


**DEPARTMENT
OF
PHARMACOGNOSY**

SANJEEVANI



TU YOUYOU
THE WOMAN WHO
CHANGED SCIENCE



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VICINITY**
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FARMS CRUEL TO
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ENVIRONMENT**



**VOLUME 1 • ISSUE IV
PHARMACOGNOSY
NEWSLETTER**



Tu Youyou - The woman who changed science



Tu Youyou, born on December 30, 1930, is a Chinese medical scientist, pharmaceutical chemist, and educator who is renowned for her discovery of artemisinin (also called Qinghaosu) and dihydroartemisinin, which have been used to treat malaria and have saved millions of lives. Her discovery of artemisinin and its use in treating malaria is considered a significant breakthrough in tropical medicine during the 20th century and has led to improved health for people in tropical developing regions of South Asia, Africa, and South America. In recognition of her contributions, Tu received the 2011 Lasker Award in Clinical Medicine and the 2015 Nobel Prize in Physiology or Medicine.

At the age of 39 in 1969, Tu Youyou had a concept to screen Chinese herbs for anti-malaria properties. To start the process, she examined the historical

Chinese medical texts and visited Chinese medicine practitioners across the country. She created a notebook called "A Collection of 'Single Practical Prescriptions for Anti-Malaria,'" which included 640 prescriptions. Tu's team also tested 380 herbal extracts that were derived from over 2,000 traditional Chinese recipes on mice. They found that one compound, sweet wormwood (*Artemisia annua*), was effective in treating "intermittent fevers" that are associated with malaria. Tu discovered that the preparation of the herb was described in a 1,600-year-old text, which detailed a recipe called "Emergency Prescriptions Kept Up One's Sleeve." Initially, the preparation did not work when they extracted it with boiling water, as described in the classic text. Tu proposed using low-temperature ether to extract the active compound, as the hot water had likely damaged it. Animal tests showed that the new method was highly effective in mice and monkeys. To ensure its safety for human use, Tu volunteered as the first human subject. As the leader of the research group, she felt it was her responsibility. The clinical trials were successful, and the treatment was deemed safe for humans.



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EDITOR'S NOTE

Dr. Ashoka Babu VL



Hello Readers,

It gives me immense pleasure to release the fourth issue of the quarterly E-Newsletter "Sanjeevani" from the Department of Pharmacognosy, Faculty of Pharmacy, Ramaiah University of Applied Sciences.

This issue offers interesting advanced agriculture techniques; few important medicinal herbs, Vatika in vicinity and various departmental activities. I would like to thank all the editorial board members, student members for their twitchy effort and contribution in bringing out this issue. Any criticism, opinion and encouragement from the readers will be highly appreciated. For any queries, suggestions, feedback or submission of articles please do not hesitate to contact our team via fphsanjeevani@gmail.com

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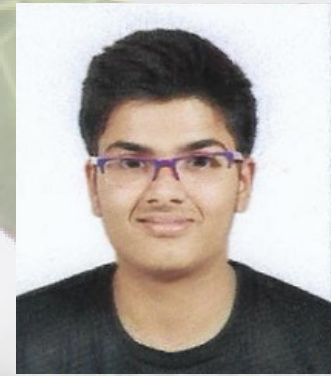
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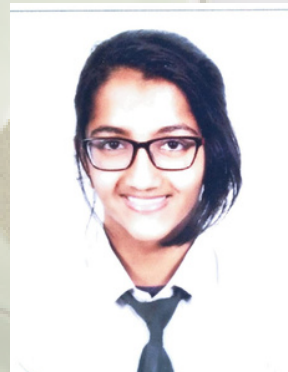
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ARTIFICIAL BIO FERTILIZER



Among other developments, the use of specialised microorganisms for plant inoculation has developed most recently to enhance soil nutrients and plant growth dynamics for increased agricultural output. To reduce the cost of bio fertiliser and for sustainable production, contemporary techniques also include the artificial microbiome selection, mixed inoculants, PGPR as bio fertilizers, usage of biofilms as bio fertilizers, and bio-organo-chemical fertilisers are some examples of bio fertilizers.

Need for bio fertilizers

Bio fertilizers help soil to become fertile and long-term use of chemical fertilisers degrades the soil and lowers crop productivity. The soil's capacity to retain water is increased while essential elements like nitrogen, vitamins, and proteins are also added by bio fertilisers. They are commonly used in agriculture as a natural source of fertiliser.

Plant Growth Promoting Bacteria (PGPR)

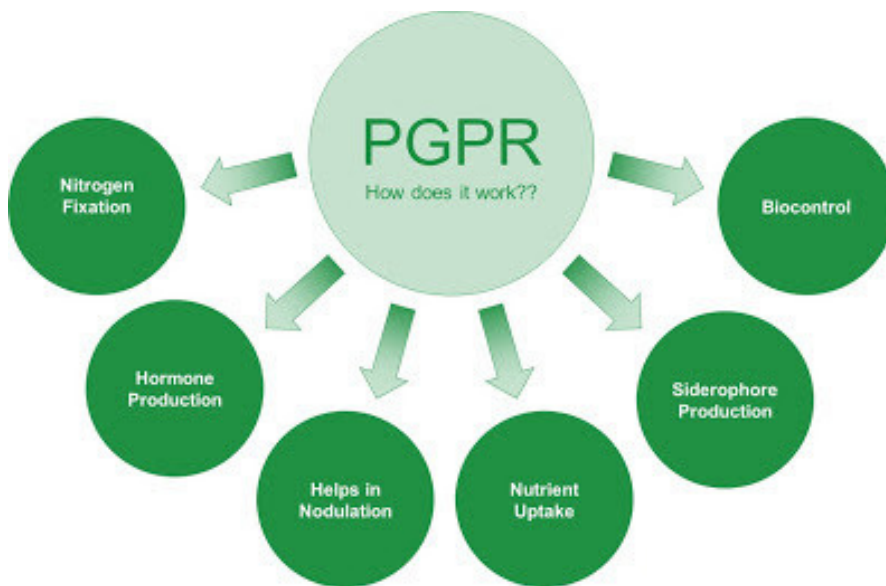
PGPBs are crucial for increasing crop production because they involve controls and transporters that promote nutrient absorption and allow for greater plant development. The use of these PGPR as bio fertiliser for growing a variety of crops in a variety of environmental and climatic circumstances has enormous potential, according to researchers. In addition to enhancing nutrient resources for plant

Bio fertiliser contains bacteria that increase the availability of essential nutrients to the plants, which will encourage the growth of plants and trees. Bacteria, blue-green algae, and mycorrhizal fungus are just a few examples of the living things that make it up. In contrast to cyanobacteria, which are characterised by their capacity to fix nitrogen, mycorrhizal fungi primarily extract minerals from organic materials for the plant.

