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GULMOHAR

Volume 5 | Edition 2

GULMOHAR NEWSLETTER

December 2022 |

Verdure Facts

- The word pineapple comes from European explorers who thought the fruit combined the look of a pinecone with flesh like that of an apple!
- The first certified botanical garden was founded by Pope Nicholas III in the Vatican City in 1278 AD!

Welcome dear readers, students and educators alike; we are pleased to bring to you a new edition of the Gulmohar Newsletter with exciting articles on various captivating topics as well as a colourful photo gallery at the end of this issue. We have come back with a new team of enthusiastic students and hope to keep putting out more editions of the fascinating newsletter this year.

We hope you find this edition engrossing and continue to look forward to our upcoming issues. Happy reading!!

Chaitrali Deshpande, Editor

https://www.facebook.com/profile.php?id=100063888732304&mibextid=ZbWKwL

https://instagram.com/gulmohar_botany_newsletter?igshid=YmMyMTA2M2Y=

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"Great works are performed not by strength, but by perseverance."
-Samuel Jackson

STRATEGY PLANTATION

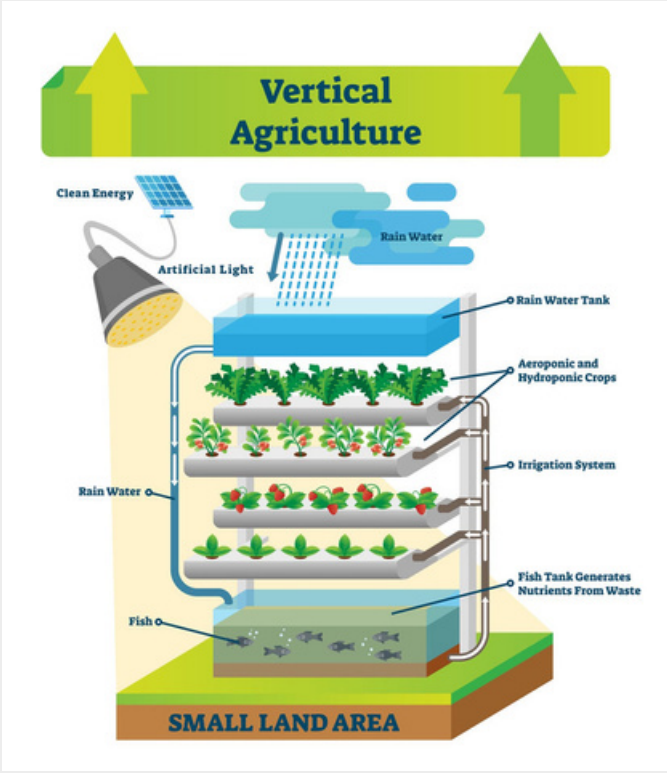
In a country like India, which is the 7th largest in the world, covering around 3.287 million square kilometres of area, the availability of land for agriculture is limited due to the enormous population of around 1.4 billion people.

But unfortunately only a small proportion of the total land of India is considered as suitable for agricultural use, which is sometimes unable to satisfy the demand of food for such a large population.

In order to overcome this problem and to produce high yield from limited area of agricultural land, Government of India has came up with various plantation strategies such as Vertical farming and Lakhi baug yojana.

India is evolving every day with something new. Also, industrialization is increasing dramatically due to which many arable lands are at greater risk. Vertical farming in India is the answer to all these problems.

Vertical agriculture is an innovative way of maintaining our agricultural practices. In India, vertical farming is mostly polyhouse-based farming. Poly-house farming is a protected way that gives higher productivity and yield of vegetables and fruits across India



AUTHOR:-Sanket Khambe
REFERENCE: https://www.researchgate.net/publication/330579925_coconut_cropping

STRATEGY PLANTATION

Vertical farms have been proposed as an alternative to pesticide and fertiliser dependent farming, and technological advances have decreased the cost of production and made the concept commercially feasible. It's estimated that there are already more than 2,000 vertical farms in the US. These farms can occupy spaces such as buildings or shipping containers, where they produce greater yields than traditional outdoor farming, and use 70 to 95% less water. A study conducted by the Indian Agricultural Research Institute (IARI) found that water and fertilizer savings of around 25% and 30% respectively were reported for various fruit crops in Delhi region through the drip fertigation system

Another way of cultivating crops in an limited area of land is by Lakhi baug, which was introduced by Dr. Balasaheb Sawant.

