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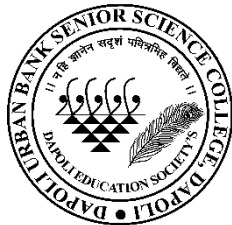
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Sign /-

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Murudseng: A Constituent of Aajibaicha Batwa



The Indian screw tree (*Helicteres isora*), also called Murud Sheng, Marori, Marorphali, Enthani, Avartani, Kevani, Atmorha, and Mriga-shinga. Mriga-shinga translates to deer's horn in Sanskrit. It got this name due to its peculiarly twisted fruit pods in the form of a screw. It is found in southern Asia and northern Oceania. In India, it is distributed in dry forests throughout Central and Western India, especially in Rajasthan, Punjab, and Bihar. The impressive health benefits of the Indian screw tree have made it one of the prominent herbs in the Ayurvedic system.

The stem bark, root, fruit, and seed of this Ayurvedic plant are used widely in the Ayurvedic system for various medicinal purposes. According to Ayurveda, the Indian screw tree balances Kapha and Pitta dosha. It has an astringent taste and cool potency. The main chemical constituency includes diosgenin cucurbitacin B and isorin. It also has antioxidant, hypolipidemic, antibacterial, anti-plasmodium, cardiac antioxidant, anticancer, anodyne, hepatoprotective, and anti-diarrheal activity. Here are some of the impressive health benefits of the Indian screw tree.

Excellent cure for gastrointestinal problems

One of the biggest health benefits of the Indian Screw tree is its ability to treat gastrointestinal problems. The root juice and fruit paste of this plant are taken orally to get relief from dysentery, stomach ache, and diarrhoea.

Health booster for new mothers

The fruit powder mixed along with some other nutritional herbs and spices is given to new mothers as a health-booster food in order to cope with post-delivery weakness.

***Helicteres isora* L.** Sp. Pl. 963. 1753; Cooke, Fl. Pres. Bombay 1: 136. 1958 (Repr.); Singh and Karthikeyan, Fl. Maharashtra state dicot. 1:355. 2000; Jain, Dict. Ethn. 100. 1991. 'Murudseng'.

Shrubs, 2-3 m tall; Leaves bifarious, oblong-obovate clothed with stellate hairs. Flowers 2.5-4.0 cm long, bright red. Follicles 5, beaked, stellately tomentose. Seeds numerous.

Fls. & Frts. : August-September

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Article by-
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Fast Way of Making Pufferfish's Neurotoxin May Lead To New Pain Drugs



Some pufferfish accumulate stores of the potent nerve poison tetrodotoxin inside them

A quicker way of making one of the world's most potent neurotoxins could lead to novel drugs for pain relief and to a better understanding of how the body's pain system works. Tetrodotoxin (or TTX) is found in some animals, such as [pufferfish](#) and sea snails, but is actually made by bacteria. It has a remarkable ability to block sodium ion channels, which nerves use to send signals, and just a few milligrams of it are enough to cause bodily paralysis and death in humans. Sodium ion channels are also essential to how we detect pain, so there is a lot of interest in tetrodotoxin's potential as a pain-relief drug.

Although TTX is arguably one of the most potent blockers of sodium ion channels, the difficulty in synthesising it has meant that progress in developing drugs by using it has been slow, says [Dirk Trauner](#) at New York University.

Now, Trauner and his colleagues have designed a 22-step process that results in 11 per cent of the ingredients used being turned into tetrodotoxin. This is a 10-fold improvement on previous techniques to create it and reduces the number of steps by at least a third.

The synthesis relies on producing a key part of the molecule in a different way. Rather than adding nitrogen-based fragments to the core carbon structure of tetrodotoxin, Trauner and his colleagues add a carbon fragment. Swapping out a carbon-nitrogen bond for a carbon-carbon bond allows them to simplify the entire process, says Trauner.

Tetrodotoxin is used often in neuroscience labs to study how pain works at a cellular level. "It's virtually an irreplaceable tool," says [Alasdair Gibb](#) at University College London. "It's one of the most selective and useful tools that people have for neuroscience research. You would find tetrodotoxin in virtually every research lab that was doing cellular neuroscience." The discovery of a better way to synthesise tetrodotoxin also opens doors to new avenues of pain research, says Gibb. Researchers will now be able to experiment with slight adjustments to the synthesis process to alter the structure, which could lead to drugs that act differently, and more effectively, on sodium channels in the body.

