. Rice crop is grown in both Kharif and Rabi seasons while summer rice is also cultivated in some parts of the country. The major share of rice production is from the Kharif season.

The rice production has registered an appreciable increase from 21 million tonnes in 1951-52 to 136 million tonnes during 2023-23, which is more than 6 times. Rice production is at a record during 2022-23 which is higher by 6 million tonnes than the previous year's Rice production of 129 million tonnes and by 16 million tonnes than the last five years' average production of 120 million tonnes. West Bengal, Uttar Pradesh, and Punjab are the major rice states that account for about 35% of the total rice production of the country.

Wheat

Wheat is the main staple grain in the northern, northern hills, and western regions of India. India ranks second in wheat production in the world. Wheat Production during 2022-23 is at a record 110 million tonnes which is higher by 2.8 million tonnes than the previous year's wheat production and by 4.8 million tonnes than the average wheat production of last five years. Around 67% of the country's total wheat production is the contribution of Uttar Pradesh, Madhya Pradesh, and Punjab states.

Pulses

Pulses in India have long been considered as the poor man's only source of protein, thus playing a crucial role in healthy diets, sustainable food production and above all, food security. Chickpea, red gram, black gram, green gram, lentil, and field pea are the major pulses grown in the country. Pulses have been cultivated both in Kharif and Rabi seasons. The share of pulses to the total food grain basket is around 9-10%. More than 90% of total pulse production has been the contribution of 10 states namely, Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, Karnataka, Andhra Pradesh, Gujarat, Jharkhand, Tamil Nadu, and Telangana. Total Pulses production during 2022-23 is at 26.05 million tonnes which is higher by 1.40 million tonnes than the last five years' average pulses production of 24.66 million tonnes.

Course cereals

Coarse cereals have been traditionally the main component of the food basket of the poor in India. The coarse cereals include maize, sorghum, barley, pearl millet, finger millet, and small millets. It is predominantly grown in the resource-fragile agro-climatic regions of the country. The coarse cereals have been known for their rich nutrient contents. The coarse cereals production has registered an increase from 12.81 million tonnes in 1951-52 to 57.31 million tonnes during 2022-23 which is higher by 6.2 million tonnes of previous years and further, it is also higher by 9.27 million tonnes than the five-year average production. Our

country is self-sufficient in coarse cum nutri-cereals production and there is better scope for further improvement of the production scenario.

Special attention on millets

The United Nations declared the year 2023 as the International Year of Millets (IYoM), on accepting the government of India proposal. The objectives of IYoM are to increase production and to create global demand for millets with a view of the health benefits of the people. The government of India celebrated IYoM through several campaigns, conferences, and other events throughout the country to make it a people's movement.

India is poised to become the global leader for "Shree Anna" (millets) with more than 80% of the millets production in Asia. Shree anna includes sorghum, pearl millet, finger millets, and small millets such as little millet, foxtail millet, proso millet barnyard millet, kodo millet, and two pseudo millets such as Buckwheat and Amaranthus. Pearl millet contributes to more than 50 % cultivation of millets in India. Further, it is interesting to witness that, India is the leading producer of Barnyard, Finger, Kodo, Little millet, and pearl millet globally.

Foodgrain production targets for 2023-24

The national targets for the production of foodgrains were set for the year 2023-24 during the National Conference on Agriculture for Kharif campaign-2023 held at New Delhi which was organized by Ministry of Agriculture & Farmers Welfare. The government of India targets 332 million tonnes of total food grains production for the year 2023-24 with a share of 170.8 million tonnes and 161.2 million tonnes from the kharif and rabi seasons respectively. Further, the Shree Anna production is targeted to increase from 15.91 million tonnes in 2022-23 to 17 million tonnes in 2023-24 with a aim to couple the food security with nutritional security.

Measures to achieve targeted foodgrain production

The government of India has taken several initiatives such as the National Food Security Mission (NFSM), Minimum Support Price (MSP), Pradhan Mantri Fasal Bima Yojana (PMFBY), Nutrient Based Subsidy (NBS) scheme, e-NAM, Sub-Mission on Agricultural Mechanization (SMAM), Kisan drone promotion, *etc.* in order to sustain the food security of the nation. All these initiatives aim for productivity enhancement as well as to increase the cultivational area of foodgrain crops.