It is systematic plantation of spices crops in coconut orchard for maximizing returns per unit area.
The University technology assessment revealed that the per hectare input utilization and corresponding cost for maintaining lakhi baug directly varied with the total plant population in the orchard.

Lakhi baug is a concept of mixed cropping of spice crops such as cinnamon, nutmeg and black pepper as well as fruit crops such as banana and pineapple along with the coconut plantation. From one acre of such planting system, coconut growers can earn profit of more than Rs 100,000 due to increased nut yeild.
This technique helps to produce high yield eventually contributing in food supply.

AUTHOR:-Sanket Khambe
REFERENCE: https://www.researchgate.net/publication/330579925_coconut_cropping

VEGETATIVE PROPAGATION BY PLANTS: LAYERING

Layering is an attached method of propagation. Natural layering typically occurs when a branch touches the ground, whereupon it produces adventitious roots. At a later stage the connection with the parent plant is severed and a new plant is produced as a result. Roots form in that part of the plant can be cut from the parent plant and can be grown anywhere. Such root stem is known as "layer". Examples Strawberry, Raspberry, Lemon, Guava, Hibiscus (China Rose), etc

Layering has evolved as a common means of vegetative propagation of numerous species in natural environments. Layering is also utilized by horticulturists to propagate desirable plants.

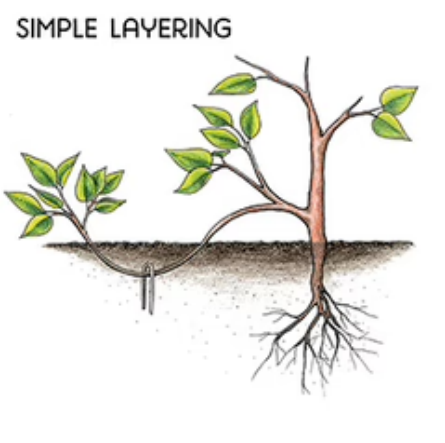
The horticultural layering process typically involves wounding the target region to expose the inner stem and optionally applying rooting compounds. In ground layering, the stem is bent down and the target region buried in the soil. This is done in plant nurseries in imitation of natural layering by many plants such as brambles which bow over and touch the tip on the ground, at which point it grows roots and, when separated, can continue as a separate plant. In either case, the rooting process may take from several weeks to a year.

Layering is more complicated than taking cuttings, but has the advantage that the propagated portion can continue to receive water and nutrients from the parent plant while it is forming roots. This is important for plants that form roots slowly, or for propagating large pieces.

Types of Layering:

1. **Simple layering**

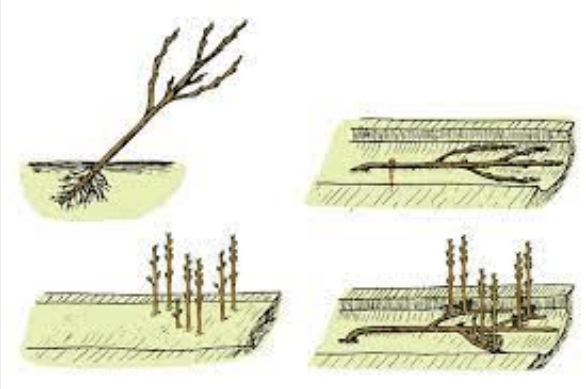
In simple layering, a partial tongue-like cut is given on a branch. The branch is then bent to the ground and the treated portion is covered with soil, keeping the top or terminal portion exposed. The layered branches produce roots in weeks and are ready for transplanting in a nursery after detaching them carefully. This method is followed in plants like Jasmine



AUTHOR: Sana Ansari
REFERENCE: https://propg.ifas.ufl.edu/08-layering/13-layering-trench.html

VEGETATIVE PROPAGATION BY PLANTS: LAYERING

2.**Compound or serpentine layering:**
Compound layering is similar to simple layering, except the branches are alternately covered and exposed along their length. The branches must be longer so that they can be layered at several places. This method is followed in plants like muscadine grape and wisteria.