Microorganisms used as bio fertilizers are:

- *Rhizobium*
- *Azotobacter*
- *Azospirillum*

absorption, bacteria that for improved plant development and growth, both promote plant growth and offer protection against harmful factors. For enhancing growth yield and preserving a plant's development and growth, bacteria like *Bacillus megaterium*, *Anabaena*, *Azolla*, *Bradyrhizobium*, *Bacillus polymyxa*, *Rhizobium* and *Sinorhizobium*, among others, are regarded to be vital.



DID YOU KNOW?

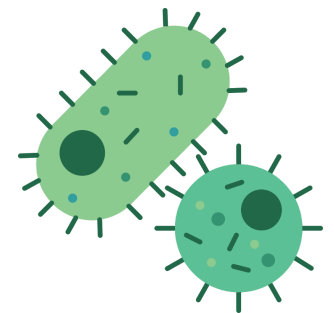


Curcumin -

a yellow pigment found in **turmeric** that is the dietary staple in India can improve cerebral blood flow and reduce oxidative stress which can be useful in age related neurodegenerative disorders (causing dementia)

Nitrogen fixation

Nitrogen-fixing bacteria known as rhizobacteria group together and connect with woody plants. In both free-living and symbiotic bacteria, the specialised genes known as *Nif*, which carry out N_2 fixation, are present. They also include the enzyme nitrogenase, which needs iron as a cofactor and contains the enzyme dinitrogen reductase. Utilizing electrons is made possible by dinitrogen's reductase, which dinitrogen promotes in the reduction of nitrogen to ammonia.

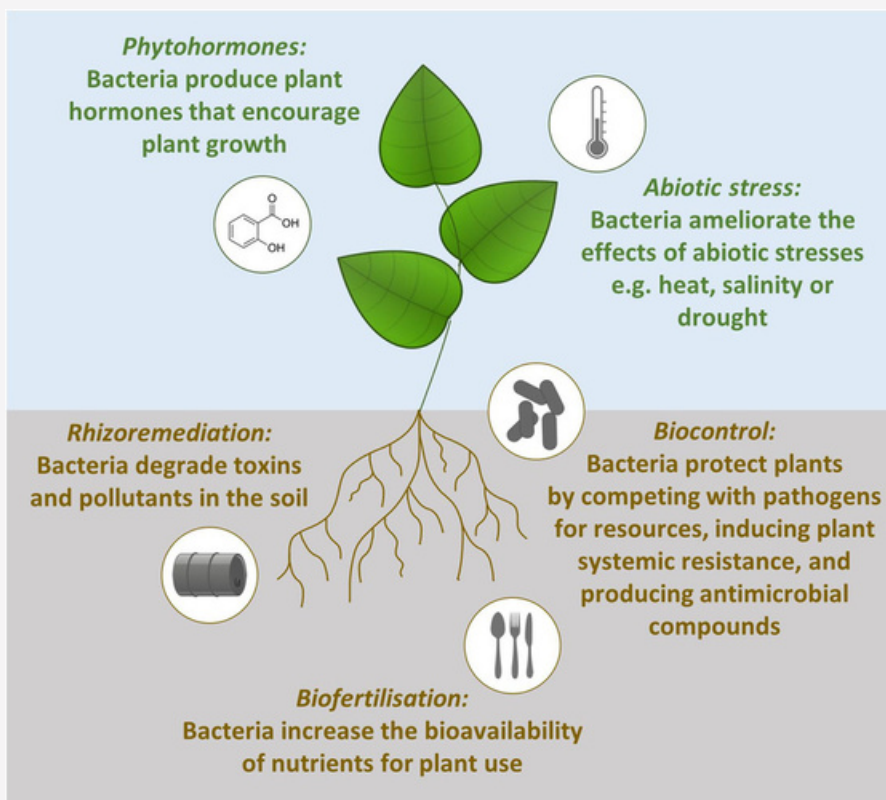


Phytohormone Production

Phytohormones are essential for the growth and development of plants and can be utilized to create biofertilizers because of this. As plants adapt to the environment's growth-inhibiting elements, their levels of these phytohormones change. It is investigated that those microbial species that colonize in the rhizosphere also regulate the level of phytohormones and providing essential benefits to host plant changing the phytohormone level during stress. More than 80% of the microorganisms that support rapid crop development have been shown to manufacture auxin.

Encapsulation and lyophilisation technique

This method is commonly used to create microbial species with controlling composition and architectural characteristics. This technique includes a specialized field called microencapsulation, which develops a protective shell or considering the potential to increase crop productivity and lengthen the shelf life of bio fertiliser, a capsule has been created around an active molecule. In terms of delayed and sustained release into soil, this sort of formulation is more favourable. Lyophilisation is the freeze drying method for the preservation and storage of microorganism. It is widely used technique. It is an excellent technique for increasing bacteria's chance of survival and extending storage time. It can be used in conjunction with a suitable carrier, immediately applied in the field.



Bio-film Bio fertilizer

Novel developments in the biofilm-based synthesis of biofertilizers. The microbial populations that create biofilms cling to surfaces, which might be biotic or abiotic. Biofilm also help in Zn solubilization and production of chelating agents. Biofilm provide a way to transfer the genetic material and organic nutrients between microbial species in a community. Researchers have shown that a biofilm that contains various bacteria strains is more durable and long-term strategy than using a biofilm made up of only one type of microbial species.

Nano- Bio fertilizer

In order to increase agricultural production and output, a type of fertiliser known as nano-bio fertiliser combines the use of nanotechnologies with biofuels. According to researchers at Wuhan University in China, nano-based fertilisers have the potential to resolve significant problems with other fertilisers, such as instability on the field because to changes in the environment and short shelf life, decreased microbial strains, and increased soil permeability. Farmers who utilize nano-biofertilizer gain significantly from better field performance, lower costs, lower expenses, and increased yield. Nano-biofertilizers help local microbial populations work more efficiently by utilising essential nutrients like potassium, nitrogen, and phosphorus. They also benefit the environment. As a result, they assist in producing crops of the highest degree.

Overall, the use of bio fertiliser is crucial for the effective growth of plants and for producing a respectable crop production. Thanks to recently developed techniques like nanobiofertilizer and biofilm bio fertiliser, crops are able to acquire greater resilience to environmental inhibitors. Thanks to the creation of various PGPR inoculum and the development of sophisticated microbial inoculants, plants have acquired strong resistance to pathogen assault, disease control, and environmental stress

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DID YOU KNOW?



Brown algae (*Sargassum plagyophyllum*) extract is highly rich in phytochemical constituents that show antioxidant and anti-collagenase activity and hence can be used as an active pharmaceutical ingredient for anti-wrinkles cosmetics.



