



# THE SCIENCE OBSERVER

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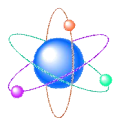
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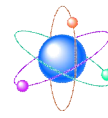
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## The Science Observer

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## FRUIT RIPENING HORMONE – ETHYLENE

K. Krishna Surendar

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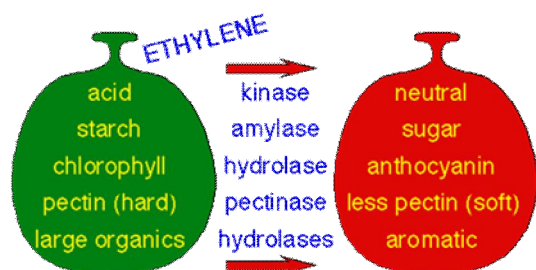
### Nature of Ethylene

Ethylene, unlike the rest of the plant hormone compounds is a gaseous hormone. Like abscisic acid, it is the only member of its class. Of all the known plant growth substance, ethylene has the simplest structure. It is produced in all higher plants and is usually associated with fruit ripening and the tripple response. (Arteca, 1996; Salisbury and Ross, 1992). Global ethylene production was 138 million tonnes in 2010 and 141 million tonnes in 2011 (Warren, 2012).

### Physiological changes during fruit ripening:

Fruit ripening refers to the changes in fruit that make it ready to eat. It includes softening due to enzymatic action like:

- Break down of cell walls
- Starch hydrolysis
- Increase sugar accumulation
- Disappearance of organic acids
- Increase phenolic compounds like tannins
- Increase fruit visibility by increasing anthocyanin and carotenoids accumulation.



### Functions of Ethylen

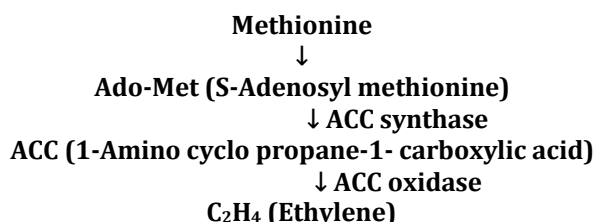
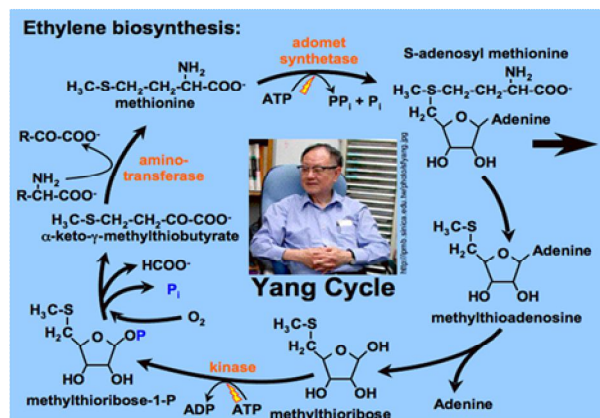
**Ethylene is known to affect the following plant processes:**

- Stimulates the release of dormancy.
  - Stimulates shoot and root growth and differentiation (triple response)
  - May have a role in adventitious root formation.
  - Stimulates leaf and fruit abscission.
  - Stimulates Bromiliad flower induction.
  - Induction of femaleness in dioecious flowers.
  - Stimulates flower opening.
  - Stimulates flower and leaf senescence.
- Stimulates fruit ripening.

### Biosynthetic pathway of ethylene:

Ethylene is synthesized from methionine. Methionine is a precursor for ethylene biosynthesis. Methionine is further converted in to S-Adenosyl methionine then in to ACC with the help of ACC synthase enzyme. ACC synthase enzyme is called as cytosolic enzyme. Then ACC is converted in to Ethylene with the help of ACC

oxidase enzyme. Here ACC oxidase enzyme is otherwise known as ethylene forming enzyme.



### Inhibitors of ethylene action:

- AVG (Aminoethoxy vinyl glycine)
- AOA (Aminooxi acetic acid)
- CO<sub>2</sub><sup>+</sup> (Cobalt)
- AgNO<sub>3</sub> (Silver Nitrate)
- Ag (S<sub>2</sub>O<sub>3</sub>)<sub>2</sub><sup>3-</sup> (Silver thiosulphate)
- CO<sub>2</sub>
- Cyclohexamide

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LET THE MOTHER AND HER CUBS BE ONE HAPPY FAMILY. DON'T MAKE THE CUBS LOSE THEIR MOTHER.