3.**Trench layering:**
Trench layering is primarily used in fruit plants. Covering the shoots with soil results in etiolation, so it is also known as 'etiolation layering'. New shoots arise from the length of the buried branches. After rooting, individual shoots are separated from the mother plant. This method is followed by apples, cherry, and pear.

4.**Mound layering or stooling:**
This method is followed in plants whose branches are firm and difficult to bend. The selected plant must be at dormant stage at the time of layering. Mound layering is useful with heavy stemmes closely branched shrubs and rootstock of tree fruit. This method is used by nurseries to propagate fruiting trees like apple, magnolia, etc

5.**Air layering:**
It is also known as 'gootee'. Air layering is a method of propagating new trees and shrubs from stems still attached to the parent plant. It is an effective propagation method for some plants that do not root readily from cuttings and which often lack low-growing shoots suitable for conventional layering, such as citrus fruits, lychee, pomegranate, etc.

AUTHOR: Sana Ansari
REFERENCE: https://propg.ifas.ufl.edu/08-layering/13-layering-trench.html

VEGETATIVE PROPAGATION BY PLANTS: CUTTING

Definition

A cutting is a section of plant such as a modified stem, leaf, or root used for vegetative propagation that forms either adventitious shoots, adventitious roots (stem and single node cuttings), or both (root and leaf cuttings).

Types

There are four general types of cuttings: stem cuttings, leaf cuttings, root cuttings, and single node cuttings.

1. Stem cuttings: segments of shoots containing lateral and/or terminal buds

• Hardwood stem cuttings are obtained from mature and dormant stems of both deciduous and evergreen species.

• Semi-hardwood stem cuttings are obtained from new growth in the current growing season after it has begun to harden off.

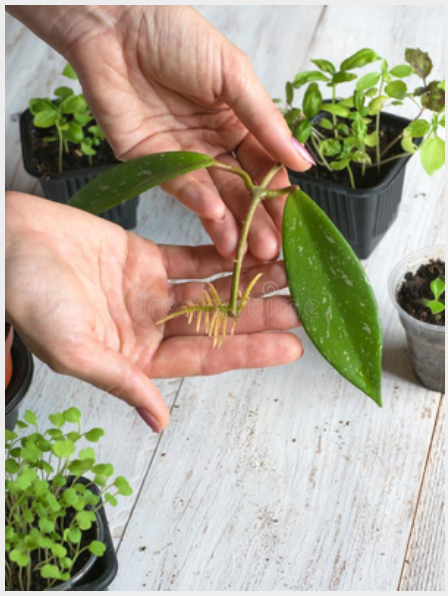
Leaf cuttings are obtained from leaf blades or leaf blades with the petiole still attached.

3. Root cuttings are obtained from sections of roots.

4. Single node cuttings are obtained from a section of a shoot with a leaf blade, petiole, and a piece of the stem with the attached axillary bud.

Collection and Storage

- Stem cuttings should be taken from ontogenetically young sections of the parent plant.
- Hardwood stem cuttings are usually taken in late autumn and winter months when the tree/shrub is dormant Store in a cool, moist environment until they can be planted in a moisturereretentive media such as vermiculite with high humidity
- Semi-hardwood stem cuttings are taken early on a cool day in the mid to late summer months to prevent dehydration. Store in a dark, moist room until planting in a moisture-retentive media with high humidity levels.



