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Sign /-

(Dr. S.P. Jagadale, Principal)

(The editor and publisher may not agree with the views expressed in articles.)

Garcinia xanthochymus. (Yellow Mangosteen)



Botanical name: *Garcinia xanthochymus*

Family : Clusiaceae

Common name : Pivale Kokum, yellow mangosteens

The Garcinia is one of the important genus of fruiting plants. Thirty-five species of Garcinia are found in India. Origin and distribution Garcinia Xanthochymus is a native of India. It is found widely distributed in the lower hills of the eastern Himalayas, Western Ghats and Konkan to Kerala.

Nutritional value : The fruits of yellow mangosteen are used for edible purposes and contain lot of nutrients and have a peculiar taste. The fruits are rich in carbohydrates, proteins, calcium, Manganese, zinc. The fruits contain garcinol, xanthones which are used have lot of nutritional as well as pharmaceutical values.

Chemical constituents: The fruit contains several phytochemicals such as xanthones, flavonoides, saponins, tannins, alkaloids, lipids, benzophenones, guttiferone H, gamboginone and bioflavonoids.

Medicinal values: The fruit sap has anti-scorbutic, anthelmintic, and cardiotoxic properties. It is used in piles, colon cancer, breast cancer, dysentery, and tumors. The latex of fruit is used as medicine for curing wounds and other skin diseases. It is then given to goats for curing fever, used as medicine for curing pakulia disease of cattle, wound healing, Tribal people use the bark of the plant for homeopathic medicine. The decoction from leaves and roots is used in the treatment of ear aches.

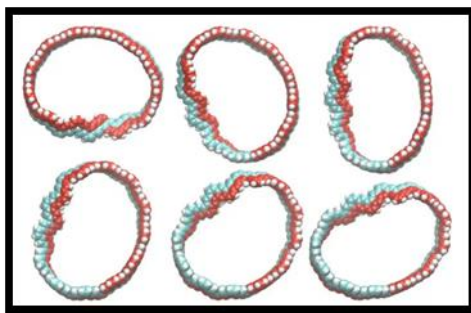
Pharmacological activities: This plant as an antioxidant, antidiabetic, and for having Nerve Growth Factor-potentiating, antimicrobial, anti-inflammatory and cytotoxic activities. This species contains a broad range of phytochemicals with curative properties that can be greatly beneficial to man. This plant is available in Kokan krushi Vidyapith medicinal garden and reported in few sacred groves of Dapoli tehsil.

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Article by
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Tiny Möbius strip fashioned from carbon nanotube building blocks



Simulated images of the carbon nanotube Möbius strips

A short section of carbon nanotube built from scratch forms a tiny Möbius strip – a one-sided surface that results from a band with a twist in it.

You would imagine you could just salami slice a carbon nanotube to get a band. But the tubes are difficult to manipulate because they are so small. They can't be cut into cylindrical bands – which chemists call carbon nanobelts – as a tube of paper might be due to the powerful intramolecular forces at nanometre scales.

There is, however, one way to make a carbon nanobelt. In 2017, Yasutomo Segawa at the Institute for Molecular Science in Okazaki, Japan, and his colleagues showed they could be assembled piece-by-piece from a collection of smaller molecular units through a series of chemical reactions.

Now, Segawa and his team have gone one step further and created a Möbius strip-shaped carbon nanobelt. To build it, they modified the chemical process for building their carbon nanobelts – instead of using an even number of repeat units to form the belt, they used an odd number.

“The ultimate goal of organic chemistry is to create all possible molecular structures,” says Segawa. “Our achievement is one great step toward that purpose.”

After they had carried out the modified chemical reactions, Segawa and his team confirmed the resulting structure really was a Möbius strip using high-resolution spectroscopy.

While an immediate use for the carbon Möbius strip might not be apparent, the finesse required to create it could lend itself to other challenges in nanoengineering and chemistry, says Nicole Grobert at the University of Oxford.

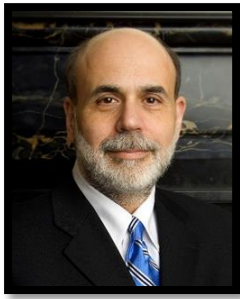
“The precise application for this Möbius band may not be an obvious one, even for the researchers who have researched it, but if they can extend their magic chemistry to larger systems and achieve ultimate control of larger carbon systems, then you can start to think about upscaling and scaling to wet chemistry techniques,” says Grobert.