SAVE OUR TIGERS



HELP MAINTAIN THE ECOLOGY

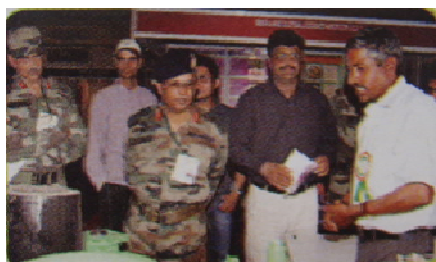
STOP THE KILLING!

## BIO-WASTE GASIFIER PROFICIENT THAN GRID POWER

**Raaz K Maheshwari and Manish Kumar**

Department of Chemistry, SBRM Govt PG College, Nagaur, Rajasthan

Any ingenious innovations in agriculture don't require an IITian's intellect, but are by self-effacing, poor peasants across the country. From Kashmir to Kanayakumari, several hundreds of these innovators endowed with their curiosity, traditional knowledge and skill have made farming easier for themselves and their ilk. Mr Ra S Singh in Rajasthan never stepped into a school, but didn't stop him from receiving an award from the local DC for building a unique biomass gasifier for operating modified diesel engines. The biomass-based gasifier unit processes about 20kg of bio-waste to run an engine of 30HP for an hour. The gasifier is conical in shape, compact in design and surrounded by a water jacket with the capability to handle multiple fuel sources. Fuel wood or agricultural residues are fed into it. An air inlet is provided at the bottom. The system comprises two stages, one for removing ash, and other, for charred residue and tar. The primary filter unit comprises a series of rows of filtration units. Perforation becomes progressively smaller from the first to the third filtration unit. The filter can be easily cleaned and is surrounded by a water jacket. The secondary filter has layers of different sizes of sieves ranging from 2 inches to a fine size with the cleaning gate at the bottom. In detailing its operation, the bio-waste must be deposited from the top. This acts as a furnace and heats up to 200°C to generate gas. The gasifier is monitored and fed continuously first for about 30 minutes. An aspirator is turned on for sucking producer gas until the flame appears. Next, the air supply from the bottom is cut off. The produced gas is made to pass through the first cyclone where water-cooling is done; the gas is cooled and partial cleaning is also achieved. The gas then passes through the second cyclone, which removes carbon and ash based residues, and enters the filtration unit consisting of sieve grills and cloth. This cleans up the gas completely. After cleaning, the gas is fed into mixer unit, which mixes the gas with air in the right (fuel-air ratio), set for the engine and power rating. There is calibration mark for optimal ratio set by the innovator, but the user can override that and choose his/her settings. Alternatively, the nature of the knocking sound, which changes at optimal ratio, can also be used as a cue for optimal mixing ratio. The fuel mixer then feeds the air-fuel mixer into the modified engine running on this fuel. The furnace in the gasifier can be built to different capacities as per availability of biomass and agricultural residue. Considering the cost of machine, fuel biomass and local labor, this arrangement is estimated to cost less than half the cost per unit of power when compared to normal electricity. It can be used to operate pump sets in remote fields, pump up water in homes, operate basic machines such as saw mills, flour mills and generate electricity by charging an alternator. Dhैया claims that the fuel consumption to be almost 30-40% less than other available designs.