AUTHOR: Latisha Parab
REFERENCE: www.esf.edu.com

VEGETATIVE PROPAGATION BY PLANTS: CUTTING

Types of Cuttings

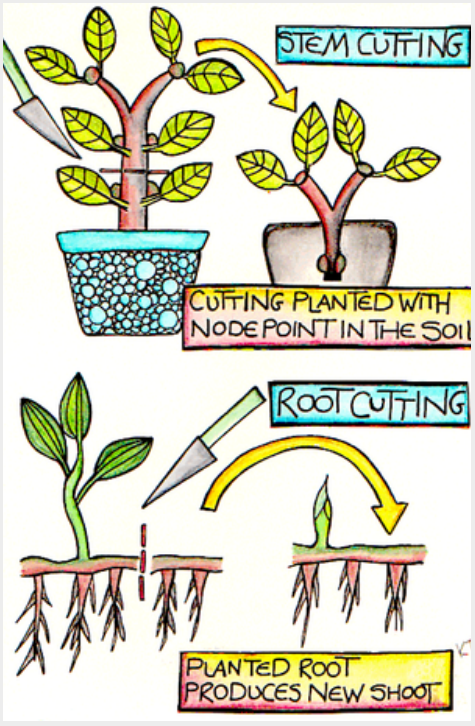
Cuttings can be made from any part of the plant. Most frequently, however, either a stem or leaf is used. A stem cutting includes a piece of stem plus any attached leaves or buds. Thus, the stem cutting only needs to form new roots to be a complete, independent plant. A leaf cutting uses just the leaf, so both new roots and new stems must be formed to create a new plant.

1.Stem cutting:-

Stem cuttings can be taken from both herbaceous plants (e.g., garden flowers and houseplants) and woody trees and shrubs. Because the new growth of trees and shrubs hardens as the summer progresses, cuttings taken at different times of the year vary in their ability to form roots. Softwood and herbaceous cuttings are the most likely to develop roots and become independent plants, hardwood cuttings the least likely.

2.Leaf Cuttings:-

Leaf cuttings are prepared by taking a single leaf from the plant. This leaf must generate not only new roots, but new shoots as well. The leaf used for propagation usually does not become part of the new plant, but disintegrates after the new plant is formed . Only a limited number of plants have the ability to produce new roots and shoots from just a leaf.



AUTHOR: Latisha Parab
REFERENCE: www.esf.edu.com

VEGETATIVE PROPAGATION BY PLANTS: GRAFTING

Grafting is an art of connecting two pieces such as stock and scion i.e living parts of plant in such a manner that they unite and subsequently grow and develop into new and complete plant. These are asexual propagation techniques that are used to propagate cultivars that do not root well from cuttings. Grafting must be done at a time when both the scion and rootstock are in a proper physiological stage. From a genetic perspective, grafting involves the creation of a compound genetic system by uniting two (or more) distinct genotypes.

TYPES OF GRAFTING: -

1. Whip and Tongue Grafting:

The whip and tongue graft is particularly useful for grafting small material (about 6 to 13 nm). It is a variation of apical graftage. In this type of grafting corresponding cuts through rootstock and scion are joined end to end and then bound. The interlocking 'tongues' add structural support to
join the cambium layers which heal and fuse together. The tissues in the graft union area are sealed with grafter's wax, parafilm etc. to prevent the drying out of tissues.

2. Splice (whip) Grafting:

Splice grafting is similar to whip and tongue grafting, if the tongue is not made either in the rootstock or scion. A slant cut of same length and angle is made on both stock and scion. They are placed together and tied or wrapped securely with plastic grafting tape or budding rubber strips. This is also a variation of apical graftage. This type of grafting is mostly done in plants with pithy stema

3. Side insertation graft

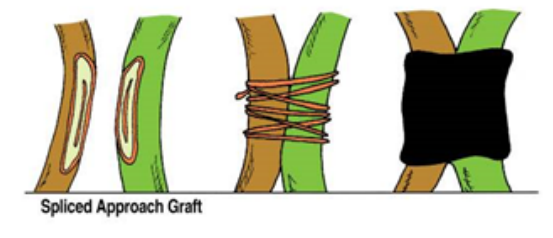
Side insertion graft is suitable for rootstocks with wide hypocotyls. It is a type of side graftage. A 35–45-degree angle cut is made on both sides on the scion hypocotyl. Two cut surfaces are matched together and held with a grafting clip or silicone sleeve.