- **Mr. Soubhagya Maity**
(I M. Pharm, Department of
Pharmacognosy)

NUTRIENTS MANAGEMENT IN ORGANIC FARMING

The goal of organic farming is to cultivate the soil and raise crops in a manner that safeguards the life and health of the soil by utilizing biodegradable waste, and beneficial pathogens (also known as "biofertilizers") that release nutrients into plants for increased sustainable production in a pollution-free environment. As per USDA study "Organic



arming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives, etc.) and to the maximum extent practicable relies upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives, and biological system of nutrient mobilization

Nutrient Management

Manure

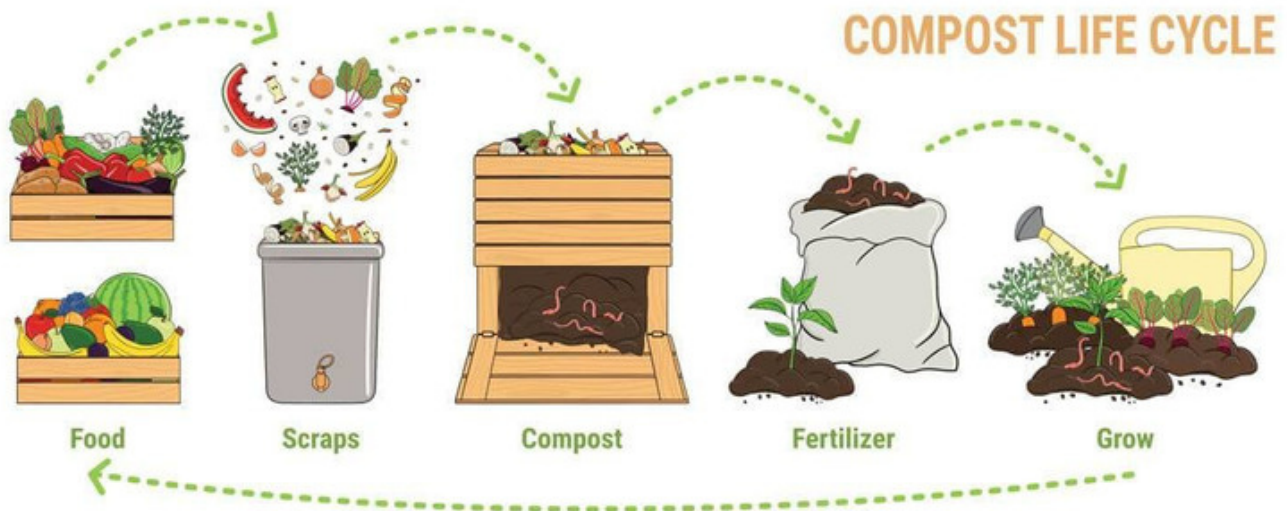
Organic farming frequently benefits from the application of manure. However, because crops remove more nitrogen than phosphorus, applying manure to completely satisfy the nitrogen needs of crops might result in an excess of phosphorus in the soil. Manure has positive impacts on the soil as well. As manure is absorbed by the soil, nutrients are released. Plants profit from the improved soil as a result of this. The potential of manure to improve soil quality is the primary advantage of utilizing it in gardens. For instance, adding manure to sandy soils can



help them hold onto moisture. Manure is a good way to help loosen up compacted soil. Manure is a key energy source that increases soil carbon, making nutrients available to plants. Manure also prevents nitrates from leaking into the soil and reduces runoff.

Composting

By converting organic waste into nutrient-rich material and reducing the weight of organic materials through water and



carbohydrate loss during decomposition, composting transforms organic waste. By adding carbon to the soil, compost helps to enhance soil structure and gives plants the nutrients they need. In addition to giving plants nutrients like nitrogen (N), phosphorus (P), and potassium, it improves the physicochemical and biological characteristics of the soil (K). In this manner, compost can boost crop production and compensate for a lack of fertilizers. Compost and other organic fertilizers, especially those that make use of sewage sludge, animal manure, and organic material, must be utilized and treated properly to avoid any harmful effects on the environment, people, animals, and soil health. Although it is encouraged to use these sources of nutrients, there are quality, safety, environmental, and biosecurity risks associated with maintaining and using recycled nutrients that must be considered.

Biofertilizers

Biofertilizers are substances created to increase the availability of nutrients and uptake, promote crop development, biologically fix nitrogen, and protect against disease and insect pests. Biofertilizer products can be used on soil, seeds, or foliar tissue depending on the intended use. There is frequently insufficient or inconsistent evidence to back up product claims. According to recent studies, biofertilizers may be most helpful when applied topically or in soils with low to moderate levels of soil organic matter and the availability of nutrients. In contrast,

DID YOU KNOW?



Silymarin - a polyphenolic flavonoid derived from Milk Thistle

(*Silybum marianum*) has anti-inflammatory and hepatoprotective property and is used for the treatment of hepatitis and liver cirrhosis. It can also protect the liver from damage due to certain hepatotoxic drugs - anti-TB drugs, methotrexate, cisplatin.



significant crop or soil advantages from biofertilizer applications to soils with >3% organic matter is uncommon.

Introduced microorganisms frequently struggle to coexist and survive in microbial communities that are already robust and well-established.

Cover crops

Cover crops are not harvested since they are not grown for human or

commercial consumption. They are instead made with the environment in mind. Instead, they are removed using a number of methods prior to the planting of a source of income, improving the soil's fertility and quality. These crops are commonly planted after the harvest of a cash crop, such as maize, and before the planting of the next crop, filling the void left by areas that would otherwise lie fallow. Common cover crops include grains (like rye, wheat, and oats), grasses (like barley, ryegrass, and millet), legumes (like red clover, peas, and beans), and broadleaf plants (e.g., buckwheat, mustard). Because cover crops occur in a range of shapes and sizes, each species has a special set of advantages, and numerous types can be planted for the best results. Long-term planning, a wide range of cultural methods, and a variety of inputs are needed for nutrient management on organic farms. Despite the growing number of commercially available organic fertilizers and biofertilizers, the most prosperous organic farms often obtain their nutrients on or very close to the farm by utilizing organic wastes, scavenging leftover soil nutrients, and biological nitrogen fixation



- Mr. Arupjyoti Das
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Vāṭikā In Vicinity



PC: SHALEEN ADITYA GUPTA (B.PHARM 4TH YEAR)

Scientific Name: *Pritchardia pacifica*

Common names: Fiji fan palm

Geographical source:

As the name suggests, the Fiji fan palm is native to the Oceanic country of Fiji. It is also found in other Oceanic countries such as Tonga and Australia. Commercially, it is planted at various places around the world including India.

Family: Arecaceae

Cultivation:

Fiji Fan Palms are low maintenance trees that are easy to grow and make a great addition to any outdoor area, such as a garden or patio. In cooler climates, these palms can be moved indoors for the winter season if grown in containers. For those growing the Fiji Fan Palm at the northern edge of its growing range, it will need to be protected indoors or heavily mulched during the winter months.

Morphological characteristics:

The Fiji Fan Palm is a beautiful fan-shaped palm that can grow up to 7-10 meters tall with a trunk of up to 30 cm in diameter. Its leaves, which are up to 1.8 meters long and almost as wide, are a smooth, dull green colour on both sides with no spots or scales, and are fan-like with closely spaced, palm-like lobes. The spadices are shorter than the leaf stalks. The spherical fruit of the Fiji Fan Palm is 1.1-1.2 cm in diameter and changes from red to black when it reaches maturity. The seed is 7 mm in diameter.