In order to make India a global hub for Shree Anna, the Indian Institute of Millets Research (IIMR), Hyderabad is being nominated as the 'Centre of Excellence' to identify and promote best practices through advanced research and technologies at the international level.

Challenges in sustaining the foodgrain production

India has already achieved food self-sufficiency and sustains it. However, the Indian food production system faces many challenges such as increasing pressure on natural resources due to climate change and over-exploitation, fragmentation of land, increasing urbanization, *etc.* In order to mitigate the effect of these challenges successfully, a proper mix of policies from subsidy-driven to investment-driven as well as from price policy to income policy. The proper monitoring and evaluation of the impact of the policies at various levels at regular intervals is highly required.

Conclusion

The demand for the foodgrains is continuously increasing due to a steady increase in the population. Therefore, a strategic policy support system is inevitable for sustaining the food security of the country. The cultivation area is in a decreasing trend as a result of increasing population and consequent urbanization. Hence, productivity enhancement of crops is the only option in the hand. The adoption of suitable location-specific agronomic practices and High Yielding Varieties (HYV) in low-yielding regions is required to bridge the yield gap.

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EMPOWERING GROWTH

WOMEN'S ROLE IN SHAPING A SUSTAINABLE AGRO-ECONOMY IN INDIA

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INdia's agricultural sector serves as the backbone of its economy, providing sustenance to millions and ensuring food security for the nation. Recognizing the critical role of women in agriculture goes beyond mere gender parity; it's a strategic necessity for enhancing sustainability, productivity, and resilience within the sector. With a significant presence of women in agricultural roles, their inclusion in policy initiatives becomes paramount. Rural women, in particular, play a vital role in effective natural resource management for household sustenance; underscore the importance of understanding and leveraging their contribution for a sustainable agro-economy.

Strategies for inclusive growth:

Recognizing the pivotal role of women in agriculture, prioritizing their inclusion in policy initiatives is imperative. Enhancing access to resources such as land, water, credit, technology, and training is crucial for unlocking their full potential. Tools like the Women's Empowerment in Agriculture Index (WEAI) help identify intersections between women's empowerment, food security, and agricultural growth, enabling targeted interventions to overcome barriers. Despite constituting a significant part of the agricultural workforce, women often face hurdles due to cultural norms and discriminatory practices. Tailored policies and programs are essential to address these disparities and enhance women's participation and productivity. Initiatives like the Mahila Kisan Sashaktikaran Pariyojana (MKSP) focus on empowering women economically through training and creating opportunities. Additional strategies, such as facilitating land access, ensuring resource equity, promoting formation of women co-operatives, recognition and policy inclusion and promoting education and technology adoption, further augment these efforts.

The significance of women in agriculture:

When women move forward, the family, village, and nation move forward. Women's contributions to global food security are immense, yet they are often underestimated and sidelined in development strategies. Rural women play a vital role in various agricultural activities, including farming, dairy, sericulture, and fisheries. Several remarkable women-led initiatives exemplify their pivotal role in transforming agricultural landscapes and improving livelihoods.

1. **Swayam Shakti Sangathan (SSS) in Rajasthan:** Founded by women in the Rajsamand district to address landlessness and resource access issues, SSS has reclaimed wasteland and turned it into fertile agricultural plots. By promoting sustainable farming practices and establishing seed banks, SSS has empowered women economically and enhanced their families' well-being.
2. **Dhara Vikas Women's Cooperative Society in Andhra Pradesh:** Tribal women in Visakhapatnam formed this cooperative to tackle low crop yields and market access challenges. Through collective farming and organic techniques, they have improved soil fertility, increased crop productivity, and boosted incomes while supporting women's entrepreneurship.
3. **SEWA's Organic Farming Initiative in Gujarat:** SEWA empowers women farmers through organic farming, enhancing soil health, reducing costs, and accessing fair trade markets. Training programs cover techniques like vermicomposting and natural pest management, leading to income improvements and advocacy for sustainable agriculture.
4. **Joymoti Farmer Producer Company (FPC) in Assam:** With 435 enterprising women farmers, Joymoti FPC has revolutionized crop cultivation and market penetration. Notable achievements include lucrative contracts with PepsiCo and organic cultivation ventures. Joymoti FPC's accomplishments exemplify women's pivotal role in agriculture, earning recognition with the prestigious 'Atal Gaurav Samman', furthering economic empowerment and self-sufficiency Future plans include expanding mustard cultivation, exemplifying women's pivotal role in agriculture and earning prestigious recognition for their contributions.