AUTHOR: Aswathy Nair
REFERENCE: https://www.researchgate.net/publication/45822306_Grafting_as_a_Research_Tool

VEGETATIVE PROPAGATION BY PLANTS: GRAFTING

4. Spliced approach graft

The stems used for spliced approach graft should be approximately of same size. This is a variation of approach graftage. A slice of bark and wood 2.5 to 5 cm long is cut from both stems. Cuts must be perfect and smooth also flat as possible so that pressing will lead to close contact of vascular cambium layers.



5. Cacti grafting

Cacti are easy to be grafted and is also possible to graft almost any two cacti successfully. Cacti grafting is done to save plants that is severely rotted or diseased, thus ensuring better growth and flowering by grafting scions of slow growing species into fast growing stocks.

Common Rootstocks for Cacti grafting:

- Dragon fruit *(Hylocereus undatus)*
- Peruvian torch cactus *(Echinopsis peruviana)*
- Blue myrtle cactus *(Myrtillocactus geometrizans)*
- Peruvian apple cactus *(Cereus repandus)*
- Golden torch *(Echinopsis spachiana)*

Significance:

- Precocity: The ability to induce fruitfulness without the need for completing the juvenile phase.
- Dwarfing: To induce dwarfing or cold tolerance or other characteristics to the scion.
- Ease of propagation: Because the scion is difficult to propagate vegetatively by other means, such as by cuttings. In this case, cuttings of an easily rooted plant are used to provide a rootstock. In some cases, the scion may be easily propagated, but grafting may still be used because it is commercially the most cost-effective way of raising a particular type of plant.
- Repair: To repair damage to the trunk of a tree that would prohibit nutrient flow, such as stripping of the bark by rodents that completely girdles the trunk.
- Changing cultivars: To change the cultivar in a fruit orchard to a more profitable cultivar, called top working. It may be faster to graft a new cultivar onto existing limbs of established trees than to replant an entire orchard.

AUTHOR: Aswathy Nair
REFERENCE: https://www.researchgate.net/publication/45822306_Grafting_as_a_Research_Tool

PLANT-MICROBE SYMBIOSIS

Introduction:

Symbiosis is a biological phenomenon describing any long-term relationship or interaction between two dissimilar organisms living in close physical association. It involves dynamic changes in the genome, metabolism and signalling network. Plant-microbe symbiosis is a complex, dynamic and continuous process that is as old as plant colonization on Earth. Plants and microbes mainly participate in 3 out of many symbiotic associations viz. mutualism, commensalism and parasitism.

SYMBIOTIC RELATIONS BETWEEN PLANTS AND MICROBES

- **Mutualism:**

Arbuscular mycorrhizal (AM) symbiosis is a symbiotic relationship between fungi and plants. The fungi colonize the plant's root system and provide it with increased water and mineral absorption while the plant provides the fungus with carbohydrates formed from photosynthesis.

Root nodule (RN) symbiosis is formed by communication between plants (like legumes) and nitrogen-fixing bacteria (like rhizobia). In legume-rhizobium symbiosis, rhizobia convert atmospheric nitrogen to ammonia, which the plant uses for development in exchange for photosynthates.

Root nodule (RN) symbiosis

- **Commensalism:**

Some commensal microbes protect plants from pathogens while others help in their betterment. The commensal Pseudomonas strain protects *Arabidopsis thaliana* from another pathogenic *Pseudomonas*. *Neotyphodium lolii,* a fungal endophyte, produces bioactive alkaloids to improve grass development.

Arabidopsis thaliana

AUTHOR: Ronit Vayada

REFERENCE: https://apsjournals.apsnet.org

PLANT-MICROBE SYMBIOSIS

- **Parasitism:**

The grey mould pathogen, *Botrytis cinerea* produces enzymes to penetrate and kill hosts' cells. It also produces cellulases and hemicellulases that decompose plant cell walls to obtain nutrition.

Moniliophthora perniciosa infects the meristematic tissue of Theobroma cacao and induces excessive shoot branching, ultimately causing necrosis. This is popularly known as the witches' broom disease.

Botrytis cinerea

Maintaining Symbiotic Homeostasis:

Ever wondered how plants engage with beneficial microorganisms while restricting pathogens at the same time? The answer to that lies in 3 mechanisms viz. metabolic gating, dual receptor recognition and immune homeostasis each with the potential to screen out mutualists from pathogens.