Uses:

In Fiji, the leaves of the Fiji Fan Palm were historically used to make fans, known as Iri masei or Ai viu, that were reserved for use by chiefs. A light and flexible wood was used to make a frame for the large leaves, which can be up to 90 cm wide. The term "Ai viu" in Fijian refers to both fans and umbrellas, as the leaves of the Fiji Fan Palm were used for protection from both the sun and rain. When it rained, the leaf was held above the head to allow the rain to roll off the back. The trunk of this species was sometimes used for ridge-beams.

Today, the Fiji Fan Palm is used primarily for ornamental purposes and gives an aesthetic appeal to the area(s) in which it grows.

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HOW ARE FACTORY FARMS CRUEL TO ANIMALS AND ON ENVIRONMENT

The number of industrial cattle sent to slaughter each year, according to the United Nations, is equivalent to eight times the number of people who live on Earth. Never in history have there been as many animal deaths or life-long hardships.

The fundamental factor behind animal mistreatment and misery is factory farming. They have been transformed into machines that produce meat, milk, and eggs from these mute victims. We take away the lives of these sentient animals, who have a wish to live.



What is factory farming?

Factory farms, also known as concentrated animal feeding operations (CAFOs), are a form of intensive animal agriculture. It originated in the US, factory farming is becoming increasingly common around the world.

Factory farming includes terrestrial farms involving animals such as pigs, cows, chickens, and sheep. Aquaculture—in which large numbers of salmon and other fish are farmed for food—is considered another form of factory farming.

Cow farming in India

To the 800 million Hindus in India, cows are considered sacred, and in many states there is a ban on slaughtering them but this does not mean they don't suffer. When no longer optimally productive, they may be turned out into the street, sent to a gaushala or trucked over state lines to slaughterhouses.

Cow Farming Types in India - Domestic Cow-Keeping

Families frequently keep cows for their milk in rural areas. In actuality, this is what almost 80 million rural households do.



Commercial Cow Farming

A family can have some extra income if they can keep more cows and sell the extra milk, especially in areas with limited employment. There are many tiny farms that just have a few cows, but there are also enormous farms that house thousands of animals in crowded, factory farm conditions.

Cruelty of Indian cow farming

Dairy farming in general is brutal. Cows, like all mammals, produce milk to feed their young, not for human consumption, hence to maintain the milk supply, animals are artificially sexed. To prevent the infant from consuming it, the mother is separated from the child, and the infant's milk is also taken. When they are no longer required, cows are left to fend for themselves after being tethered, alone, and in unclean conditions. It's difficult to imagine anything more awful.

There are gaushalas set up to take care of these cows, however these facilities can have worse circumstances than farms do. At gaushalas, some animals are starved to death, and some are still purposefully impregnated to produce milk. Unwanted cows are frequently left to starve to death because it is against the law to butcher cows in many areas.

Environmental Impact

Cows are one of the main sources of agricultural emissions, which contribute to climate change. It's our fault, not theirs. To be able to take advantage of them for their milk, meat, and skins, humans have overbred them. We are all currently

paying for it. Additionally, cows significantly pollute streams. The Delhi Pollution Control Committee cited 2,700 more dairy farms in addition to closing 31 in the city for creating water pollution in 2019. All across the world, dairy farms are responsible for the same pollutants.

Animal abuse is practiced on pigs in farms

Pigs are compassionate creatures, who need a lot of freedom and air, are imprisoned in metal containers with little room to move or breathe. The pig is forced to eat in less than 15 minutes on a concrete floor with nowhere to explore because it enjoys foraging all day. They need to be able to do this so they can urinate close to where they live and sleep. Their keen sense of smell is affected by unhygienic conditions, which also affects their behavior and helps diseases and infections spread.



Through **artificial insemination**, pigs are continuously becoming pregnant. At a time, they are capable of having a litter of 12 piglets. They are kept in "gestation boxes," which are so small they can hardly turn around, throughout this process. Even after giving birth, individuals continue to experience pain. They will then be placed in steel cages where they can see their young but cannot nurse them. These delicate animals experience extreme stress, discomfort, and protracted suffering as a result.

Castration, a painful technique that involves physical mutilation on young pigs, is another terrible practice that smells of great brutality to the pig in industrial farms. Shortly after birth, male piglets are castrated with a knife. Because this procedure is done without anesthesia, it is incredibly painful and distressing. The factory employees differentiate each pig from the others by cutting distinct notches in their ears to denote both their individual and litter numbers.

Pigs that are kept in captivity in cramped quarters and exposed to stressful circumstances start to display aggressive habits, one of which is biting their own tails. The animals are also exposed to the horrifying process of "**tail docking**", in which their tails are amputated without the use of any anesthesia.

Pork consumption: risks to one's health and the environment

Because of the animals' extreme overcrowding and horrendously unclean living conditions, the factory is often sprayed with pesticides and other chemicals. Pigs are also given food that has been loaded with antibiotics and growth hormones to

help them quickly attain their "market weight." These compounds remain in their bodies and present a range of health hazards when taken by people.

Each farm pig generates 10 pounds of manure on a daily basis. As a result, enormous holes containing tons of trash end up getting contaminated on the surface and underneath. The Environmental Protection Agency claims that the primary cause of stream contamination is agricultural runoff.

Cruelty towards chicken in factory farming

India is the third-largest producer of eggs in the world, a position it has attained through the growth of factory farms, where intensive farming techniques are used to maximize output of items generated from animals at the expense of the welfare of the animals.



Confinement in Battery Cages

In egg farms, birds are confined in battery cages, which are wire enclosures. These cages are stacked one on top of the other in a row. The birds in these battery cages are so cramped for room that they are unable to even turn around or expand their wings. Their claws

become twisted and can twist around the cages' wire floors, inflicting crippling and excruciating injuries.

Because of the small spaces, hens will often lie over their own waste, which is rarely cleaned. 220 million hens in India live this dreadful existence every day for their brief lives of one to two years. These birds are dragged out of their cages and carried upside down by their legs to be slaughtered when their bodies falter after years of being pushed to lay eggs.