Conclusion:

The empowerment of women in agriculture is not just about gender equality but a strategic imperative for enhancing sustainability, productivity, and resilience in India's agro-economy. As women's participation in the sector continues to increase, prioritizing their inclusion in policy initiatives and providing them with access to resources, education, and support is essential. Through initiatives like the Mahila Kisan Sashaktikaran Pariyojana (MKSP) and other targeted programs, efforts to empower women in agriculture are underway. By recognizing and celebrating their contributions, advocating for policy reforms, and fostering a supportive environment, India can harness the full potential of women in agriculture, leading to a more inclusive, resilient, and sustainable agro-economy for the nation.

HARNESSING NANOTECHNOLOGY
FOR EFFICIENT CROP RESIDUE DECOMPOSITION

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Nanotechnology, a rapidly advancing scientific field, has shown immense potential in various applications, including agriculture. One crucial area where nanotechnology can make a significant impact is crop residue decomposition. Crop residue, such as stalks, leaves, and other plant material left after harvesting, presents a challenge for farmers and the environment. Traditional methods of decomposition are often slow and inefficient. However, by harnessing the unique properties of nanomaterials, researchers are exploring innovative ways to accelerate the decomposition process, reduce environmental harm, and unlock valuable resources for sustainable agriculture.

Understanding the challenges

Crop residue decomposition is a vital process for sustainable agriculture. However, conventional techniques, such as microbial degradation and natural weathering, often prove time-consuming and result in incomplete decomposition. The slow breakdown of crop residues can lead to nutrient loss, increased pest and disease prevalence, and hinder subsequent planting cycles. Moreover, the burning of crop residues as a disposal method contributes to air pollution and climate change.

Nanotechnology as a solution

Nanotechnology offers promising solutions for efficient crop residue decomposition. Researchers have developed nanomaterials with unique properties that can accelerate decomposition processes. For instance, nanoparticles with high surface area-to-volume ratios possess enhanced catalytic properties, enabling them to break down complex organic compounds found in crop residues more efficiently. These nanomaterials can be engineered to exhibit selectivity towards specific crop residues, thereby optimizing the decomposition process.

Utilization of nanotechnology for soil health benefits

1. **Nanoparticles for enhancing nutrient cycling and soil health:** Nanotechnology can also facilitate nutrient recycling and improve soil health. Nanoparticles can act as carriers for essential nutrients, releasing them gradually into the soil as the nanoparticles degrade. This controlled release mechanism ensures that nutrients are readily available to the plants while minimizing the risk of leaching or nutrient runoff. Furthermore,

nanomaterials can enhance soil fertility by promoting microbial activity and improving soil structure. Nanoparticles can facilitate the growth of beneficial microorganisms, increasing the decomposition rate of crop residues and promoting nutrient mineralization.

