Dapoli Education Society's

# DAPOLI URBAN BANK SENIOR SCIENCE COLLEGE, DAPOLI

# Eureka

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# Index



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I, Shri Dr. S. P. Jagadale hereby declared that the particulars given above are true to the best of my knowledge and belief.

Sign /-
(Dr. S.P. Jagadale, Principal)
(The editor and publisher may not agree with the views expressed in articles.)

# Anti-Tumour Plant ~ **Narky**

**Nothapodytes nimmoniana** (J. Grah.) Mabberley in Manilal, Bot. & Hist. Hort. Malab.88.1980; Mappiafoetida (Wight) Miers, Contrib. 1:64. 1851; Cooke, Fl. Pres. Bombay 1: 239. 1958 (Repr.); Singh and Karthikeyan, Fl. Maharashtra state dicot. 1:517. 2000.'Narkya'.

Trees; Leaves ovate-oblong, or elliptic-oblong, dark-green above, pale and hairy. Flowers in terminal corymbose panicles, densely pubescent.

**Fls. &Frts. :** September-November.

**Uses :** Cancer: All plant parts are used for control of cancer.

**Active Ingredients:** Camptothecin (CPT) is a potent anti-tumour isoquinoline alkaloid used extensively in the treatment of several cancers. It also contains 3-ketooctadec-cis-15-enoic acid (16.0%), palmitic acid (12.3%), stearic acid (4.2%), oleic acid (16.2%), linoleic acid (11.6%) and linolenic acid (39.7%).

Due to over harvesting from wild now the N. nimmoniana is in an endangered status. Because of unique pentacyclic structure of CPT, its artificial synthesis is difficult and one has to depend on the natural sources for raw material. Around 1000-1500 tons of N. nimmoniana wood chips are needed to get 1 ton of CPT in terms of raw material. This gives an idea about the scale at which destruction is going on and also sheds light on the extent of cultivation required to protect the wild pool and cater the commercial demand.

In India, the species is reported to occur in forests of Goa, Karnataka, Kerala, Maharashtra, Tamil Nadu, Sikkim and West Benga. In Maharashtra, it is reported from Western ghats and also reported from some sacred groves of Dapoli

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- Singh, N.P. and Karthikeyan, S. 2000. Flora of Maharashrta state. Dicotyledones, BSI, Calcutta, I.
- Domestication of Nothapodytes nimmoniana (grah.) mabb. : An endangered medicinal tree from
- Western Ghats of India By DR. Ankur Patwardhan
- https://www.google.com/search?q=Nothapodytes+nimmoniana+active+ingradients&rlz=1C1YTUH_enIN1006IN1008&oq=Nothapodytes+nimmoniana&aqs=chrome.2.0i67i355j46i67j69i59j0i512l3j0i67j69i60.3930j0j7&sourceid=chrome&ie=UTF-8


***Article by***
*Dr. Raghunath Ghalme*
***HOD ,Department of Botany***

# What is Artificial Sweetener (Sweetening Agents)?

Natural sweeteners like sucrose and fructose give sweetness to a substance, but they also contain calories which can be harmful to humans when taken in extra quantities.

Artificial sweeteners are substances that are used as substitutes for natural sugar (sucrose), they contain low calories. They are many times sweeter than regular sugar, so they are also referred to as intense sweeteners.

**Sweetening agent**

Some of them are so sweet that dextrose or maltodextrin is added to reduce the intense sweetness of artificial sweetening agents. These sweetening agents are generally obtained from the substitutes of synthetic sugar, but they can also be formed from natural substances, including herbs or sugar itself.

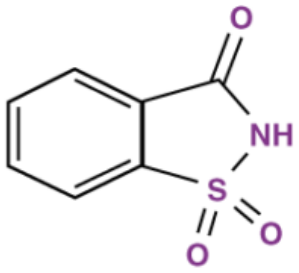
Artificial sweetener is one of the most attractive substitutes for sugar as it does not add many calories to our diet. It can be used directly in processed food such as puddings, dairy products, candy, soft drinks, baked goods, jams and many other foods and beverages. It can also be used after mixing it with starch-based sweeteners.