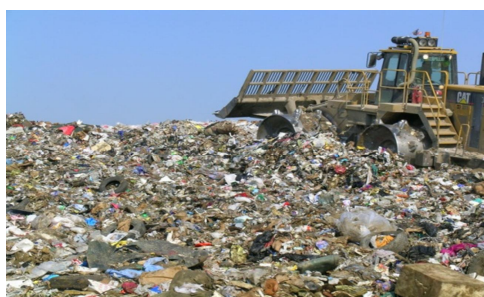


## GET A HOLD OF NOVEL STRATEGIES TO MANAGE GARBAGE

**Raaz K Maheshwari**

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Now a days, garbage or solid waste is in technical lingo. Yes, the smelly stuff we choose to keep out of sight, and hence out of mind, is a reality that needs urgent attention. The issues of dumping grounds filled close to their capacity and protects over incinerating garbage are not unique in India. Neither are the recent revelations of overcharging for transportation of waste to dumping grounds and massive tipping fees. (Waste treatment facilities and dumping grounds charge garbage haulers a tipping fee or gate fee per ton or load of waste.) About 5,000 years ago, the world's first recoded landfill was built in Knossos, Greece. Huge quantities of waste were buried in large pits, with soli layered through-out. Landfills have since remained a popular idea, not because of their usefulness but because of the dearth of disposal options – what exactly can one do with garbage?



The new-age ideas for garbage disposal began with trials and errors. Between 1885 and 1908, the US sought to tackle the problem via incineration, aptly known as “destructors” at that time, by building close to 200 incinerators. In 1905, New York City even used the incinerator to generate electricity to light the Williamsburg Bridge. But by 1909, as many as 102 of 180 incinerators were made defunct or dismantled because they had either been inadequately built or had out-lived their purpose; apparently the vast tracts of free land in the country meant that its government didn't place the same premium on land that we do today. Thus, dumping garbage was the cheaper option. Reclaiming (a fancy word for filling) wetlands near cities with garbage also because a preferred disposal method. The great American economic boom brought about an all-time consumer high, so much so that all-time consumer high, so much that the chairperson of President Eisenhower's Council of Economic Advisors declared that the US economy's “ultimate purpose”. With it came more garbage. As use of paper, plastic, Sn (tin) and Al (aluminum) as packaging material came into vogue around the first 3 decades of the 20<sup>th</sup> century; the choice started tilting in favor of other waste management options like recycling and composting. The year 1976 saw the US pass the RCRA (Resource Conservation and Recovery Act) that required all dumps to be replaced with sanitary landfills. This considerably upped the costs of waste disposal, making state government look towards resource conservation and material recovery. Fast forward to today, several countries recognized the worth of recycling – not necessarily for environmental good but as a necessity because landfill space is at a premium, and it actually costs citizens much more to throw away trash than not generate it in the first place. In certain areas of the EU, North America and Asia, citizens are charged a fee depending on the amount of trash they leave out of

garbage truck, with systems becoming sophisticated enough to penalize “wrongdoers”; all residential garbage is tracked using radiofrequency identification tags. These efforts have help reduce residential wastes from 10% to 40%.



Clearly, people have to be urged to generate less waste and recycle. The feel good factor (as we Indian can testify) isn't enough. But what happens when too much is being recycled? Prices in the recycling commodity markets (yes, they exist) worldwide fell between 2009 and 2012. Prices for recycled resins dipped due to the downward movement of fuel prices. Volumes and prices for old corrugated containers in the US' recycling commodity markets are closely tied to China's economy; the slower the economy; the lower the demand and the larger the fall in prices. It's estimated that the downward trend in volumes and prices for recovered newspaper will grow, thanks to the popularity of tablet computers, newspaper apps and e-billing. The recycling value chain is closely linked with the global economy. Even local recycling markets are governed by the law of supply and demand, though they mayn't be hit as badly. At times when recycling facilities are forced to cut back ob curbside recycling, people tend to go back to doing what they were doing previously – sending recyclable stuff top the landfill. All this doesn't mean recycling is bad or land filling (not indiscriminate dumping; the two are different) is the last resort. Government need to think up novel ways to help (mostly coerce) citizen to manage their waste responsibly. This needs a strong will backed with sound knowledge and vision.



## SPRINGTAILS AND HUMANS

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**Springtails (Collembola)** form the largest of the three lineages of modern hexapods that are no longer considered insects (the other two are the Protura and Diplura). Although the three orders are sometimes grouped together in a class called Entognatha because they have internal mouthparts, they do not appear to be any more closely related to one another than they all are to insects, which have external mouthparts.