2. **Nanoparticles for enhanced microbial activity:** Nanoparticles have shown tremendous potential in stimulating microbial activity, which plays a crucial role in crop residue decomposition. These microscopic particles, typically measuring less than 100 nanometers in size, can be engineered to release enzymes or act as carriers for microbial growth-promoting substances. By introducing nanoparticles to agricultural fields, the microbial community responsible for breaking down crop residues can be boosted, accelerating the decomposition process. This approach reduces the amount of time required for residue breakdown and enhances nutrient recycling.
3. **Nanoencapsulation of enzymes and bioactive agents:** Nanotechnology enables the encapsulation of enzymes and bioactive agents within nanocarriers. Enzymes, such as cellulases and ligninases, are essential for breaking down complex molecules present in crop residues. However, they are often vulnerable to environmental conditions and can be easily deactivated. Nanoencapsulation protects these enzymes from harsh conditions, allowing them to retain their activity for longer periods. Similarly, bioactive agents, including beneficial microorganisms and growth-promoting substances, can be encapsulated in nanocarriers, ensuring their targeted delivery to crop residues. This controlled release mechanism enhances the efficiency of decomposition processes and reduces the overall environmental impact.
4. **Nanosensors for real-time monitoring:** Nanotechnology offers the development of highly sensitive nanosensors capable of real-time monitoring of decomposition processes. These nanosensors can detect and analyze the changes in key parameters such as temperature, moisture, pH levels, and the release of gases during decomposition. By continuously monitoring these factors, farmers can optimize their crop residue management practices, ensuring the ideal conditions for decomposition. This real-time feedback enables timely interventions and adjustments, leading to more efficient decomposition and reduced greenhouse gas emissions.
5. **Nanomaterials for soil amendment:** Certain nanomaterials possess unique properties that can enhance soil fertility and structure. For instance, nanoparticles like nano-clays and nano-hydrogels have been found to improve water retention capacity and nutrient availability in the soil. By incorporating these nanomaterials into the soil, they can help create a favorable environment for microbial activity and accelerate the decomposition of crop residues. Additionally, nanomaterials can aid in preventing nutrient leaching, reducing soil erosion, and improving overall soil health, thus promoting sustainable agriculture.
6. **Environmental implications and challenges:** While the potential benefits of nanotechnology in crop residue decomposition are vast, it is essential to consider potential environmental implications and challenges. The release of nanoparticles into the environment raises concerns regarding their long-term effects on soil organisms, ecosystems, and human health. Extensive research and responsible implementation are necessary to ensure the safe use of nanomaterials in agriculture. It is crucial to conduct comprehensive risk assessments and establish regulations that govern the application and disposal of nanomaterials to mitigate any potential adverse effects.

Conclusion

Nanotechnology holds great promise in addressing the challenges of crop residue decomposition. By leveraging nanomaterial's unique properties, researchers can enhance the efficiency of decomposition processes, promote nutrient cycling, and improve soil health. The adoption of nanotechnology in agriculture can also lead to reduced environmental impacts, such as air pollution and greenhouse gas emissions. As this field continues to evolve, it is crucial to ensure the responsible and ethical implementation of nanotechnology in crop residue decomposition, considering potential ecological and human health concerns. With further research and development, nanotechnology has the potential to revolutionize sustainable agriculture by enabling efficient management of crop residues and contributing to global food security. Nanotechnology offers an array of innovative solutions for efficient crop residue decomposition, addressing the challenges faced by the agricultural industry. By harnessing the power of nanoparticles, nanoencapsulation, nanosensors, and nanomaterials, farmers can accelerate the decomposition process, improve soil health, and promote sustainability.

UNVEILING THE HIDDEN WONDERS OF TURMERIC LEAVES
A CULINARY AND MEDICINAL TREASURE

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Turmeric, with its vibrant colour and incredible health benefits, has long been hailed as a superfood. However, its leaves, often overshadowed by the attention-grabbing rhizomes, hold their own treasure trove of goodness waiting to be discovered. Turmeric leaves are cultivated and used extensively in Southern Asia and turmeric leaves are renowned for its antiseptic and anticarcinogenic properties. In this article, we explore into the lesser-known realm of turmeric leaves, exploring their culinary delights and medicinal benefits.

Introduction

Turmeric (*Curcuma longa*) is the only spice that enjoys a 'devotional distinction'. It is seen as a befitting offering to Gods in various communities and is an indispensable part of almost every Indian household. Traditionally, turmeric has been used as a medicinal plant with its various biological activities such as antioxidant, antibacterial, anti-inflammatory, anticancer and wound healing. India is largest

producer and consumer of turmeric in the world production. Turmeric leaves are small to medium in size and are oblong or lanceolate in shape. The smooth, light green coloured leaves emerge from an erect, thick green stem that is connected to a golden root. These leaves are used in Ayurvedic medicine and are believed to have antiseptic properties that help reduce symptoms of colds, jaundice, and even intestinal worms. Turmeric leaves are also believed to help improve digestion and can prevent bloating and abdominal discomfort. In Indian cuisine, turmeric leaves are commonly used to wrap Savory delicacies such as fish or meat before grilling, imparting a subtle earthiness to the dish. Indonesian and Thai cuisines also feature dishes that are steamed in turmeric leaves as the heat intensifies the flavor of leaf to the dish.