**How does an artificial sweetening agent work?**

For a sweetening agent to work properly, a sweetener should be soluble in water and it should readily bind with a receptor molecule present on the surface of the tongue. The receptor is actually connected with a G- protein and when the sweetener binds with the receptor, the G- protein starts dissociating which in turn activates a nearby enzyme and triggers a sequence of events in which the signals are transmitted to and are interpreted by the brain. The interaction between the receptor and sweetener accounts for the sweetness of an artificial sweetening agent.

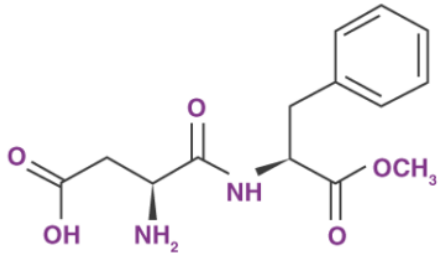
**Common Artificial Sweetener**

1. Saccharin: It was discovered in 1879 and is considered the oldest non-nutritive sweetener. Sucrose is about 300 times less sweet than saccharin, but it has a bitter aftertaste. It cannot be used in products where baking of food is necessary as it becomes unstable when it is heated. But it can be used to sweeten candies, drinks, and toothpaste.




Saccharin

2. **Aspartame:** In 1879 Aspartame was discovered and it was found that it is approximately 200 times sweeter than sugar. It is a dipeptide methyl ester and its name is aspartyl phenylalanine-1-methyl ester. It is commonly used as a tabletop sweetener and is also used in a variety of foods. When it is heated it breaks down into amino acids and loses its sweetness, so it cannot be used for baked foods. As it becomes unstable at cooking temperature, it is only used in soft drinks and cold foods.



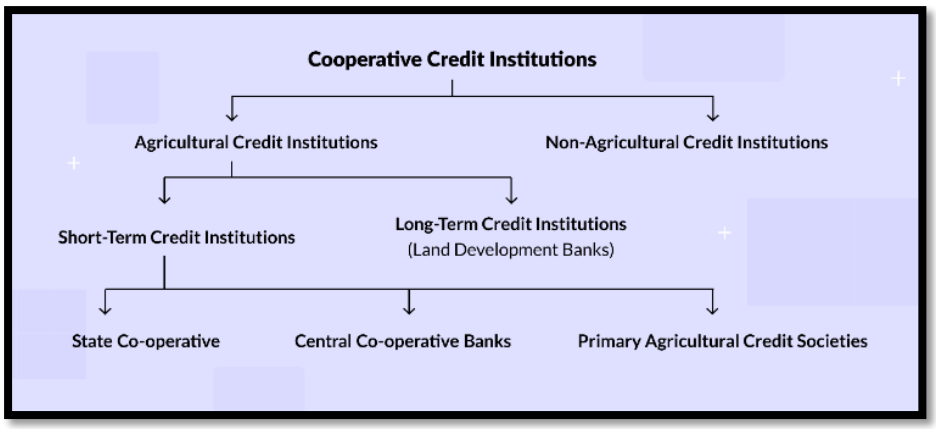

Aspartame

**Advantages of Artificial Sweeteners**

1. **Weight Control:** If someone wants to lose weight, then they should use an artificial sweetening agent as virtually it carries zero calories. One gram of sugar carries 4 calories, and one teaspoon of sugar contains about 4 grams of sugar. So by eating 1 teaspoon also we gain 16 calories. So in the case of weight control, an artificial sweetening agent is the best option.
2. **Diabetes:** It also helps in controlling diabetes as it does not raise the blood sugar levels because it does not contain the carbohydrates in it.