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Journal reference: Nature Synthesis, DOI: 10.1038/s44160-022-00075-8

Article by
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Ben Bernanke: the Nobel Warrior who fought the Great Recession of 2008



The fundamental reason for how major nations currently respond to global crises, such as the recent pandemic or the Great Recession of 2008, was laid by a trio of American economists, including former Federal Reserve Chair Ben Bernanke. They were awarded this year's (2022) Nobel Economics Prize. The work of the trio has ramifications for the current economic crisis as well, as record-high interest rate increases to combat inflation are amplifying the risks of a recession that will unavoidably affect the banking sector.

Born Benjamin Shalom Bernanke on December 13, 1953, he was raised in South Carolina and is the son of a pharmacist and a teacher. An outstanding learner, Bernanke earned his undergraduate degree summa cum laude from Harvard University before earning his Ph.D. from MIT in 1979. He was an economics professor at Stanford University before moving on to Princeton University, where he chaired the department until 2002, when he decided to leave academia to serve in government. In 2005, he formally resigned from his position at Princeton.

From 2006 to 2014, Ben Bernanke presided over the board of governors of the United States Federal Reserve. On February 1, 2006, Bernanke succeeded Alan Greenspan as chairman of the Federal Reserve, ending Greenspan's 18-year tenure in that position. Before being proposed as Greenspan's replacement in late 2005, Bernanke, a former governor of the Federal Reserve, served as the

head of the United States President's Council of Economic Advisors.

President George W. Bush first suggested Bernanke for the position of Fed chair in 2005. He had joined President Bush's Council of Economic Advisors earlier that year, largely seen as a trial run for taking over as chairman after Alan Greenspan. He was put forward by President Barack Obama in 2009 for a second term as chair. In 2014, Janet Yellen took over as chair in his place. Bernanke was a member of the Federal Reserve's Board of Governors from 2002 to 2005 prior to his two terms as the Federal Reserve's chair.

In the wake of the 2008 banking crisis, which drove the economy into a tailspin, Ben Bernanke played a crucial role in reviving the American economy. To regain public trust in the banking sector, he adopted an aggressive and innovative strategy.

A low-rate strategy to stabilise the economy was one of the many tactics the Fed used to stop the worldwide crisis. The Fed cut the benchmark interest rates almost to zero under Bernanke's guidance. By lowering the federal funds rate, banks can lend money to one another more cheaply and, as a result, can charge lower interest rates on loans to individuals and companies.

Bernanke suggested a policy of quantitative easing when things became worse. To expand the amount of money in the economy, the quantitative easing programme entailed the unorthodox purchase of Treasury bond securities and mortgage-backed securities (MBS).

The Fed stimulated demand for these securities by making large-scale purchases of them, which raised their prices. Interest rates decreased in reaction to the increased prices since bond prices and interest rates are

negatively correlated. The financial situation of a business was improved because the cost of funding business investments was decreased by the lower interest rates. Businesses were able to increase operations and activities, which led to the creation of additional jobs and a decline in the unemployment rate.

The Federal Reserve and the Financial Crisis, a collection of Bernanke's lectures on the background of the Federal Reserve and the 2008 financial crisis, was published in 2013. It includes his observations on the Fed's actions, choices, and reactions to the world around it. He chronicled his time as the chairman of the Federal Reserve Board in *The Courage to Act: A Memoir of a Crisis and Its Aftermath*, which was published two years later. In it, he revealed how close the world economy came to imploding in 2008 and claimed that it would have done so had the Federal Reserve and other agencies not taken drastic action.

Additionally, according to President Barack Obama, Bernanke's actions kept the financial crisis from escalating as far as it might have. Bernanke, though, has also come under fire from some who believe he didn't do enough to predict the financial catastrophe.

Although Bernanke's actions played a crucial role in the global economy's recovery, his methods for achieving this recovery drew criticism. His injection of hundreds of billions of dollars into the economy through the bond-purchase programme, which would have raised personal and corporate debt and caused inflation, was criticised by economists. Along with these academics, lawmakers also disapproved of his aggressive actions and voted against his reappointment as the Federal Reserve Chair in 2010. However, he was reappointed by President Barack Obama for a further term.

As of August 2022, Ben Bernanke is a consultant on monetary and fiscal matters at the Brookings Institution, a non-profit public

organisation with headquarters in Washington, DC. He also works at Citadel as a senior advisor.