Genetic Manipulation

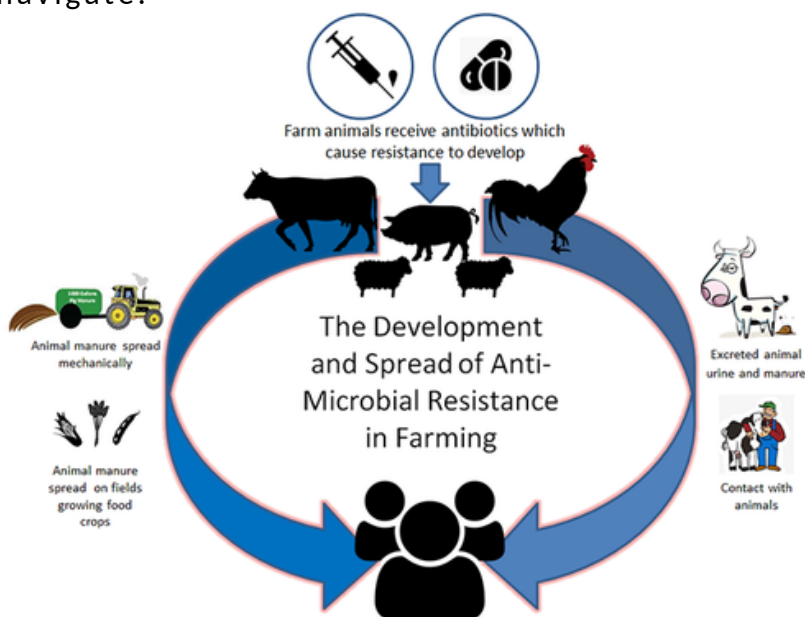
A human would weigh 660 pounds at two months old if they developed at the same pace as broiler chickens, who have been selectively bred to grow so quickly. Congestive heart failure is just one of the many illnesses and conditions that broiler chickens endure as a result of their rapid growth, which puts stress on their key organs like their hearts and lungs, which are therefore unable to support their growing bodies. Most



broiler chickens have trouble walking because their bones, joints, and muscles are not genetically predisposed to support them. Usually, their agony makes it difficult for them to move.

How Factory Farms Play Chicken with Antibiotics

Antibiotic-resistant bacteria are becoming more prevalent globally as a result of the excessive use of antibiotics in chickens and other farm animals. For many years, chickens were given antibiotics by the chicken industry—not because the hens were ill, but rather as a non-prescription means of promoting quicker growth. Antibiotics are still fed to hens today in the pretext of keeping them healthy. Farm hens are vulnerable to deadly diseases like Salmonella and E. coli due to battery cages and the unclean flooring of chicken houses, which are difficult for broiler birds to navigate.



Environmental Impact

It's crucial for environmentalists to remember that chicken has a higher carbon footprint than tofu, beans, and peas. In addition, the incinerators that burn chicken manure discharge chemicals into the atmosphere that aggravate respiratory and cardiovascular conditions. Farmers can develop asthma and chronic bronchitis from the dust and chemicals, such as ammonia, in poultry houses.

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DID YOU KNOW?

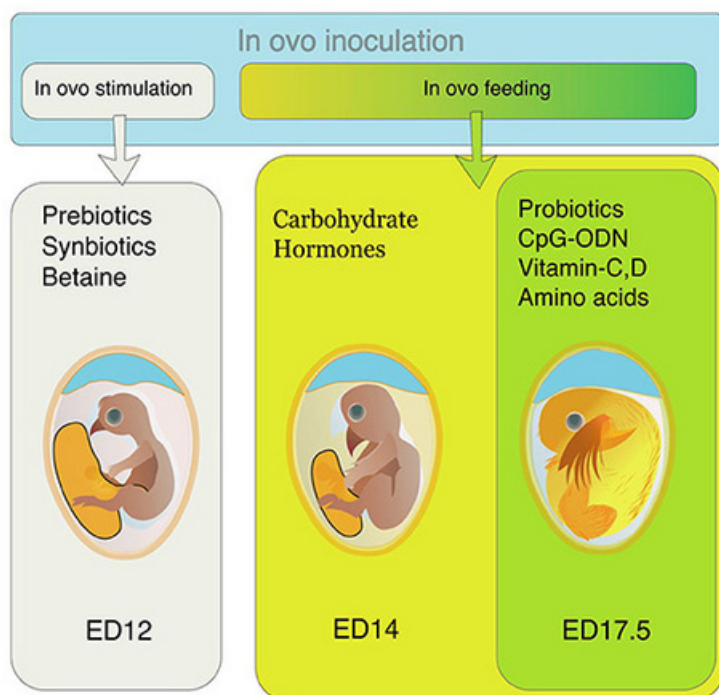
Caffeine in coffee increases sympathetic activity causing increase in anxiety symptoms, BP, HR, headache, and sleep disturbances. But it also seems to have various beneficial effects - antidepressant effects, reduce risk of stroke, prevent cognitive decline, anti-oxidant property, hepatoprotective, nephroprotective and cardioprotective properties.



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NUTRACEUTICAL DELIVERY IN OVO IMPROVES POULTRY BIRD HEALTH & PRODUCTION PERFORMANCE

The poultry industry is critical in providing high-quality protein as well as essential nutrients and vitamins to the world's growing population. According to an OECD/FAO survey (2019), the poultry sector accounts for 37% of global meat production industry in 2017 and it is expected that the global poultry industry will grow rapidly in the coming years, producing approximately 331 million tonnes of meat by 2028.



Nutraceuticals, which include amino acids, carbohydrates, minerals, and vitamins, have gained popularity due to their numerous nutritional and health benefits, including the maintenance of normal physiological functions status and disease prevention, thereby improving poultry bird production performance. Commercial poultry production systems include for approximately 24-48 hours, chicks do not have access to feed or water. Transport between the hatchery and the production farm this pause time has a negative impact on early feed intake, organ development,

and other factors. Natural microbiota exposure and immune sensitization of chicks. Early feeding of nutrients and feed additives via in ovo inoculation. During the 12th or 17th to 18th days of incubation, the developing embryo significantly mitigates the negative effects of starvation and improves the post-hatch performance and health of poultry birds pre- and post-hatch phases.

Nutraceutical in ovo feeding improves poultry immune performance

Fast-growing broiler chicks achieve the market weight at 6-8 weeks of age under modern poultry husbandry techniques (Havenstein, Ferket, and Qureshi 2003). Due to the detrimental effects on commercial poultry strains, breeding for increased immunocompetence was not done production efficiency and expansion. Recently,

scientists and researchers have concentrated on supplementing in ovo with nutraceuticals, immunostimulants, vaccinations, bioactive substances, and other feed additives can increase immunocompetence. Nutraceuticals administration resulted beneficial in both infectious and noninfectious diseases.

When inoculated into amniotic fluid on the 18th day of incubation, nutraceuticals (amino acids, trace elements, fatty acids, and vitamins) were found to improve the immunological response in broiler chickens, according to Bakyaraj et al(2012) 's research. Additionally, the IOF of vitamins, fatty acids, trace minerals, and amino acids enhances the humoral and cell-mediated immunological responses, which optimises broiler development and production performance. Due to its numerous benefits, including improved immunity, reduced oxidative stress, and improved general performance of post-hatch birds, in ovo mineral supplementation in poultry has received a lot of attention (Goel et al. 2016). While causing the immunomodulatory effect, in ovo injection of trace minerals such as selenium, iodine, and zinc did not alter post-hatch growth.

DID YOU KNOW?

Peel extract of **Pomegranate** fruit (*Punica granatum* L.) is highly rich in hydrolysable tannins that have scientifically confirmed therapeutic properties such as antioxidant, antimicrobial, anticancer, antiulcer, and anti-inflammatory activities. The peel extract exhibits excellent antimicrobial activity against several foodborne pathogens and therefore improves the postharvest storability of food products.