***Article by***
*Mr. Shantanu Kadam*
***Department of Chemistry***

# Co-operative Credit Institutions




In India's financial system, cooperative banks have a significant impact. A cooperative bank is a type of bank that is owned jointly by all of its members. In order to reach the last individual in the last village, cooperatives are frequently founded by members of local professional communities who have an interest in rural finance. Cooperative credit has no competitors other than ordinary money lenders. Various attempts and initiatives have been launched by different countries to broaden banking services, encourage saving, and make credit available to those who are not bankable.

Beginning in the early 1900s, co-operative banks were established in India as part of a formal initiative to develop an entirely novel institution that followed the ideals of cooperative management and organization. These banks were designed to serve as alternatives to money lenders by offering quick, appropriate, and long-term institutional credit at costs that were affordable.

Co-operative banks are tiny organizations within the cooperative sector that function in both urban and rural locations. Since they primarily credit to individuals and enterprises, these banks are generally focused on communities, localities, and workplace associations.

The co-operative banks in urban areas primarily finance various groups of people for self-employment, businesses, small-scale units, and home financing, whereas the cooperative banks in rural areas primarily finance agricultural-based activities such as farming, livestock milk, hatchery operations, financial planning, etc., along with a few small-scale businesses and self-employment-driven activities. The majority of services, including loans, mortgages, safe deposit boxes, current and savings accounts, are offered by these banks to both individual and commercial clients.

Internet banking and phone banking services are not extremely significant to middle class customers who utilize banks as their primary means of saving money. Although they don't offer more amenities than private banks, their financing rates are unquestionably competitive. But in contrast to commercial banks, the documentation procedure is drawn out, if not rigorous, and obtaining a loan granted swiftly is very challenging. Less strict requirements apply to loans from urban cooperative banks than to loans from commercial banks.

It is a group for the underprivileged, illiterate, and unskilled. It is an organization of mutual assistance and sharing, which reduces social cleavages and class conflicts, as well as bureaucratic evils and political faction follies. It also overcomes obstacles to agricultural development and fosters the growth of small and small-scale businesses.

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***Article by***
*Ms. Siddhi Salgaonkar*
***Department of Commerce***

# How Is Computer Science Used in Everyday Life?

Computers have become an important part of our lives by making it easy to do things faster, better, and more accurately. They have revolutionized the way we do business, communicate, bank, and study. They have made it possible for businesses to operate on a global scale. Computers are used in homes, offices, schools, government offices, hospitals, and more. So, knowledge of computer science is one of the most important today.

**What is computer science?**

Computer science is the field that studies computers and computational systems. Computer scientists mostly deal with software, unlike computer and electrical engineers. They deal with the theory, design development, and application of computer software.

The main areas that are studied in computer science include the theory of computing, bioinformatics, software engineering, programming languages, numerical analysis, graphics and vision, human and computer interaction, database systems, security, computer networks and systems, and artificial intelligence. Programming is only one part of the equation. Computer science professionals also design algorithms and analyze them to solve problems.

**Uses of computer science in everyday life**

Computer science is an ever-evolving field that continues to have a great impact on our lives. Here are just a few ways it is used in everyday life.

**Healthcare**

Computer science has played a major role in improving people's lives and health. Technological advances such as electronic health or medical records and telehealth are made possible due to computer science. Healthcare informatics is a process of combining information technology and healthcare, and it is one of the fastest-growing fields within the healthcare industry. Computer science also allows different healthcare facilities to work together and network to improve patient care.

**Education**

Education standards and quality have improved considerably in the last few years. Decades ago, children learned to count and recognize their alphabet in kindergarten and first grade. Today, students in these grades have access to online learning materials and resources and are familiar with the use of computers. E-learning platforms and applications are changing the way students' study. It provides them with the tools they need to solve complex problems and learn about interesting topics. Computer science has brought many positive changes in the academic field. With distance learning programs, it is possible today for people to earn their degrees easily from the comfort of their own homes. Baylor University, for example, offers an online masters

computer science program that allows students to prepare for high-demand roles in data science and software engineering while studying on their own schedule. Computer science is also a high-demand field offering some of the highest-paid jobs today. Students in this field can pursue degrees that allow them to find lucrative positions in almost any industry.