Ben Bernanke, the previous Federal Reserve chair for two terms, is generally credited with putting policies in place that saved the American economy. His strategies, despite being somewhat divisive, resulted in a growth in American jobs, the rescue of well-known, reputable financial organizations, and a strong economy. But there were plenty of those who thought his activities were more harmful than helpful, so he wasn't immune to criticism. Despite conflicting views, Bernanke is regarded as one of the most prominent Fed chairs in history and is still in great demand as an economist and advisor.

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Article by
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Web Browser

What is a Web Browser?

A web browser is a software application that is used to access the world wide web(www) or as known by everyone on the Internet. It is an interface between us and the information available on the web. This information might be pictures, audio, videos, or some other files that are shown on our screens through a web page. The web browser can be called a client program as it requests the webserver for the information demanded by the user. Some of the common browsers are Google, Mozilla Firefox, Safari, internet explorer, Netscape Navigator, etc.

How does a browser work?

The whole process of gathering information begins with the user when it enters the URL of the desired website in the address bar. The browser is a part of the client-server model where it plays the part of the client. It sends requested information to the web server through HTTP-hypertext transfer protocol. Once the request is received, the server gathers the related information it forwards it through web pages. When a URL is entered, supposedly artoftesting.com the web browser first requests the DNS (Domain name server) the IP address of the artoftesting.com. The DNS is a phonebook of the internet and therefore, it stores the system names and their corresponding IP addresses.

Element of a Web Browser

The web browser is made of 7 main components that work in sync to make the web browser function-able. These are-

1. User Interface

The user interface is the first page that you see when you open the web browser. This page has the address bar, forward/ backward button, menu, bookmarking option, and a few more options.

2. Browser Engine

The browser engine acts as an interface between the rendering engine and the UI of the browser. Based on the input, it manipulated the rendering engine to provide output.

3. Rendering engine

The rendering engine is responsible for producing requested content to the browser and displaying it on the screen. It parses the HTML documents and then converts them to readable form. All the browsers we know have their own rendering engines.

- The safari uses WebKit.
- Chrome and Opera use Blink (fork of WebKit).
- Internet explored use Trident.
- Firefox uses Gecko.

The WebKit is an open-source rendering engine and was made for

Linux. It has been modified the Apple to support mac and windows too.

4. Networking

The network layer is responsible for security and communication on the internet. It is also used for HTTP requests and to cache the documents retrieved in order to reduce network traffic.

5. UI Backend

It is for drawing basic boxes and windows/ widgets. This is for a generic interface and independent of any specific platform. Behind all this, it uses an Operating system for UI methods.

6. JavaScript Interpreter

As we all know the JavaScript is responsible for all the websites/webpages. All these pages are written in JavaScript language. Therefore, this interpreter translates these pages and these are sent to the rendering engine to display the final results.

7. Data persistence

Data persistence or storage is for saving the data locally, like cookies. The browsers support storage mechanisms like IndexedDB, WebSQL, File System, etc. to store databases locally on your computer. This way user data is handled like cache, bookmarks, cookies, etc.

Features of a Web Browser

Some of the features of the web browser include-

1. **Home button** – Clicking the ‘Home’ button brings the user directly back to the home page of the browser. We can set any webpage as the home page. Usually people prefer to have search engines like – Google.com as their home page.
2. **Address bar** – The address bar is where the URL of the desired website is entered. This bar helps us to navigate to the desired website of our choice.
3. **Refresh button** – The refresh button is to reload the page. In some cases, the page locally stores and saves the information. This prevents users from seeing the updated information. Therefore, the refresh button is helpful in such cases.
4. **Bookmarks** – This option is to save a particular website for reference later in the future. It is used to mark pages that might be important or prove to be useful in the future.
5. **Tabbed browsing** – This feature helps to open new screens on the same browser for multiple browsing at the same time.

Features of a web browser

Popular Web Browsers

Google Chrome

Google Chrome is the most popular and used web browser. There is a high chance you are using it yourself right now. The reason behind its popularity is its speed. It is one of

the fastest browsers – opens and loads quickly, the search results are retrieved within seconds. Another reason might be its simple and easy-to-use UI.

Safari

Although safari is specially created for apple users it can be used on PCs as well. However, its uniqueness can only be seen on Mac or Apple devices. It is a cross-compatible software and can integrate your data on multiple platforms. Another fascinating feature is iCloud keychain that lets you access your passwords saved on your apple device.

Mozilla Firefox

This one is another popular choice among users. Although people have always preferred this one as an option due to its speed. It takes much more time than chrome or safari.