◊ Metabolic Gating –

Here, the plant produces selective metabolites that either only some microbes can use or are toxic to pathogenic microbes to select desired symbiotic associations. This mechanism is seen in AM symbiosis.

◊ Dual Receptor Recognition –

This mechanism includes the recognition of Microbe-Associated Molecular Patterns (MAMPs) by plant receptors. MAMPs are highly conserved molecular signatures present only in a particular class of microbes like chitin for fungi and flagellin for bacteria. This helps the plant to separate friends from foes.

◊ Plant Immune Homeostasis –

This mechanism describes that plants' engagement in symbiosis is not fixed but can be adjusted as per the plant's requirements by adjusting the plant's susceptibility to microbes. For instance, under low nitrogen conditions, legumes secrete larger amounts of flavonoids, increasing legume-rhizobia symbiosis.

AUTHOR: Ronit Vayada
REFERENCE: https://apsjournals.apsnet.org

HOUSEHOLD MANURES

Growing crops in your backyard can save money, provided youg o about it right and manage your soil. Crop rotation is one method,but if you only have a small backyard or vegetable garden, chances are,year after year, your plants are depleting the soil of many nutrients faster than you can replenish them. You need fertilizer to feed your plants.

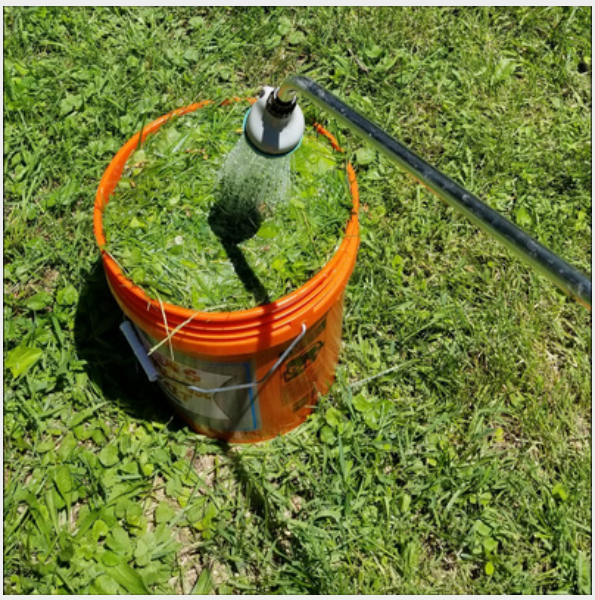
The agriculture industry as a whole has been battling this same problem for decades, and it is not getting any easier. In the past four decades, soil depletion has led to as much as a 33% decrease in food-grade quality land, i.e, land with good enough quality soil for nutritious foods to be grown. For Your Plants which can easily be found in your kitchen and will help boost up your house plants.

1-Coffee Grounds

If your home has acid-loving plants like *nasturtium*, daffodils, marigold, sweet potato, parsley, potatoes etc, then this fertilizer is a must have on your gardening list. Coffee has the ability to maintain the required nitrogen as well as acid level in such plants and is a fertilizer available in every kitchen. There are two ways to use coffee grounds; either you can evenly sprinkle coffee grounds over the top layer of soil or you can dilute them in fresh water and drizzle them over your plants.

2-Grass Clippings

Once you have mowed the extra grass from your lawn, you can use these grass clippings as a homemade fertilizer for your indoor as well as outdoor plants. Surprisingly, grass clipping has the most needed macronutrients-Nitrogen,Phosphorus, and Potassium in them. Evenly spread chopped grass clippings over the bottom layer of the soil and cover them with the retaining.



AUTHOR: Arshi Khan

REFERENCE: https://m.fnp.com/blog/6-easy-home-made-diy-fertilizers-for-your-plants

HOUSEHOLD MANURES

3-Gelatin as Indoor Plant Fertilizer

Gelatin will only be effective if it's unflavored.
Flavored gelatin has added sugars, which can be damaging to plants. Years ago, the Brand 'Knox' – a manufacturer of gelatin had a theory that the gelatin could be a rich source of nitrogen for plants.
To make a batch of fertilizer, the instructions are:
- Mix 1 pouch of unflavored Gelatine with 50 ml of cold water in a 1-liter jug.
-Leave it for two minutes.
-Add 250 ml of cold water and stir until it dissolve.
-Then fill the jug up with cold water and water your plant with the mixture.