**Disaster management**

One of the biggest impacts computer sciences has made is in how we predict and manage disasters today. Meteorologists use computer science to predict storms and other weather events. Computer science has also made it possible for us to monitor weather continuously through satellites and other tools. We can predict tornadoes, hurricanes, and outbreaks of diseases. It also provides us with valuable tools that can be used to prevent crimes by predicting human behaviour.

**Utility facilities**

Computers have directly contributed to making our lives convenient and comfortable. When it comes to transportation, computer science has changed the way we travel since airlines, public transport, and trains all use computers today to control and manage their operations. We use computers to plan our trips and book tickets online to save time.

Map and GPS applications have made it easy for us to travel conveniently anywhere in the world without having to rely on anyone else for directions. Even in desolate, unfamiliar locations, this technology helps us reach our destination safely and on time. Google Maps, for example, is also capable of providing us with information about weather alerts, traffic conditions, and the time required to reach our destination. The application provides us with important information about alternate routes and alerts so we can save time while traveling.

Public transit, trains, buses, and airports are also much safer today because of computer science and the use of CCTV surveillance systems. Utilities that we use daily, such as water and electricity, have also improved because of computer science.

**Everyday communication**

One of the biggest impacts of computer science can be seen in the way we communicate and connect with others. Computers have facilitated contact between people through social media, mobile phones, video conferencing, texting, and emailing. It has brought people closer and made it possible for us to stay in touch with friends and family in any part of the world.

The way businesses communicate with their customers has also changed drastically. Radio, television, online ads and other advertising methods depend on computers for production, storage, control, and broadcasting. Computers have allowed businesses to communicate with their employees more easily, and employees can work

collaboratively in real-time and remotely. People can share their ideas, stories, and thoughts with others instantly through an internet connection and social networking sites. It is easier than ever to communicate with people, share important life updates, and keep in touch with people because of computer science.

Our life today is very different compared to a few decades ago when computers and the internet were not widely available. Computers are used today to make a positive impact in every imaginable field. Computer science allows us to do things quickly, easily, and more efficiently than ever before. It also connects us to the world and has changed the way we do things in our daily lives.

**Reference:**

https://www.entrepreneurshipinabox.com

***Article by -***
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# The Harmful Reality of Plastic Recycling

Plastic pollution has flooded our planet, harming people's health, accelerating social injustice, destroying biodiversity, and fueling the climate crisis at each stage of plastic's lifecycle - from the extraction of oil and gas to disposal in landfills and incinerators to the plastic trash that clogs our oceans. Science is only beginning to understand the long-term effects of plastic on human health, yet micro plastics have been found in the air we breathe, the food we eat, and even in our organs and blood. A new Greenpeace report has been published highlighting the toxic hazards of recycled plastic.

The reality is that most plastics collected for recycling are never recycled – and when plastics are recycled, they contain a toxic cocktail of chemicals that makes them unfit for food-grade and other consumer uses. Recycling is not a safe or effective way to end plastic pollution.

**1. Direct contamination from toxic chemicals in virgin plastic:** When plastics are made with toxic chemicals and then recycled, the toxic chemicals can transfer into recycled plastics.

**2. Leaching of toxic substances into plastic waste:** When plastics are tainted by toxins in the waste stream and the environment and are then recycled, they produce recycled plastics that contain a stew of toxic chemicals. For example, plastic containers for pesticides, cleaning solvents, and other toxic chemicals that enter the recycling chain can contaminate recycled plastic.