Opera

The opera is also one of the commonly used browsers. It has its own range of add-on extensions that you might need to check out. It also can be synced among multiple devices. So do not miss out on this one.

Microsoft Edge

This one comes pre-installed on Windows 10 devices. This was developed to replace internet explorer and thus acts as a default browser. It is gaining popularity because of its new rendering feature, easy-to-use UI,

freestyle writing over webpage displays, and much more.

Kingpin – The reason this software is gaining popularity is because of its security feature. This browser always works in incognito mode, and thus no worries of browsing getting exposed. Fascinating, isn't it?

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Article by -

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Food Waste and Environment



Did you know food waste is closely linked to Globalization? Yes, food waste is the major contributor to Greenhouse gas in turn climate change. Many of us don't realize how much food we waste at some point in time. For instance, think about the days when we cook more than what we could eat or the milk that is left too long inside the refrigerator. All these are discarded on landfills which rot there for days to produce greenhouse gas. Throwing occasionally might sound like meager damage to the planet from one household. According to Food and Agricultural Organization, we waste about one-third of all produced food. To say roughly, if food waste was a country it would be the third-largest in the world.

Food waste means water waste! Yes, when you waste food, you're wasting millions of water too. Agriculture uses most of the world's freshwater. Those freshwater resources are diminishing quickly, just like the rise in demand for millions of hungry people and thirsty people globally. We use a large amount of water in every stage of producing food like irrigation, spraying, poring, or any other means. Also, water is much needed for feeding cattle, fishes, and poultry.

When food is discarded it goes to the landfills, there it rots to produce Methane- a Greenhouse gas that is 28times much potent than Carbon dioxide. If we divert food waste from landfills to an innovative food waste treatment system then we can stop almost 11% of Greenhouse gas emissions. About 67 million tons of food in India is wasted every year among which 70-75% of food waste rots in landfills. This puts an overstress on our land which has worked hard to produce food for us already. If we don't care for losses soon, the ability to yield over-time will degrade as well. So there are many innovative food waste treatment system in India which not only lessens the impact of food waste on our environment but provides you enough energy for cooking/ electricity.

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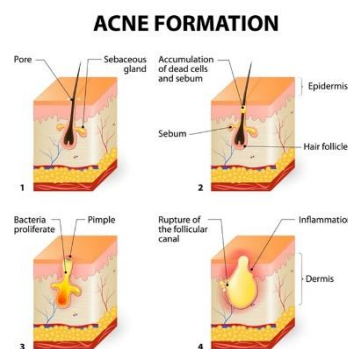
Article by -

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Propionibacterium

Propionibacterium is a gram-positive, anaerobic, rod-shaped genus of bacteria named for their unique metabolism: They are able to synthesize propionic acid by using unusual transcarboxylase enzymes. Its members are primarily facultative parasites and commensals of humans and other animals, living in and around the sweat glands, sebaceous glands, and other areas of the skin. They are virtually ubiquitous and do not cause problems for most people, but propionibacteria have been implicated in acne and other skin conditions. One study found the Propionibacterium was the most prevalent human skin-associated genus of microorganisms. Members of the genus Propionibacterium are widely used in the production of vitamin B12, tetrapyrrole compounds, and propionic acid, as well as in the probiotics and cheese industries. The strain Propionibacterium freudenreichii subsp. shermanii is used in cheesemaking to create CO₂ bubbles that become "eyes"—round holes in the cheese.



Pathology

Propionibacterium spp. are commensal bacteria that can occasionally cause infectious diseases. The most studied of these infections is acne vulgaris, caused by *Cutibacterium acnes* (formerly *Propionibacterium acnes*). It is a chronic inflammatory disease caused by the blockage of pilosebaceous units causing inflammatory lesions, non-inflammatory lesions or a mixture of both on the face, neck and/or chest. Acne vulgaris cannot be defined as an infectious disease since the bacteria is found on a vast majority of individuals without causing lesions. *C. acnes* colonize the skin only under certain favorable conditions. In most cases, *C. acnes* get trapped under the comedones where they proliferate to form micro-comedones, not visible to the naked eye, which can later form structures such as closed comedones (white heads) and open comedones. These comedones can rupture, releasing the follicular material inside the dermis. The cause of this rupture was thought to be the indirect effect of fat metabolism by the bacteria, however it was later found that bacteria are directly involved in comedome rupturing by producing factors such as proteases, hyaluronidases and neuraminidases which might be involved in thinning of the epithelium. *C. acnes* can also produce immune factors such as proinflammatory cytokine inducing-factors and chemotactic factors, and can induce host complement pathways.