4-Banana Peels

Banana peels can be a source of up to 42% potassium and up to 25% phosphorous. There's also the additional calcium, magnesium and sulfur in banana peels, which is why it's among the best organic material to use to make a homemade fertilizer.

5-Egg shell Fertilizer

Eggshells have a few essential nutrients for plants. Mostly calcium, but they're also sources of selenium and nitrogen.You can add eggshellsinto your mulch, but a faster way to get the same benefitsisto crush the eggshells up and boil them.To make an eggshell brew, you only need a pot large enough to boil a gallon of water and just 30 grams of crushed eggshells.

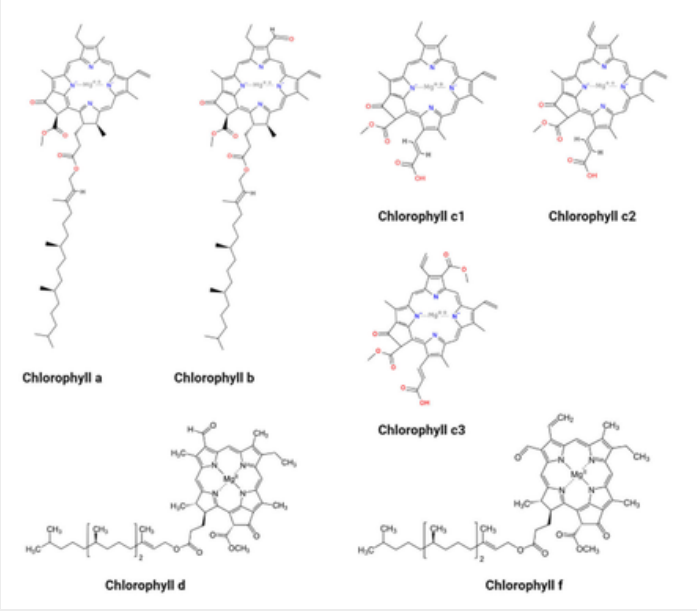
AUTHOR: Arshi Khan
REFERENCE:https://m.fnp.com/blog/6-easy-home-made-diy-fertilizers-for-your-plants

PLANT PIGMENTS AND THEIR ROLES

Have you ever wondered what makes plants colourful? The different pigments present in the plant cells give each plant its colours. Pigments are compounds whose role is to provide the plant cell with a specific colour. Pigments appear a particular colour because of the absorption and reflection of different wavelengths of light. These colouring substances are also called biological pigments or biochromes. Let's take a closer look at which pigments are present in which plants and what are their roles.
There are 4 main types of pigments:

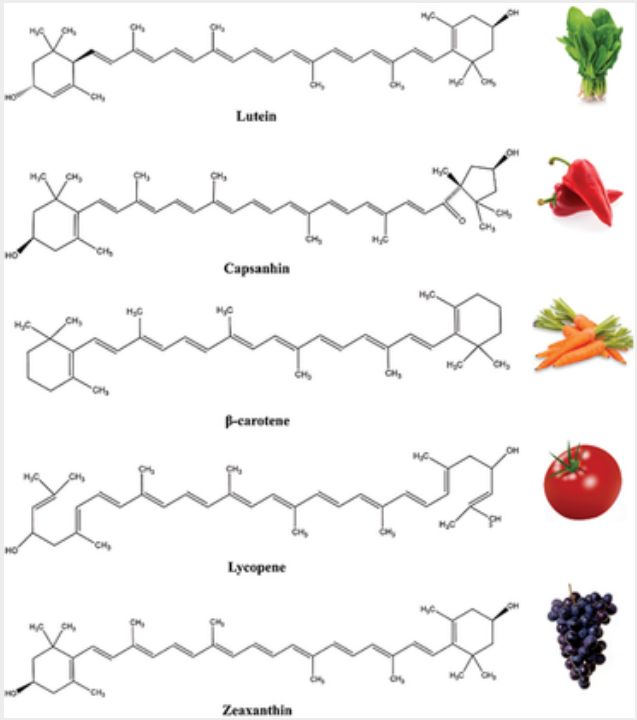
Chlorophylls

Chlorophylls are the primary pigments found in all photosynthesizing plants. there are 5 types of chlorophyll pigments, namely, chlorophyll a, b, c, d and e. These pigments absorb the blue and red wavelengths and reflect the green wavelengths of light, thus appearing green in colour. These pigments help in the process of photosynthesis.