**3. New toxic chemicals created by the recycling process:** When plastics are heated in the recycling process, this can generate new toxic chemicals that make their way into the recycled plastics. For example, brominated dioxins are created when plastics containing brominated flame retardants are recycled, and a stabilizer used in plastic recycling can degrade to a highly toxic substance in recycled plastics. Sorting challenges and the presence of specific packaging components in sorted materials can also lead to toxicity in recycled plastic

We cannot recycle our way out of this crisis. Major players in the industry must recognize that plastic recycling will never be fully sustainable. To date, it is estimated that only 9% of all the plastic ever produced has been recycled globally, and production is projected to triple in the future. We will never be able to solve this crisis with just waste management and cleanups. The solution is for decision-makers to support a strong plastics treaty to end runaway plastic production and invest in refill and reuse.

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***Article by -***

*Mr. Aniruddha Sutar*

***Department of Environmental Science***

# What is gentamicin?


Gentamicin, an aminoglycoside antibiotic, is bactericidal. Gentamicin passes through the gram-negative membrane in an oxygen-dependent active transport. As oxygen is required, this is why aminoglycosides are not effective in anaerobic bacteria.

Gentamicin is an antibiotic that fights bacteria.Gentamicin is used to treat severe or serious bacterial infections.Gentamicin may also be used for purposes not listed in this medication guide.

- **Gentamicin side effects**

Get emergency medical help if you have signs of an allergic reaction: hives; difficult breathing; swelling of your face, lips, tongue, or throat.

**Gentamicin may cause serious side effects. Call your doctor at once if you have:**

- hearing loss, or a roaring sound in your ears;
- Severe or ongoing dizziness;
- Weak or shallow breathing;
- Numbness or tingly feeling;
- Twitching, muscle tightness or contraction;
- Seizure (convulsions);
- Severe stomach pain, diarrhea that is watery or bloody;
- Fever, blisters or ulcers in your mouth, red or swollen gums, trouble swallowing;
- Kidney problems--little or no urinating; painful or difficult urination; swelling in your feet or ankles; feeling tired or short of breath;
- Signs of an electrolyte imbalance--confusion, weakness, bone pain, increased urination; or
- Increased pressure inside the skull--severe headaches, ringing in your ears, dizziness, nausea, vision problems, pain behind your eyes.

Side effects may be more likely in older adults.

**Common side effects of gentamicin may include:**

- Vision problems;
- Nausea, vomiting, loss of appetite, weight loss;
- a light-headed feeling, like you might pass out;
- Itching or rash;
- Pain where the medicine was injected;
- Headache, mood changes; or
- Joint pain.

**References-**

Drugs.com on Aug 3, 2023. Written by Cerner Multum

***Article by:***
*Miss. Priyanka Salvi*
***HOD, Department of Microbiology***

# Mission Aditya L1: Visionary Mission by ISRO

Aditya L1 shall be the first space based Indian mission to study the Sun. The spacecraft shall be in a halo orbit around the Lagrange point 1 (L1) of the Sun-Earth system, which is about 1.5 million km from the Earth. A satellite placed in the halo orbit around the L1 point has the major advantage of continuously viewing the Sun without any occultation/eclipses. This will provide a greater advantage of observing the solar activities and its effect on space weather in real time. The spacecraft carries seven payloads to observe the photosphere, chromosphere and the outermost layers of the Sun (the corona) using electromagnetic and particle and magnetic field detectors. Using the special vantage point L1, four payloads directly view the Sun and the remaining three payloads carry out in-situ studies of particles and fields at the Lagrange point L1, thus providing important scientific studies of the propagatory effect of solar dynamics in the interplanetary medium.

The suits of Aditya L1 payloads are expected to provide most crucial information's to understand the problem of coronal heating, coronal mass ejection, pre-flare and flare activities and their characteristics, dynamics of space weather, propagation of particle and fields etc.

## What is Aditya-L1 Mission?

**Aditya-L1** is the first space based observatory class Indian solar mission to study the Sun from a substantial distance of **1.5 million kilometers.** It will take approximately **125 days** to reach the L1 point.