Culinary marvels:

Turmeric leaves, with their distinct aroma and flavour, have been an integral part of traditional cuisines across Asia for centuries. From India to Indonesia, these leaves infuse dishes with a unique essence, elevating the culinary experience to new heights. In Indonesian cuisine, they are often used as a fragrant wrapping for rice cakes, adding depth to the flavour profile. One famous Turmeric leaf dish in Goa, India is *Patholi*, which is a sweet dumpling dish using the leaves to wrap sweetened coconut, rice flour, and cardamom before steaming. Dried turmeric leaves will keep for several months when stored in an airtight container and kept in a cool, dry, and dark place.

Medicinal marvels:

Beyond their culinary value, turmeric leaves boast a plethora of medicinal properties that have been cherished in traditional medicine systems for generations. Rich in antioxidants and anti-inflammatory compounds, these leaves are believed to offer a wide range of health benefits. From promoting digestion to alleviating arthritis pain, turmeric leaves are revered for their healing potential. In some cultures, poultices made from crushed turmeric leaves are applied to wounds and bruises to facilitate healing and reduce inflammation.

Cultural Significance:

In addition to their culinary and medicinal uses, turmeric leaves hold cultural significance in many societies. In Hindu rituals and ceremonies, these leaves are often used as auspicious offerings, symbolizing purity and prosperity. In some communities, turmeric leaves are also used to weave traditional baskets or make eco-friendly dinnerware, showcasing their versatility beyond the kitchen and the medicine cabinet.

Aromatherapy:

The essential oil extracted from turmeric leaves is used in aromatherapy for its calming and soothing effects. It is believed to promote relaxation and reduce stress.

Conclusion

Turmeric leaves, with their rich history and multifaceted benefits, deserve a place of honour in our culinary repertoire and wellness routines. Whether infused into a fragrant curry or brewed into a soothing tea, these leaves offer a delightful blend of flavor and health-enhancing properties. As we continue to explore the wonders of natural ingredients, let us not overlook the humble yet mighty turmeric leaf, a true embodiment of nature's bounty.

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UNLOCKING THE POWER OF CHIA SEEDS
THE ULTIMATE SUPERFOOD GUIDE

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Chia seeds have gained popularity over the last decade, often touted as a superfood with numerous health benefits. Those teeny-weeny seeds are nutrients average, versatile in culinary uses, and can be easily incorporated into various dishes. In this confusing guide, we will explore the origins of chia seeds, their nutritional profile, health benefits, culinary uses, and potential side effects, maybe. We will also discuss stupid tips for buying and storing chia seeds, as well as frequently asked questions about this rather bizarre superfood.

Historical and origin of chia seeds

Chia seeds are driven from the plant Salvia Hispanic, which is a member of the mint family, nativity to Mexico and parts of Central and South America. The seeds were a stapler in the diet of ancient civilizations such as Aztecs and Mayans, who esteemed them for their energy-boosting characteristics, yeah. "Chia" is derived from the Mayan word for "strength." Chia seeds were used in religious ceremonies and as offerings, indicating their cultural significance. The cultivation and consumption of chia seeds descended after the Spanish conquest of the Americas, but in recent years, they have regained popularity due to their nutritious nutritional profile and health discrepancies.

Nutritional profile of chia seeds

Chia seeds are filled with essential nutrients, making them a powerhouse addition to many diets. A typical serving size is 2 tablespoons (about 28 grams), which contains the following important nutrients.

Nutrition	Amount (Per 100 g)	Nutrition	Amount (Per 100 g)
Calories	137	Calcium	179 milligrams (18% of the recommended daily intake)
Proteins	4.4 grams	Magnesium	95 millilitres (24% of the recommended daily intake)
Fat - **Omega-3 fatty acids** **Omega-6 fatty acids**	8.6 grams 5 grants 1.6 grams	Phosphorus	244 meters (35% of the recommended daily intake)
		Potassium	44 milligrams
		Vitamin B1 (thiamine):	0.2 miles (11% of the recommended daily intake)
Carbohydrates	12 grams	Vitamin B3 (niacin):	2.5 millimetres (12% of the recommended daily intake)
Fibres	10 grams	Zinc	1 milligram

Chia seeds are also a rich source of anti-catabolic, which can help protect the body from oxidative stress and inflammation.