Nutraceutical in ovo feeding enhancing antioxidant status of poultry birds

The overproduction of reactive oxygen species (ROS), such as hydrogen peroxide, hydroxide, and superoxide radicals, which triggers antioxidant defense and cellular death,

is one of the main effects of oxidative stress (Sarkar et al. 2015).The synthesis and functional activity of numerous enzymes, such as catalase, superoxide dismutase, and glutathione-s-transferase, which help to neutralise ROS, are enhanced by the nutraceuticals (Alagawany et al. 2021; Arain et al. 2022b) Sodium selenite (Na_2SeO_3) is injected in utero into amniotic fluid to: The 18th day of embryonic development is when space increases immune response and antioxidant protection against pathogen exposure in post-hatch chicks (Lee et al. 2014). The outcome demonstrated that in broilers infected with *Clostridium perfringens*, IOF of selenium decreased the serum levels of catalase, superoxide dismutase, and malondialdehyde.

Injecting Selenium nanoparticles of in ovo

Another study published recently demonstrated the effect of injecting biologically

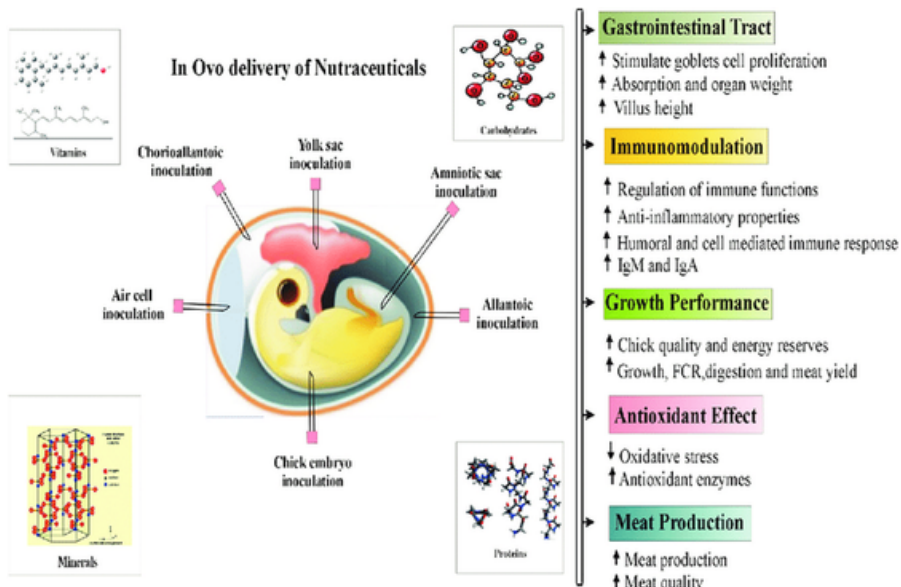
produced selenium nanoparticles (Se-NPs) into embryonated eggs on the 18th day of incubation. The antioxidant defense was improved in Se-NPs (10 or 20 g/egg)-treated groups by increasing the activities of antioxidant enzymes such as peroxidase, catalase, superoxide dismutase, and glutathione (El-Deep et al. 2020)

Injecting vitamin C in ovo

Another study found that in ovo vitamin C injection significantly increased the molecular expression of heat shock protein (HSP60) and pyruvate. At the 16th day of embryonic life, 13 dehydrogenase kinase 4 (PDK4) genes were discovered (Zhu et al. 2020). Furthermore, in ovo vitamin C (3 mg) feeding has been shown to improve antioxidant defense and immune performance in broiler chicks, with lower expression of pro-inflammatory cytokines in the spleen (Zhu et al. 2019b)

Effects of Nutraceuticals in gut development in ovo

The gastrointestinal tract (GIT) tissues are subsequently exposed to early in ovo feeding of nutraceuticals after the growing embryo ingested amniotic contents prior to air cell emergence. The primary benefits of early IOF include increased metabolic and absorptive capacity, improved nutritional condition of the prehatch embryo, increased energy stores in the hatchlings, and accelerated early development of intestinal organs.



The production efficiency of poultry birds Tako, Ferket, and Uni (2004) was improved by the in ovo administration of nutraceuticals into embryonated eggs due to improved digestion and increased villus length (2004).



- Ms Shilpa M
I M.Pharm,
Department of
Pharmacognosy

References:

- OECD/FAO (2022), "Table C.4 - World meat projections", in OECD-FAO Agricultural Outlook 2022-2031,
- Potential role of important nutraceuticals in poultry performance and health - A comprehensive review. Research in Veterinary Science, 137, pp.9–29. doi:https://doi.org/10.1016/j.rvsc.2021.04.009.

DEPARTMENTAL ACTIVITIES

Field Visit to Savandurga



Exploring wild vegetation on the monolith - A field visit to Savandurga Hill

Continuing its tradition of imbibing practical knowledge and inculcating natural awareness of plant kingdom, the Department of Pharmacognosy, Faculty of Pharmacy, had scheduled a visit to the Savandurga Hill on the 20th of October 2022. Like outings undertaken previously, this visit too, included a stroll into the Medicinal Plant Conservation Area (MPCA) located in Savandurga. The field comprised enthusiastic students from the Bachelor of Pharmacy and the Masters of Pharmacy course, as well as faculty members from the Department of Pharmacognosy.



The resource person, Mr Mutiah was kind enough to share his experiences and knowledge that he had gathered while taking utmost care of the MPCA region for close to thirty years.



The field visit made it possible for everyone to learn about a plethora of plant species such as Droscera, Hibiscus surathensis, the tantric plants such as Garudarashike, Mayurarashike and a variety of rare and endemic species.

Spread over an enormous area of 250 hectares, this MPCA at Savandurga was a fantastic educational experience for all the young minds of Faculty of Pharmacy, M S Ramaiah University of Applied Sciences.



Awards/Achievements

Dr R. Gowri received the Annual Exemplary Award from RUAS on 12th September 2022 during Teacher's Day Celebrations at RUAS.



Soil Day Celebration

Winning Article **SOIL - WHERE FOOD BEGINS**

It takes just a small seed to fall into the soil and just with a few droplets and sunlight a new life that will ultimately be the source for other life around by being a source of food, is born. That is the importance of soil, it's where food begins. If soil is such an indispensable resource why has the world seemed to have forgotten its value, we are standing at a point in our history where soil pollution is at an all-time high, altering the biodiversity of the soil and leaching the contaminants into the food we consume.

Soil is a finite resource and is depreciable, once its integrity is lost the same quality cannot be recovered once again. Soils are fundamental for producing crops, feed, fibre and fuel, filter and clean tens of thousands of cubic kilometres of water each year. As a major storehouse for carbon, soils also help regulate emissions of carbon dioxide and other greenhouse gases, which is fundamental for regulating climate. Healthy soils can provide and feed millions around the world, ending world hunger and ultimately sustaining a healthy planet. It is estimated that 95% of the food is directly or indirectly sourced from soil but in recent years soil nutrient degradation has been a major threat to the provision of nutrition. But one-third of global soils are already degraded and is rising due to the 10 threats: soil erosion by wind, water and tillage, loss of soil organic carbon, nutrient mismanagement, salinization and sodification, soil pollution, compaction, acidification, loss of soil biodiversity, and soil sealing and waterlogging. The severity of the threats differs. Due to human negligence or better said anthropogenic activity around 35% of the soil around the world has already been degraded.