References

World Health Organization

Article by:

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Study of light

Introduction

Light is basic to almost all life on Earth. Light is a form of electromagnetic radiation. Light represents energy transfer from the source to the observer. Many phenomena depend on the properties of light.

- Seeing a TV or computer monitor
- Blue sky, colors at sunset and sunrise
- Images in mirrors
- Eyeglasses and contacts
- Rainbows
- Many others

What is light?

- Light is a wave, like sound. A wave is a disturbance that occurs when energy travels.
- Light is unique in that it has both wave-like and particle-like properties, but we are going to focus on its wave-like properties in this unit.
- Light is a type of wave that carries energy through matter or space.
- A source of energy such as the Sun or a light bulb gives off light waves that spread out in all directions from the light source.

A light ray is a narrow beam of light that travels in a straight line.

Reflection of light

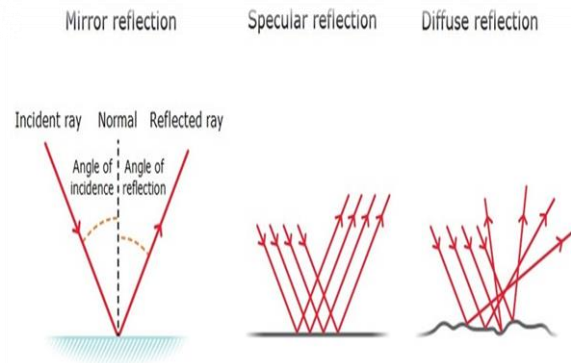
Reflection is when light bounces off an object. If the surface is smooth and shiny, like glass, water or polished metal, the light will reflect at the same angle as it hit the surface. This is called specular reflection.

Refraction of light

When a light ray is incident on the surface separating two media, the direction of the ray changes. This phenomenon is known as the Refraction of light.

What is Light Energy?

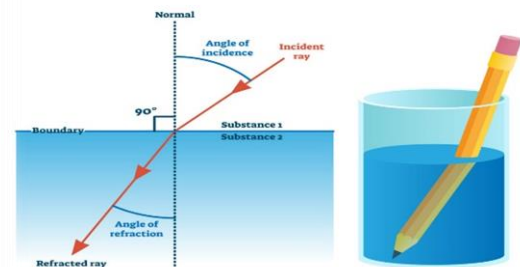
- The energy produced by vibrations of electrically charged particles is light energy.



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- The examples of light energy are: The energy that we use to cook food in a microwave oven is a form of light energy.
- Army men use radar to get the searchlight beam on the target. Radar systems that are used for ATC (air traffic control) use a form of light energy.

REFRACTION



The types of Light Energy

Following are types of Light Energy -

1. Visible Light –

They are the form of electromagnetic energy and can be seen only through naked eyes. Naturally, the Sun is the source of Visible light, whereas, flashlights, bulbs are some of the man-made sources.

2. Infrared Light –

They are a form of electromagnetic energy which produces heat. TV remotes, AC remotes are the most commonly used Infrared light.

3. X-rays and Ultraviolet Light –

They are lights with short wavelengths. Used by doctors to monitor the inside of a human body.

Uses of light energy

- It helps us to see things.
- It helps plants to make food and grow.
- It is used in power satellites and space stations.
- It is used in many electronic appliances.
- The energy of light from the sun can be harvested to solar panels and can be used for domestic use since it is eco-friendly and cost effective too.

Types of Light Sources

In reality, we have a lot of sources of light, but all of them can be categorized under two categories which are known as **natural sources** and **artificial sources**.

Natural Light Sources

In our universe, there are a lot of objects that emit light of their own. Some of the lights from these sources can reach the surface of the earth. The things which are present in nature and have the ability of emitting lights are given below.

The Sun is one of the major sources of light for our planet Earth. The Sun is considered as a massive ball of fire that produces massive energy by the nuclear fusion at its center. This energy from the Sun comes out in the form of light and heat. The major factor which is behind the sustainability of life on the planet Earth is the light from the Sun.

- Every star also produces light, but because of the huge distance between the Earth and these stars, only a small amount or sometimes no amount of it reaches the surface of the earth.
- The moon also provides light, but it doesn't produce light of its own. The light which we get from the moon is the light that is being reflected by the moon from the Sun.

- Certain natural phenomenon's also emit light, such as volcanic eruptions and lightning.
- There are some living organisms also who can produce light of their own. They are called bioluminescence. Some examples of these are jellyfish, fireflies, glow worms, etc.