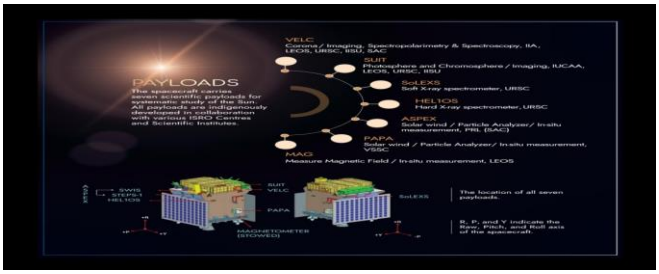
Aditya-L1 is also ISRO's second astronomy observatory-class mission after **AstroSat (2015).**

The mission's journey is notably shorter than India's previous **Mars orbiter mission, Mangalyaan.**

The spacecraft is planned to be **placed in a halo orbit** around the **Lagrangian point 1 (L1) of the Sun-Earth system.**

## Objectives

- The mission aims to provide valuable insights into the **solar corona, photosphere, chromosphere, and solar wind.**
- The primary objective of Aditya-L1 is to gain a deeper understanding of the Sun's behaviour, including its **radiation, heat, particle flow, and magnetic fields,** and how they impact Earth.




## Major Science Objectives

- Understanding the Coronal Heating and Solar Wind Acceleration.
- Understanding initiation of Coronal Mass Ejection (CME), flares and near-earth space weather.
- To understand coupling and dynamics of the solar atmosphere.
- To understand solar wind distribution and temperature anisotropy.

**Uniqueness of the mission**

- ✓ First time spatially resolved solar disk in the near UV band.
- ✓ CME dynamics close to the solar disk (~ from 1.05 solar radius) and thereby providing information in the acceleration regime of CME which is not observed consistently.
- ✓ On-board intelligence to detect CMEs and solar flares for optimised observations and data volume.
- ✓ Directional and energy anisotropy of solar wind using multi-direction observations.

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***Article by:***
*Mr. Aniket Nandiskar*
***HOD, Department of Physics***

# Pattern of migration in golden eagle

Golden eagle migration habits are not entirely clear. In the west, some groups of golden eagles migrate while others remain there all year. In the east, all golden eagles migrate. The migration patterns of eagles from the west and the east are comparable.Both migratory and non-migratory populations of the golden eagle exist.The bulk of breeding eagles in the northernmost region of their range migrate.Golden eagles travel alone along established paths.Their wintering sites are near eagles that live there year-round.In the east, all golden eagles migrate.

**Do golden eagles move around?**

West North America is the stronghold of the North American golden (Aquila chrysaetos canadensis). Eastern North America is home to a modest population.Typically, golden eagles winter and breed on the same locations. While some golden eagle populations migrate, others remain year-round residents.Throughout their entire lives, golden eagles make random short, medium, and long-distance movements.However, only golden eagles breeding in the northernmost regions of the species' range engage in migratory movements, which are described as movements that occur predictably every year.

**How long does the golden eagle migration journey last?**

Golden eagles that migrate have different migration times based on the distance between their breeding and wintering grounds, their age and social standing, and whether they migrate in the spring or fall.The Spring migration, also known as the northward migration, is often shorter and is started by breeding adults who hastily return to occupy good breeding territory. Breeding doesn't begin for juvenile and subadult animals until their fourth year. They leave farther south and arrive to the northern summer range later.Nonbreeding birds arrived at the same region up to 12 weeks after the adults, according to a study that included adult and young eagles.Considering that there is less of a rush to get to the wintering grounds in the fall or southern migration phase, it tends to persist longer.

Fall migration in the west lasts six to forty-seven days to reach the wintering habitats for eagles.The wide range in time is explained by variations in the distance between a bird's breeding and wintering sites.Fall migration in the east lasted an average of 52 days for adults and 56 days for juvenile birds.Young eagles frequently stop over for many weeks in the east before continuing their migration.It might take immature eagles up to 153 days to get to their wintering grounds in the south.

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