Some DNA sequence studies suggest that Collembola represent a separate evolutionary line from the other Hexapoda, but others disagree; this seems to be caused by widely divergent patterns of molecular evolution among the arthropods. The adjustments of traditional taxonomic rank for springtails reflects the occasional incompatibility of traditional groupings with modern cladistics: when they were included with the insects, they were ranked as an order; as part of the Entognatha, they are ranked as a subclass. If they are considered a basal lineage of Hexapoda, they are elevated to full class status.

Springtails are well known as pests of some agricultural crops. *Sminthurus viridis*, the 'lucerne flea', has been shown to cause severe damage to agricultural crops,[28] and is considered as a pest in Australia. Also Onychiuridae are known to feed on tubers and to damage them to some extent. However, by their capacity to carry spores of mycorrhizal fungi and mycorrhiza-helper bacteria on their tegument, soil springtails play a positive role in the establishment of plant-fungal symbioses and thus are beneficial to agriculture. They also contribute to controlling plant fungal diseases through their active consumption of mycelia and spores of damping-off and pathogenic fungi. It has been suggested that they could be reared to be used for the control of pathogenic fungi in greenhouses and other indoor cultures.

Various sources and publications have suggested that some springtails may parasitize humans, but this is entirely inconsistent with their biology, and no such phenomenon has ever been scientifically confirmed, though it has been documented that the scales or hairs from collembolans can cause irritation when rubbed onto the skin. They may sometimes be abundant indoors in damp places such as bathrooms and basements, and incidentally found on one's person.

More often, claims of persistent human skin infection by springtails may indicate a neurological problem, such as Morgellons Syndrome, or delusory parasitosis, a psychological rather than entomological problem. Researchers themselves may be subject to psychological phenomena. For example, a publication in 2004 claiming that springtails had been found in skin samples was later determined to be a case of pareidolia; that is, no springtail specimens were actually recovered, but the researchers had digitally enhanced photos of sample debris to create images resembling small arthropod heads, which then were claimed to be springtail remnants. However, Hopkin reports one instance of an entomologist aspirating an *Isotoma* species and in the process accidentally inhaling some of their eggs, which hatched in his nasal cavity and made him quite ill until they were flushed out.

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[www.google.com](http://www.google.com)

[www.beppls.com](http://www.beppls.com)



[Courtesy: Wikipedia]

## Ayurveda Facts

### Ayurvedic Remedies for Diabetes Cure

1. The bitter melon is regarded as the best remedy for diabetes. Drinking at least one tablespoon of bitter melon juice daily will reduce blood sugar levels in your blood and urine.
2. Having bitter melon cooked in ghee for a period of three months will bring the diabetes down by a significant amount.
3. A tablespoon of Indian gooseberry juice mixed with a cup of fresh bitter-melon juice, taken daily for two months will enable the pancreas to secrete insulin.
4. Drinking a glass of water with 10 tulsi leaves, 10 neem leaves and 10 belpatras early morning on an empty stomach helps in keeping sugar levels under control.
5. Mix and grind seeds of Fenugreek (100 gm), turmeric (50gm), white pepper. Take one teaspoon of this powder with a glass of milk twice daily.
6. Put one cup of water into a copper vessel at night, and drink the water in the morning.

## THE UNEQUALED PERSONA OF SPIRULINA

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Blue green algae, commonly known as spirulina is a group of organisms found in the ocean and sometimes in fresh water lakes. They are among the most nutritious plant-like organisms known to humans, so if malnutrition is anywhere on the radar, then think "spirulina" because the concentration of micronutrients in this power packed "magic food" is unsurpassed. Spirulina has the highest concentration of digestible vegetable protein with a perfectly balanced combination of essential amino acids. One of the most common vitamin deficiencies found in a vegan or vegetarian diet, namely that of B-12, can be quite easily be fixed with spirulina. This naturally occurring wonder food (which can also be cultivated) is rich enough in protein (65 to 70 percent complete protein) apparently to make even beef cringe, and is remarkably well endowed with beta carotene, iron and trace minerals, and the rare yet essential fatty acid GLA. The immune boosting qualities of spirulina can never be over stated what with its unique ability to fight infection, enhance cellular functioning, and even keep cancer at bay. The dark green color of spirulina is a measure of how rich it is in chlorophyll, which in turn is a great detox agent, helping the body steer clear of atmospheric and other pollutants. It penetrates as far into the body as the DNA and gives it a cellular "tune up" or regeneration, thereby vastly improving cellular communication and well being. There is enough scientific research and evidence to validate the immune boosting qualities of spirulina and consumers reporting increased energy levels bears testimony to this fact.