Both the enhanced yield and reduced number of steps are a huge improvement, says [Steve Roome](#) at Hello Bio, a commercial manufacturer of tetrodotoxin. "If that 11 per cent yield is consistent and can be translated to large scales within a manufacturing environment, then I think it would make a fantastic approach for the manufacture of TTX."

Journal reference: Science, [DOI: 10.1126/science.abn0571](https://doi.org/10.1126/science.abn0571)

Article by-
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Software Testing

Today's world of technology is completely dominated by machines, and their behaviour is controlled by the software powering it. Software testing provides the solution to all our worries about machines behaving the exact way we want them to. Software Testing is a process of evaluating the functionality of a software application to find any software bugs. It checks whether the developed software met the specified requirements and identifies any defect in the software in order to produce a quality product. It is basically executing a system in order to identify any gaps, errors, or missing requirements in contrary to the actual requirements.

It is also stated as the process of verifying and validating a software product. It checks whether the software product:

- Meets the business and technical requirements that guided its design and development
- Works as per the requirement
- Can be implemented with the same characteristics

The software application's success rate controls the growth of our business. It plays an important role for the development of software applications and products.

We need software testing for the following reasons:

1. **Cost Effective** – Testing has many benefits and one of the most important ones is cost-effectiveness. Testing our project on time can save money in the long run. Software development consists of many stages and if bugs
2. **Are caught in the earlier stages** it costs much less to fix them.
3. **Security** – This is the most sensitive and vulnerable part of software testing. Users are always looking for trusted products that they can rely on. It helps in removing problems and risks beforehand.
4. **Product Quality** – In order to make your product vision come to life, it has to work as planned. It is important to follow the product requirements because it helps you get the required end results.
5. **Customer Satisfaction** – The ultimate goal for a product owner is to give the best customer satisfaction. Software should be tested in order to bring the best user experience possible. Being the best product in this saturated market will help you gain trustworthy clients which will have great long-term effects.

Now let's move ahead and have a look at some of the principles of Software Testing.

Principles of Software Testing

Testing of software is exceptionally imaginative and an intellectual task for testers to perform. Testing of software or applications consist of some principles that play a significant role for a software tester while testing the project.

The Principles of Software Testing are as follows:

1. Software testing can help in detecting bugs: Testing any software or project can help in revealing a few or some defects that may or may not be detected by developers. However, testing of software alone cannot confirm that your developed project or software is error free. Hence, it's essential to devise test cases and find out as many defects as possible.

2. Testing with effectiveness is impossible: Until your project or application under test has a straightforward structure having limited input, it won't be likely or achievable to check and test all feasible sets of data, modules, and scenarios.

3. Early testing: The earlier you will begin to test your project or software the better you will find to utilize your existing time.

4. Defect in clustering: At the time of testing, you can observe that majority of the defects or bugs reported are because of a small number of modules inside your software or system.

5. Software testing is context-dependent: Various methods, procedures, and kinds of testing are there which defines the type and characteristics of the application. For example, an application related to health device needs more testing and doctor based feedbacks than a game or small software.

6. Error free or Bug-free software is a myth: Just because when a tester tested an application and didn't detect any defects in that project, doesn't indicate or imply that your software is ready for shipping.

Now that we know about software testing and the principles of it, let's move ahead and have a look at the life cycle of software testing.

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Article By

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Title: The Economics behind Line-Cutting

Can I use the copier, please? —allowed them to make cuts 60% of the time. They could reduce 94% of the time by explaining that they were pressed for time. Despite its flimsiness, "May I use the copy machine? I need to make copies." was almost as persuasive.

Typically, the person directly responsible for an incursion gets to determine whether to permit it. The other queuers usually do not say anything if that person does not object. Some travellers who would not often use a wheelchair ask for one, so they can go through security checks swiftly and board the plane first. They exit the plane walking rather than waiting for a wheelchair and being the last to get off the plane.

In the cinema, when it is time for the movie to end, some of the audience members jump out of their seats and rush towards the exit, ignoring the movie's climax before others even have a chance to move.

All of this appears to be more indicative of concealed motives. Even if we prefer to think that we are being kind, the main motivation is to avoid conflict. We have two options when someone appears to be trying to hurt us: we either resist them while risking a conflict, or we can give in and stay out of it. When we can employ the justification that caving in is us being good, caving in is much simpler for us.

As long as we act nice while doing so, we frequently let individuals walk all over us. Even those who are responsible for upholding laws prohibiting line-cutting prefer to avoid conflict. We all accept that those ready to risk conflict should get their way, even if it means harming others. We accept those who are willing to try to dominate as the dominant.