2. Artificial Light Sources

Light can also be produced artificially apart from natural sources. The different lights which can be produced artificially come under three categories. Those categories include incandescent sources, luminescent sources and gas discharge sources.

Effects of light

- Light allows us to perceive our surroundings using our eyes.
- Light is not only used for sight but also has an influence on endogenous messenger substances and sets the "body clock".
- If the irradiance exceeds certain levels, light can also be harmful – especially to the eyes.
- Excess luminous intensity overwhelms the eye's ability to adapt, and the person is dazzled.
- The dazzling of vehicle drivers or pilots by light sources such as powerful laser pointers is very dangerous and can result in the loss of human life.

Article by:

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Tiny Phytoplankton: The Most Powerful Organisms of the Oceans

Do you imagine a shark when you think of the sea's most powerful life forms? Or perhaps a huge killer whale? Sailfish, another ocean powerhouse, glides like torpedoes and utilizes its jaws like a spear to catch its victim. It is after all the fish that moves the fastest. These organisms are all incredible; they are powerful, quick, and fierce. The oceans, however, could not function without another set of organisms, but they are so tiny you have probably never seen them. The minuscule plankton are shown. small animals found in freshwater or the ocean. They simply float along with the sea, which is why they are called plankton. The tiniest plankton can only be seen under a microscope, and even then, you'll see a wide variety of various species of plankton, some of which may appear as teeny-tiny specks (Figure 1). What endows these tiny critters with such power? Why do we care about something that is not visible to the naked eye? They can't swim very well. They don't have any teeth at all, or even teeth that are powerful. They are important since they are the source of food for all marine life (Figure 2). There wouldn't be any fish, whales, sharks, turtles, clams, or oysters without plankton.

Phytoplankton Are the Most Powerful Type of Plankton

Plankton is available in a variety of varieties. Phytoplankton Plankton that resembles plants and engages in photosynthesis, changing sunlight and water's CO₂ into oxygen and the energy necessary for growth. are the tiny, plant-like organisms known as microalgae or

algae, respectively. Because they can grow through the process of photosynthesis and use sunlight as energy, phytoplankton are the most potent ocean organisms among all plankton. the method through which green plants and algae with plant-like characteristics create their own food using sunlight, carbon dioxide, and water. Then, other marine species feed on phytoplankton. In addition to the phytoplankton produce food for the oceans, but they also produce roughly half of the oxygen in the entire world! They use the carbon dioxide in the water to create oxygen through photosynthesis, which is essential for breathing for most living things, including humans. So the next time you eat seafood or take a breath, thank the phytoplankton !

Zooplankton Plankton organisms that resembled animals and consume other plankton species, such as phytoplankton, bacterioplankton, or mixoplankton. are the tiny, closely resemble plankton. Just picture zoo animals to help you remember their names! Phytoplankton is consumed by zooplankton (and some other types of plankton too). They play a crucial role in the ocean's food cycle . Small fish consume zooplankton. One organism consumes another, which in turn consumes another, and so on. However, because there are so many different kinds of organisms and food items, the chain actually resembles a spiderweb. because there are so many different types of organisms and foods. While forming significant links in the food chain, zooplankton does not

produce oxygen in the same way that phytoplankton does since they do not possess the photosynthesis magic.

Phytoplankton: Tiny But Mighty!

Microorganisms named phytoplankton have enormous strength! The entire ocean environment depends on them for energy, yet they also have the potential to cause pain or death. Think about how powerful phytoplankton is when you see a picture of a shark, a whale, or a large fish in the future. Take a moment to appreciate the oxygen produced by the phytoplankton by taking a deep breath. And the following time you see a beach sign cautioning you against swimming or eating fish due to hazardous or harmful algae, ignore it. Respect the strength of the phytoplankton and mixoplankton, and be aware that harmful microalgae can also be found. Sadly, because we use plant nutrients on crops that run off into lakes, rivers, and oceans, we are polluting our lakes and oceans with the nutrients that help these blooms grow. As a result, there are now significantly more harmful and toxic phytoplankton and mixoplankton growing than there were previously. Because many toxic blooms thrive in warm waters, climate change is making the situation worse. So that the beneficial phytoplankton and mixoplankton may continue to flourish, feed fish, and provide humans with oxygen, let's all do our share to prevent water pollution and halt climate change. We can all contribute to control the evil plankton by becoming responsible global

citizens and lowering pollution! and in lakes.

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