The list of diseases and conditions known that could succumb to spirulina treatment is pretty long, of which fighting viral infections, increasing mental sharpness, and enhancing the body's ability to generate new blood cells are but a few. However, blue-green algae products must be free of toxic chemicals and liver-damaging substances, so it is wise to look into where the product is coming from. Contaminated blue-green algae is incredibly toxic to the system and can cause a range of fresh health problems such as stomach pain, nausea, vomiting and shock. Due to the little known benefits of spirulina consumption during pregnancy and lactation it best avoided during this time. As well, it is important to check the recommended daily dosage, which could vary from 1 to 8 grams depending on various factors such as body constitution and quality of product, before taking spirulina as a dietary supplement on a daily basis. While spirulina is not a cure all or a replacement for other types of therapy, it certainly bears all the markings of dietary genius with healing properties, and seems well worth investigating into, especially since it promises relief from chronic fatigue, depression, obesity, and maybe even memory loss.

### CHEMICAL COMPOSITION

Since 1970, Spirulina has been analyzed chemically. It has been shown to be an excellent source of proteins, vitamins and minerals.

#### Proteins

Spirulina has a high protein concentration (60%-70% of its dry weight). Spirulina is useful in human nutrition, due to the high quality and quantity of its protein. The nutritive value of a protein is related to the quality of amino acids, digestibility coefficient, as well as by its biological value. Spirulina contains essential amino acids; the highest values are leucine (10.9% of total amino acids), valine (7.5%), and

isoleucine (6.8%). Denaturation of Spirulina protein is observed when algae are heated above 67 °C, at neutral aqueous solution. Hydrophobic regions interaction during heating and hydrogen bonds formation during cooling are aggregation and gelation factors of Spirulina protein.

#### Vitamins

Among food, Spirulina has a relative high provitamin A concentration. An excessive dose of b-carotene may be toxic, but when the b-carotene is ingested from the Spirulina or another vegetable it is usually harmless since the human organism only converts into vitamin A the quantity it needs. Spirulina is a very rich source in vitamin B12, and that is a reason why these Cyanobacteria are of great value for people needing supplements in the treatment of pernicious anemia.

#### Lipids

Spirulina contains 4-7% lipids. Spirulina has essential fatty acids: linoleic acid (LA) and g-linolenic acid (GLA). The latter is claimed to have medicinal properties and is required for arachidonic acid and prostaglandin synthesis. GLA lowers low-density lipoprotein, being 170-fold more effective than LA.

#### Minerals

Iron in some nutritional complements is not appropriately absorbed. Iron in Spirulina is 60% better absorbed than ferrous sulfate and other complements. Consequently, it could represent an adequate source of iron in anemic pregnant women.

#### Carbohydrates

Spirulina platensis contains about 13.6% carbohydrates; some of these are glucose, rhamnose, mannose, xylose and galactose. Spirulina does not have cellulose in its cell wall, a feature that makes it an appropriate and important foodstuff for people with problems of poor intestinal absorption, and geriatric patients. A new high molecular weight polysaccharide, with immunostimulatory activity has been isolated from Spirulina and is called "Immulina". This highly water-soluble polysaccharide represents between 0.5% and 2.0% (w/w) of the dry microalgae.

#### Nucleic acids content

One of the main concerns about the consumption of microorganisms is their high content of nucleic acids that may cause disease such as gout. Spirulina contains 2.2%-3.5% of RNA and 0.6 %-1% of DNA, which represents less than 5% of these acids, based on dry weight. These values are smaller than those of other microalgae like Chlorella and Scenedesmus.

#### Pigments

Some natural pigments are found in Spirulina. These pigments are responsible for the characteristic colors of certain flamingo species that consume these Cyanobacteria in the African Valley. This knowledge has promoted the use of this microorganism as source of pigmentation for fish, eggs and chicken. Spirulina also increases the yellowness and redness of broiled chicken due to accumulation of zeaxanthin.