Many individuals are divided on this issue since they take pretty varied positions regarding requests from strangers to join lines while others are waiting. One is not at all open to the concept of letting anyone cut the line in front of her and can take a very aggressive position. He or she explains, "It is just too terrible that you are strapped for time, but my time is equally valuable." He or she continues, "There is a line for a reason; it cannot be that our time (that of everyone in line) is less valued." She/he pleads with you to get in line and wait for your turn.

However, others are all about grimacing and gesturing the intruder forward. Even though they might shake their heads and murmur about how unjust everything is, they are prepared to let individuals advance, especially if they appear to be particularly stressed out.

For someone who allows others to cross the line because he is prepared to pay with his time to avoid conflict, it is tough to remain impartial about these issues. Although it would be an added benefit for him if people thought well of him, he will indeed go to considerable efforts to avoid conflict.

The purpose of bringing up a topic related to behavioral economics for debate is to draw attention to a key lesson: costs and benefits apply to all aspects of life, not just financial notions.

Every decision you make has advantages and disadvantages. Not all of them must have financial repercussions. In actuality, the majority of them will not directly affect your finances.

Nevertheless, once we understand that money itself serves as a tool to achieve a goal rather than being an end in and of itself, we start to understand the necessity to think about costs and benefits far more broadly than we have up to this point, and that economics is about much more than 'just' money.

Let us hope that no one ever offers to cut in front of us in a line, but if you see one of us grimacing, know that she would prefer to keep the line intact because she values her peace and quiet more than the two minutes she will save. Alternatively, let us call it her current state of equilibrium in life!!

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Article by:

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LASER

Physics is advancing with time leading to newer discoveries and answers to the mysteries of universe. But still there is a lot more to find and research and experiment are being carried out globally.

Here we discuss three important fields of physics namely, Lasers, Plasma and Particle accelerators, which are largely interconnected and extensively studied by nations, as they have wide applications in the areas of defence, energy security, medicine, agriculture and industry. Countries spend billions of dollars into research, building and conducting research. One such famous example is Large Hadron collider (LHC) built mainly for nuclear research between 1998 and 2008, in collaboration with thousands of scientists and institutes all around the globe.

In India, our scientist are also experiments on these topics to benefit our country. Under the Department of Atomic Energy, Government of India, various units have been established all around nation to carry out research. Speaking about them are, Raja Ramanna Centre for Advanced Technology (RRCAT) is a frontline in non-nuclear research areas of Lasers and accelerators. Studies on Laser material development and Industrial aspects are being done in RRCAT. Medical and agricultural uses of lasers are key focus areas. The centre has indigenously designed 2 synchrotron radiation sources Indus-1 and Indus- 2. Indus-2 is largest and highest energy accelerator of India. Another such unit, Bhabha Atomic Research Centre (BARC), is working on Laser-screen Projectile velocimeter (LSPV), which is velocity measuring instrument based on time-of-flight principle. Their Laser Plasma Technology division is working on these areas developing new technologies BARC leads India's nuclear programs by developing advance technologies and securing national interest.

Variable Energy cyclotron centre (VECC), dedicated to development of accelerator science, nuclear science, etc. Last year scientist at VECC produced Thallium-201 radioisotope. for the first time in India. Other aided institutes by DAE like, Institute for Plasma Research, Gujrat are Carrying out research in plasma physics. Various Indian Institutes of Technologies (IITs) have set up laboratories to study Laser and plasma. India will surely lead world in these areas. New laser based weapons like KALI, DURGA and Laser guided missiles are under development by DRDO. And the list goes on, this tells us how crucial it is, for development of advance physics these 3 topics Laser and plasma applications also cover areas like semiconductor manufacturing, 3-D printing, cancer treatment, etc. which are attracting industries to look into them. We will discuss all thre topics briefly to get an overview and their applications in medicine and agriculture.

Contribution of LASER Technology

LASER is an acronym for Light Amplification by Stimulated Emission of Radiation. Laser light is highly monochromatic, directional and coherent. History of LASER starts when Einstein introduces stimulated emission in 1917. Then in 1954, first Maser (microwave) was demonstrated by Charles Towns. Following that in 1960, Theodore Naiman developed first LASER. 3/9

While transitioning to a lower energy level, electrons emit energy ($E_2 - E_1 = \Delta E = h\nu$) equal to the difference in energy of two levels in the form of Electromagnetic radiation. A Laser amplifies and directs this energy into an intense beam of light. Diagram below shows components and design of a typical laser. It consists of a 1. Gain Medium /active medium 2. Energy pumping source 3. Optical cavity. Besides and this, two reflection mirror are kept

parallelly, one of which is partially reflecting mirror (~99% reflection, ~ 1% transmission), for laser beam to come out.