Soils have become one of the world's most vulnerable resources. Their degradation is leading to poverty by triggering rural to urban migration. Leading to Food insecurity, climate change and even the threat towards sustainable development. The people with insufficient land or income are forced to flee as they can no longer cultivate. The major issues looming in Africa and Asia are soil erosion and nutrient mining. Soil compaction and Soil pollution are most prevalent in Europe. Soil Acidification, erosion and nutrient management are threats in Asia. In America, there is a domination of soil salinity and erosion.

It is to be remembered that it takes around 1,000 years for a centimetre of new soil to be made naturally. With that figure by the year 2050, the population would've reached 9 billion and agricultural production would need to increase their production by 60% to provide for the people by then. This could only be done by sustainable soil management.

What is sustainable soil management? As per the World Soil Charter- "Soil management is sustainable if the supporting, provisioning, regulating, and cultural services provided by soil are maintained or enhanced without significantly impairing either the soil functions that enable those services or biodiversity. The balance between the supporting and provisioning services for plant production and the regulating services the soil provides for water quality and availability and atmospheric greenhouse gas composition is a particular concern".

It strives to minimize the rates of soil erosion through wind and water, to ensure there is sufficient

surface cover to protect the soil and water is efficiently stored to meet the requirements of plants, to minimize Soil salinization, sodification and alkalinization.

Through sustainable soil management up to 58% of the food can be produced which would certainly help in the food production as well as protection of the soil.

Soil may seem like a forgotten resource but plays as important role as mentioned early and the loss of soil integrity is as important as climate change, pollution of the oceans and rapid deforestation.

The effects of soil degradation are many but can we come up with ways of in turn saving the soil and protecting are major medium of food production? Yes!

Through sustainable soil management the organic carbon can be stored in the soil which will later adapt to climate change, and through unfortunate circumstances it is unsustainably managed the soil can in turn accelerate climate change by releasing carbon dioxide and more potent greenhouse gases. We can also turn to holistic methods of management systems and promote agro-ecosystem health there can be a change in sustainable social, economic and ecological ways that can help in providing better productivity.

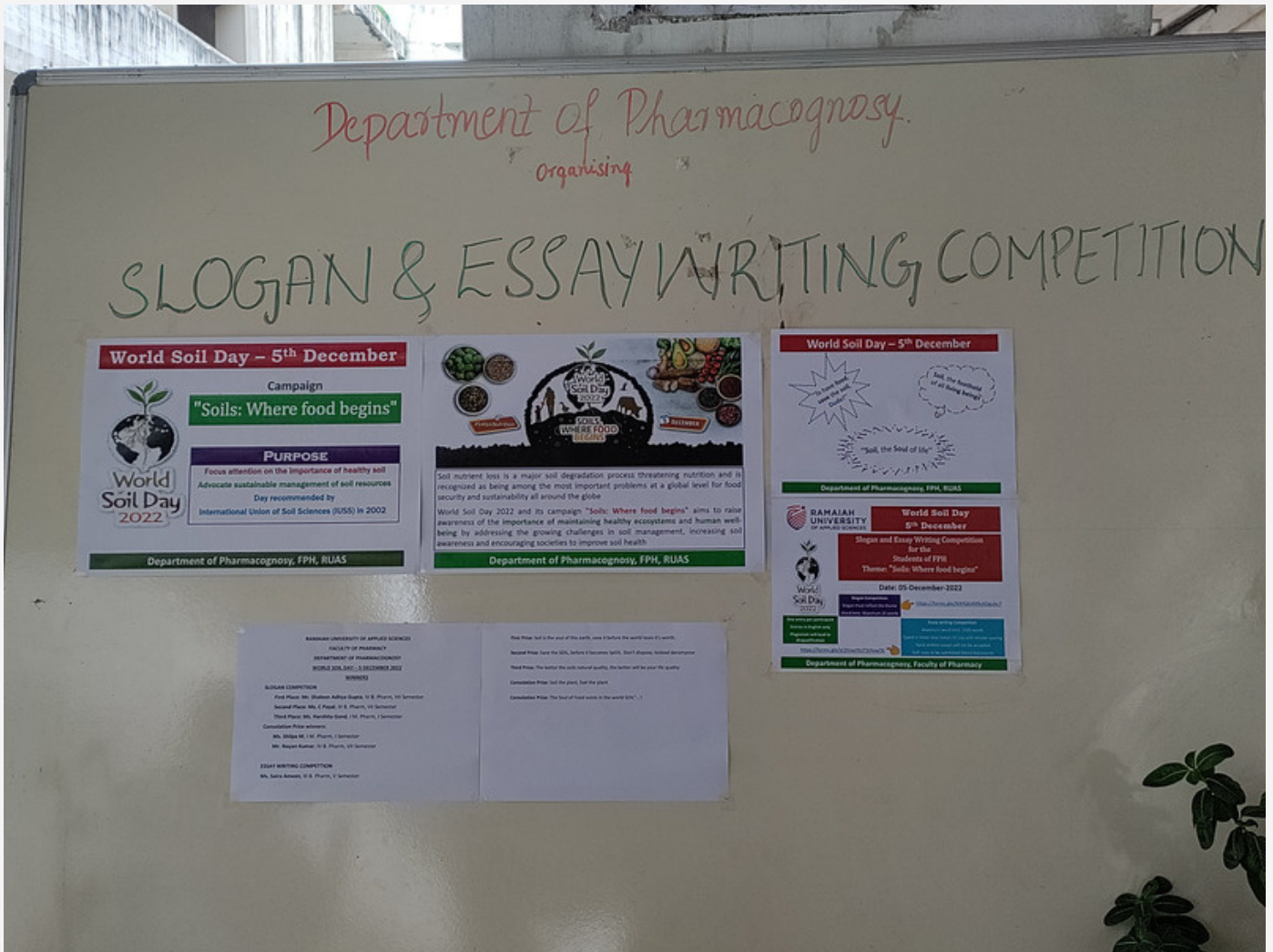
Farmers can play an integral role as the agents that bring major changes by adopting numerous and diverse farming approaches to promote the sustainable management of soils with the goal of improving productivity like agroecology, conservation agriculture, organic farming, zero tillage farming and agroforestry. They must be provided with incentives and an enabling environment for the application of these techniques. With a better understanding of the link between soil and its ecosystem function and the reduction in human impacts there can be a decrease in the negative impacts on soil and a promotion of more sustainable and productive agriculture. Sustainable soil management is a combination of science and local knowledge that can help in restoring balance in the soil.