TEM (Transmission Electron Microscope) observations show for Spirulina prokaryotic organization, capsule, pluristratified cell wall, photosynthetic or thylakoid lamella system, ribosomes and fibrils of DNA region and numerous inclusions. The capsule has fibrillar structure and covers each filament protecting it. The irregular presence of capsule around the filaments in *S. platensis* is a differentiating mor-



phological characteristic to compare with *S. maxima*. Trichome width varies from 6 to 12  $\mu\text{m}$ , and is composed of cylindrical cells. The helix diameter varies from 30 to 70  $\mu\text{m}$ ; the trichome length is about 500  $\mu\text{m}$ , although in some cases when stirring of culture is deficient the length of filament reaches approximately 1 mm. It is very important to explain that the helical shape of Spirulina in liquid culture is changed to spiral shape in solid media. These changes are due to hy-



dratation or dehydration of oligopeptides in the peptidoglycan layer.

Spirulina cell wall is formed by four numbered layers, from the inner most outward as: LI, LII, LIII and LIV. All these layers are very weak, except layer LII made up of peptidoglycan, substance that gives the wall its rigidity. The LI layer contains  $\beta$ -1, 2-glucan, a polysaccharide not very digestible by human beings. However, the low concentration (<1%) of this layer, thickness its (12 nm), and the protein and lipopolysaccharide nature of the LII layer are favorite reasons for the easy human digestion of Spirulina. In this microorganism chlorophyll a, carotenes and phycobilisomes, which contain phycocyanin (blue pigment), are located in the thylakoid system or photosynthetic lamellas. The inter-thylakoid space is limited by the presence of electronically transparent protein gas vesicles, with the cylindrical form that give Spirulina its floating capacity. Ribosomes and fibrils of DNA region are generally of central localization. Spirulina contains numerous characteristic peripheral inclusions associated to thylakoids. Those are: cyanophycin granules, polyhedral bodies, polyglucan granules, lipid granules, and polyphosphate granules. The cyanophycin granules, or reserve granules, are important due to their chemical nature and a series of pigments. The polyhedral bodies or carboxysomes mainly contain the enzyme ribulose 1, 5-diphosphate carboxylase that allows the fixation of  $\text{CO}_2$  in photosynthetic organisms and probably carry out a reserve function. The polyglucan granules or glycogen granules or  $\alpha$ -granules are glucose polymers, small, circular and widely diffused in the interthylacoidal space. The lipid granules,  $\beta$ -granules or osmophile granules form the reservation deposit, constituted by poly- $\beta$ -hydroxybutyrate (PHB), found only in prokaryotes. PHB acts as a carbon and energy reserve. As spirulina is a natural source of food packed with essential nutrients like no other, spirulina is literally teaming with potential health benefits. Studies show that spirulina increases phagocytic activity of macrophages and stimulate antibodies and cytokines production. Spirulina may also facilitate lipid and carbohydrate metabolism. Studies demonstrate healthy benefits against several types of virus, toxicity and cancers. Spirulina is also thought to increase digestion and absorption of nutrients, prevent fatigue, support weight loss, prevent malnutri-

tion and undernourishment, improve recovery after strenuous training, rejuvenate cells and reduce the effects of ageing. All these health benefits and many more are attributed to a near perfect combination of nutrients and antioxidants of extremely high bioavailability in spirulina. Health against hunger Almost 30 years ago founder of Florida whole-food nutrition company Re-Vita realized that spirulina is the perfect food to fight hunger. Bob Weatherly wanted to develop a nutrient dense natural food that would have profound health benefits, help prevent hunger and feed children suffering from malnutrition. The result came in 1986, a molecular nutrition whole-food product enriched with liquefied spirulina called Liqa Health. Re-Vita has since donated over 46 million servings to hungry and malnourished children all over the world.

**Immunity and spirulina** In a 2002 Japanese study, 12 adult males were administered an oral hot water extract of spirulina, and the number and activity of their natural killer (NK) cells was measured before and after treatment. (NK cells destroy tumour cells by binding to them and delivering lethal chemicals that kill on contact.) At the study's end, there was a significant increase in the production and cancer-killing ability of these subjects' NK cells. When their NK cells were exposed to a bacterial product after treatment, production of interleukin-12 (IL-12), a measure of immune strength, was significantly increased in comparison to IL-12 production in NK cells without pre-exposure to spirulina. The authors concluded that spirulina acts directly and indirectly on NK cells in humans. This study suggests that the immune-enhancing effects of spirulina are persistent, as heightened immunity continued to be seen up to five weeks after the subjects stopped receiving spirulina.