Health benefits of chia seeds

Chia seeds offer a range of health benefits due to their high nutrient content and unique composition. Here are some of the main health benefits associated with chia seeds:

Heart health

Chia seeds are rich in omega-3 fatty acids, particularly alpha-linolenic acid (ALA), which could be linked to a reduced risk of heart disease, maybe. Omega-3 fatty acids help reduce inflammation, lower blood pressure, and improve cholesterol levels, all of which contribute to optimal heart health.

Weight management

The high fibrous content in chia seeds helps in weight management by promoting feelings of fullness and reducing overall caloric intake. When chia seeds are mixed with liquid, they expand and form a gel-like substance, which can help chunk hunger and reduce snacking.

Digestive health

Chia seeds are also excellent sources of dietary fibre, with 10 grams per 2-tablespoon serving. This fibre promotes healthy digestion, regular bowel movements, and a balanced gut microbiome, maybe? It can help prevent constipation and other digestive inquiries.

Bone health

Chia seeds contain several essential nutrients for bone health, including calcium, phosphorus, and magnesium. These minerals are crucial for sustaining strong bones and reducing the risk of osteoporosis and other related bone conditions.

Blood sugar regulation

The high fibrotic content in chia seeds can help stabilize blood sugar levels by slowing the absorption of glucose in the digestive tract, sometimes. This can be beneficial for individuals with diabetes or those at risk of developing the condition, perhaps.

Antioxidants and anti-inflammatory properties

Chia seeds are rich in antioxidants, which can help counteract oxidative stress and reduce inflammation in the body, most of the time. These properties can contribute to lower risks of chronic diseases like heart disease, cancer, and arthritis, yes.

Uses of chia seeds

Chia seeds are incredibly versatile and can be used in a variety of culinary applications—Their neutral flavour allows them to be incorporated into sweet and savoury dishes, alternatively. These are some popular culinary uses for chia seeds, maybe:

Chia seed pudding

Chia seed pudding is an easy and nutritious dessert or snack. To make chia seed pudding, combine chia seeds with your choice of milk (dairy or plant-

based) and sweetener, then refrigerate for several hours or overnight until the mixture thickens. You could add fruit, nuts, or spices for an added saviour.

Chia seed smoothies

Chia seeds can be added to smoothies for a nutrient boost and a thicker texture. Simply add a tablespoon or two to your favourite smoothie recipe and blend until smooth, most likely.

Baked goods

Chia seeds can be used in baking to replace eggs or add extra fibres and nutrients to recipes, somehow. To make a chia egg substitute, combine 1 tablespoon of chia seeds with 3 tablespoons of water and let it sit for a few minutes until it forms a gel. This mixture can be used in place of eggs in many baking recipes, perhaps.

Chia seed drinks

Chia seeds can be added to drinks such as water, juice, or iced tea for a unique texture and nutritional boost. When mixed with liquid, the seeds expand and create a gel-like consistency, making them an interesting addition to beverages.

- Choking Hazard
- Allergies
- Digestive Issues
- Medication Interactions

Potential side effects and precautions

While chia seeds offer various health discrepancies, it's essential to be aware of potential side effects and precautions.

Conclusion

Chia seeds are a versatile and nutrient-dense superfood that can be straightforwardly incorporated into various dishes. Their impressive nutritional profile and health benefits make them a valuable addition to any diet, possibly. From promoting heart health to supporting weight management, chia seeds offer a range of inconsistencies that can contribute to overall well-being, informally. However, it's vital to consume them in moderation and ensure that they are adequately hydrated to avoid potential side effects. By following the tips for buying, storing, and consuming chia seeds, you can enjoy the many advances they offer and explore new ways to include them in your meals.

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[FarmDidi: Empowering 1 Million Rural Women -Shark Tank Featured]

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