Investing our thoughts and efforts into restoring healthy soil will bring many benefits, including climate-related ones. It will increase productivity, healthier food production, water storage and biodiversity conservation, making agrifood systems more sustainable and resilient and ultimately a healthier earth.

The road to saving the planet or helping to save the soil is a long one but surely not an impossible one when we remind ourselves that this beautiful planet, Earth is one of a kind and in outer space there may never be a planet such as this. The steps we take towards it need not be too large we take the steps in our own way, starting from our homes for example creating your own kitchen garden and using the food waste as compost, preventing the irresponsible disposal of waste into landfills, reducing the usage of plastics, promoting afforestation in your locality and the list goes on. The ways to save the soil are many but the time left to save it is limited. Soil is inherent to our origin and our sustenance and also a proof of our future, so let us strive to save the soil as it is where all food begins.

Happy World Soil Day!

-By Saira Ameen
3rd year B-Pharm



Every year, 5th December is celebrated as World Soil Day as an appreciation for the role played by soil in production of food and general upkeep of nature. Focussing on the theme for the year 2022, "Soil: Where Food begins' ', the Department of Pharmacognosy organised a slogan writing and essay writing competition for students. Lots of interesting entries were received and winners were shortlisted. The winners were awarded with a sapling as a symbol to showcase the importance of soil and its inextricable relationship with plants.

Slogan Competition Winners



1st Place: Mr. Shaleen Aditya Gupta, IV B.Pharm, VII Semester

Slogan: Soil is the soul of this Earth, save it before the world loses its worth.



2nd Place: Ms. C Payal, IV B.Pharm, VII Semester

Slogan: Save the soil, before it becomes spoil. Don't dispose, instead, decompose



3rd Place: Ms Harshita Gond, I M.Pharm, I Semester

Slogan: The better the soil's natural quality, the better will be your life quality



Consolation Prize: Ms Shilpa M, I M. Pharm, I Semester

Slogan: Soil the plant, fuel the plant.

Slogan Competition Winners

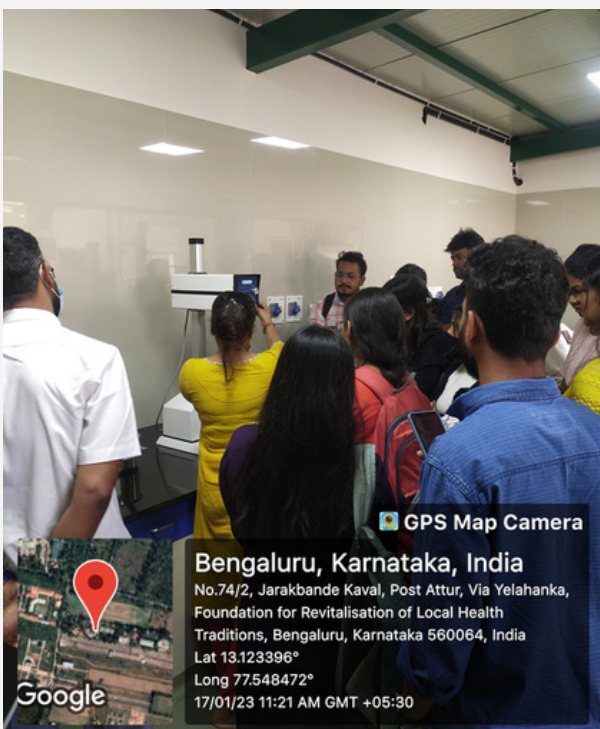


Consolation Prize: Mr Nayan Kumar M, IV B. Pharm, VII Semester

Slogan: The soul of food exists in the word soil.

Essay Competition Winner:

Ms Saira Ameen, III B.Pharm, V Semester



Visit to The Foundation for Revitalisation of Local Health Traditions (FRLHT)



On 17th January 2023, the Department of Pharmacognosy visited the renowned and prestigious Foundation for Revitalisation of Local Health Traditions (FRLHT), Yelahanka, Bengaluru. Composed of students as well as course leaders, this visit was extremely informative and exposed everyone to the wide range of opportunities with respect to research in the field of plants, genetics and biology.

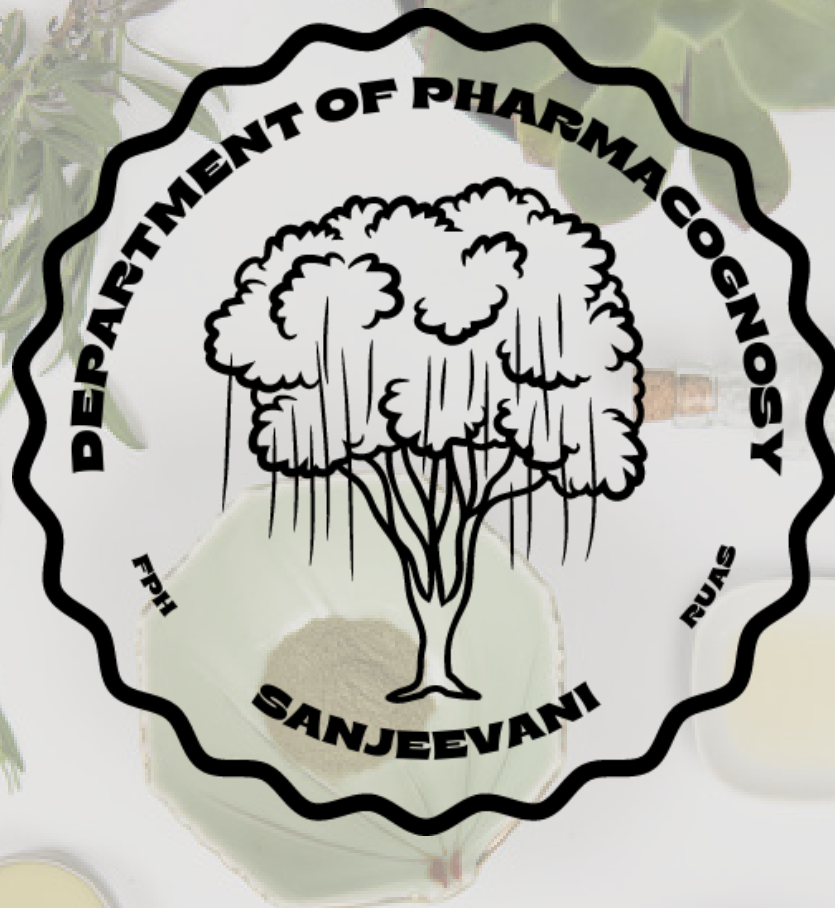
Staff and faculty members from FRLHT explained in detail the work being undertaken under their aegis.



They were kind enough to demonstrate certain scientific procedures such as homogenization of milk in their herbal kitchen and devices used for probing of DNA.

FRLHT is a haven for botanists and taxonomists, inasmuch it houses one of the largest medicinal plants herbaria in Asia and is a large repository for information on rare and endangered medicinal plants.





**WRITE YOUR FEEDBACK & SUGGESTIONS TO
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