#### HEALTH BENEFITS OF SPIRULINA

*Spirulina lowers cholesterol, suppresses fatty accumulation in the liver, prevents tumor formation, enhances the immune system, and protects kidneys."*

*Spirulina activates many of the different immune cells,*



*including macrophages, T-cells, B-cells, and natural killer cells. It also activates the organs involved with immune function such as the spleen, liver, bone marrow, lymph nodes, tonsils, and thymus gland.*

Encouraging weight loss; Counteracting toxins in the body; Helping purify the liver; Increasing mental alertness; Lowering blood cholesterol and excess triglycerides; Helping fight viral infections; Treating radiation sickness; Enhancing ability to generate new blood cells; Improving blood sugar problems; Strengthening the nervous system; Strengthening the immune system; Removing toxic metals such as lead and mercury from the body; Improving healing of wounds

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## TODAY'S MEDICINAL PLANT

### *Tinospora cordifolia: An Update*

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**Botanical Name(s):** Tinospora Cordifolia

**Family Name:** Menispermaceae

**Class:** Magnoliopsida

**Order:** Ranunculales

**Family:** Menispermaceae

**Genus:** Tinospora

**Species:** T. cordifolia

**Popular Name(s):** Gulanshe Tinospara, Gulancha Tinospara, Tinospara, Giloy

**Parts Used:** Stem.

**Habitat:** North and South India

A large, glabrous deciduous climbing shrub. The stems are rather succulent with long filiform fleshy aerial roots form the branches. The bark is gray brown and watery. The leaves are membranous and cordate. The flowers small and greenish yellow. This herb is found throughout tropical asia ascending to a height of 300 mts.

**Plant Chemicals (+)-** diterpene, tinosporone, tinosporic acid, cordifolisides A to E, syringen, berberine, giloin, gilenin, crude giloininand, arabinogalactan polysaccharide, picrotene, bergenin, gilosterol, tinosporol, tinosporidine, sitosterol, cordifol, heptacosanol, octacosonal, tinosporide, columbin, chasmanthin, palmarin, palmatosides C and F, amritosides, cordioside, tinosponone, berberine, ecdysterone, makisterone A,

#### **Health Benefits and curative properties:**

1. The plant oil is effective in reducing pain and edema and in gout and skin diseases.
2. The herb accords longevity, enhances memory, improves health, and bestows youth, betters complexion, voice, energy and luster of the skin.
3. It is helpful in treating digestive ailments such as hyperacidity, colitis, worm infestations, loss of appetite, abdominal pain, excessive thirst, and vomiting and even liver disorders like hepatitis.
4. Fresh juice of guduchi, when mixed with rock candy, speeds up the recovery in hepatitis patients.
5. It helps in remedying ailments like raktapitta, anemia, cardiac debility, diabetes, sexual debility and splenic disorders.
6. The starch of the plant serves as a household remedy for chronic fever, relieves burning sensation and increases energy and appetite.
7. The decoction of guduchi, mixed with nimba and vasa, eases the itching and oozing.
8. t benefits general weakness, dyspepsia, impotency, dysentery, secondary syphilis, tuberculosis, jaundice, constipation, leprosy, general debility, cutaneous rashes and condylomata.
9. Guduchi helps in getting rid of renal calculi and reduces blood urea level.
10. The decoction of guduchi and sunthi is a good combination for treating gout and rheumatic disorders.
11. Guduchi juice, when taken with cow's milk or lodhra, is effective in combating leucorrhea.
12. The juice is mixed with cumin seeds and consumed to reduce the burning sensation caused due to pitta.
13. The root of guduchi is a strong emetic and used for bowel obstruction



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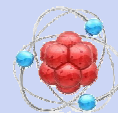
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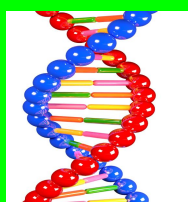
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