In Stimulated emission of radiation, electrons from excited (E1) state is strike by another photon causing a N2 to N1 transition with emission of new photon having same frequency and direction to incident photon (i.e. coherent). But for this, more electron in (N₂) excited state are needed. (population inversion, N₂ > N₁) Lifetime of an e in excited state is too low (sim 10⁻⁸ sec) So they are sent to Metastable states, these excited states have longer lifetime (sim 10⁻⁶ - 10⁻³ sec.) . Those 2 photons emitted every time multiply in number by striking other atoms, creating an avalanche effect. These emitted photons having random direction are directed into an intense beam by mirrors, as they reflect back and forth. This increases avalanche effect even further, and thus we see huge amplification of light. By virtue of this unique design, we see high monochromaticity, directionality and coherence properties of a LASER.

Based on components, Lasers can be divided into 4 main types.

1. Gas Lasers - Much like gas discharge tubes, gas lasers have gaseous gain mediums. A voltage is applied to work as a pumping source (ex. He-Ne laser) 2. Liquid/chemical lasers:- Liquid are used as an active medium.

3. Solid state laser- Active medium is crystalline solid and high energy light source work as pumping source [ex. Ruby/Nd-Yag]

4. Semiconductor laser: Much like light emitting diodes. These lasers give different wavelengths of Lasers, by varying applied current and temperature mainly.

Lasers are used to cure cancer by destroying cells that are affected. LASIK commonly known as laser eye surgery cures myopia like issues. Hair removal treatment use CO₂ laser to remove and destroy hair from roots. Farmers use lasers for Field mapping and crop height levelling. Lasers are used by researches to study and modify plant/crop seeds, to increase the yield.

Contribution of Plasma Technology

Plasma is ancient Greek word for 'moldable substance' With increasing temperature all materials transform from solid to liquid then to gas. Further increase in temperature at around 6000 °C 10,000 °C we get plasma. Thus it is called fourth state of matter. It was first discovered by Sir William Crook in 1879 and named as 'plasma by Irvin Langmuir in 1928. It is most abundant form of ordinary matter in the universe reasonably, as stellar interiors, intergalactic regions, gaseous nebulas are mostly in plasma state, So, plasma physics is crucial to study the universe know plasma-know universe; No plasma no universe. At such enormous temperatures, atoms are ionized. As a result, plasma is mostly charged particles (ions and/or electrons which makes plasma electrically conductive. Due to charged particles plasma atmosphere has electric field and due to motion of these charged particles magnetic field is created. The overall charge of plasma is roughly zero. Negative charge is usually carried by electrons and positive charge by atoms/molecules that are missing those e. So for plasma formation ionization is must. Degree of ion ionization is fraction of particles ionized, Plasma can be fully ($\alpha=1$) or partially ionized. So plasma is quasineutral mixture which exhibits collective behaviour Quasineutrality means, plasma is neutral (macroscopically) only as a whole, but not at microscopic levels. Due to presence of EM fields, it's motion is collective/interdependent Any charged particles accelerating makes plasma radiative. So, electrical conductivity. Responsiveness to external magnetic field, Quasineutrality, collective behaviour, radiative nature are properties of plasma. Plasma can shield out electrostatic potential applied to it by creating a screening effect. This is called Debye Shielding. Earths

magnetic field traps plasma coming as solar winds resulting in ionospheric plasma, this causes the Aurora borealis and Van Allen belts of plasma around it

Most common methods of (ionization) generation of plasma are photoionization and electric discharges. When photon of energy equal or greater than ionization potential strikes atom, it gets ionized. Intergalactic gases get photoionized by photons from stars creating Nebulas. In electric discharge gas is ionized by strong electric field, accelerating ions to the oppositely charged terminals, they strike other atoms and ionize them. As soon as ionizing source is turned off, recombination occurs and plasma gets disappeared. Lightning in skies is natural example of this. Based on thermal properties, plasma is classified as Hot plasma/thermal plasma - electrons and ions have about same temperature i.e. energy, and Cold/Non thermal plasma. Here electrons have much higher energy (temperature) than ions. In plasma physics temperature is written in terms of energy (electron volts) by relation, $[E = 2/3 \text{ KBT}]$.

Plasma has wide applications in medical science. for tissue regeneration, inactivation of pathogens, treating skin diseases. They are used to manufacture Food packages that keep inside food isolated. Agriculture finds uses of plasma technology for seed disinfection, insect control, and catalyst in fertilizer manufacturing, which altogether contribute toward an increased food production.

Conclusion

As we have seen the potential of Laser. Plasma and Accelerator science for well being of humanity and for knowing our universe more. These technologies' are possible ways of making India 5 trillion dollar economy as they cover issues related to energy, security, and healthcare. More and more research must be done on them. Industries must be helped and settled to use these technologies for manufacturing and engineering goods. For example, semiconductor manufacturing which has a huge market globally still not so developed in India. Government should realize importance of these and give more funds to do research on them. Along with this, young minds must be introduced to lasers; plasma and their space dominance; nuclear energy program of India, to attract them to do research in these areas. Who knows next and long awaited Nobel prize in physics for our country might be ahead of this research! Setting up more units to do research is the only way for this dream to come true. Large population of India requires more energy generation, which needs establishing more facilities to develop our nuclear energy program. We have also seen their uses in defence, medicine and agriculture, which are very promising. More or less, in this era, science and technology is the not to ignore thing for country to become developed. These research and experiments tell us more about the universe we live in, matter which we are made up of and that's the purpose of our lives, to know this universe more!!

Article by:

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Noble Prize winner Wangari Maathai



Wangari Muta Maathai was born in Nyeri, Kenya (Africa) in 1940. The first woman in East and Central Africa to earn a doctorate degree. Wangari Maathai obtained a degree in Biological Sciences from Mount St. Scholastica College in Atchison, Kansas (1964). She subsequently earned a Master of Science degree from the University of Pittsburgh (1966). She pursued doctoral studies in Germany and the University of Nairobi, obtaining a Ph.D. (1971) from the University of Nairobi where she also taught veterinary anatomy. She became chair of the Department of Veterinary Anatomy and an associate professor in 1976 and 1977 respectively. In both cases, she was the first woman to attain those positions in the region. Wangari Maathai was active in the National Council of Women of Kenya in 1976-87 and was its chairman in 1981-87. However, through the Green Belt Movement she has assisted women in planting more than 20 million trees on their farms and on schools and church compounds.

In 1986, the Movement established a Pan African Green Belt Network and has exposed over 40 individuals from other African countries to the approach. Some of these individuals have established similar tree planting initiatives in their own countries or they use some of the Green Belt Movement methods to improve their efforts.

In December 2002, Professor Maathai was elected to parliament with an overwhelming 98% of the vote. She was subsequently appointed by the president, as Assistant Minister for Environment, Natural Resources and Wildlife in Kenya's ninth parliament.

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Article by:

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Sea worms:



Nereis: A mud worm

Sea worms are the small creatures found on the bottom sand mud and associated with sea plants and corals. They are popularly known as Marine worms. Any worm that lives in a marine environment is considered a **marine worm**.

There are six phyla that contain marine worm species:

- Platyhelminthes (flatworms),
- Nematoda (roundworms),
- Annelida (segmented worms),
- Chaetognatha (arrow worms),
- Hemichordata (acorn worms), and
- Phoronida (horseshoe worms).

Marine worms known to inhabit many different environments, having been found in both fresh and saltwater habitats globally. Marine worms exhibit numerous types of reproduction, both sexually and asexually. Asexually many are able to reproduce via budding or regeneration. Marine worms can be herbivores, carnivores, parasites, detritivores, or filter feeders, but many strange examples of feeding are seen in this diverse type of animal. Marine worms have a variety of circulation and respiration processes. Many of these worms have specialized tentacles used for exchanging oxygen and carbon dioxide which also may be used for reproduction. These specialized tentacles allow for gas exchange, further decreasing oxygen content in dead zones and in shallow water, which encourages plant and algae growth.

They don't have eyes. But, they have cells called receptors that can sense whether it's light or dark. This allows worms to tell if they're underground or above ground. They can perform both male and female functions and mate every 7 to 10 days. The mating process takes around 24 hours. As a second line of defence, many ribbon worms are poisonous and taste bad. Several species contain tetrodotoxin, the infamous pufferfish venom that can induce paralysis and death by asphyxia.

The marine worm feeds primarily on oceanic particulate. However, marine worms are accomplished predators and eat fish, snails, crustaceans and clams. They can catch snails or bivalves and wrap their bodies around their victims and inject them with digestive enzymes. The bootlace worm (*Lineus longissimus*) is a species of ribbon worm (up to 55 m (180 ft) long. Its mucus is highly toxic. The worms are used as- Bait by recreational fishers all over the world.

Article by:

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