Carotenoids

Carotenoids are a type of tetraterpenoids. There are two types of carotenoids; carotenes, which include **β** carotene and lycopene and xanthophylls, which include lutein and zeaxanthin. Carotenoids absorb the blue and green wavelengths of light and reflect yellow, orange and red wavelengths of light. They have anti-oxidant properties. our body breaks down each carotene molecule into two vitamin A molecules, which make this pigment essential to our diet. These pigments are also found in tomatoes, guava, papaya, mango, carrots and the colour-changing leaves in the season of autumn.

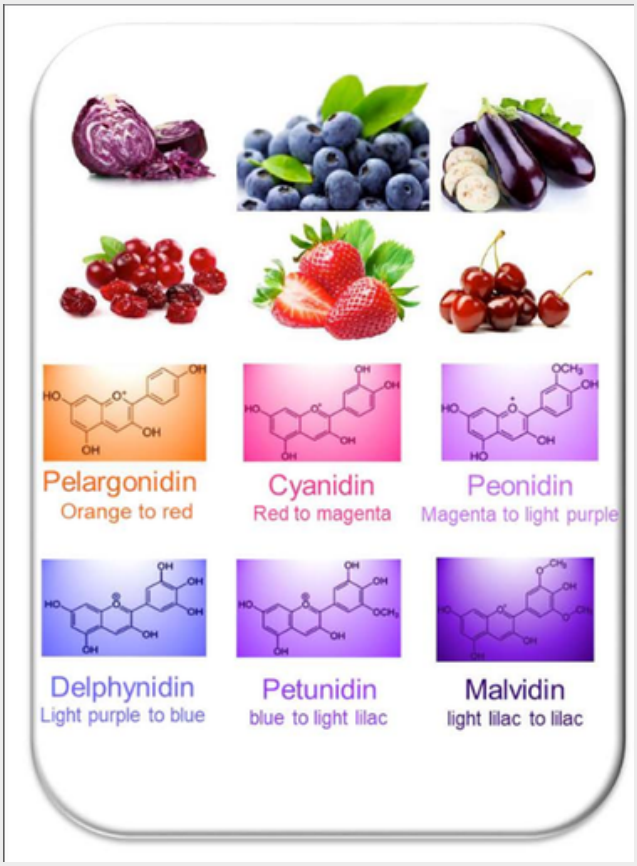


AUTHOR: Chaitrali Deshpande
REFERENCE: https://letstalkscience.ca/educational-resources/backgrounders/plant-pigments

PLANT PIGMENTS AND THEIR ROLES

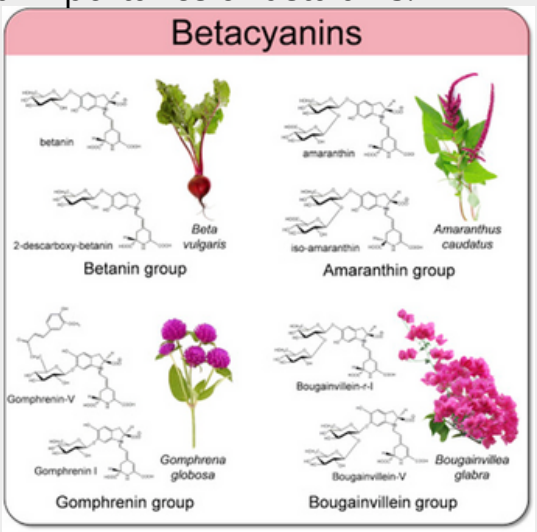
Anthocyanins

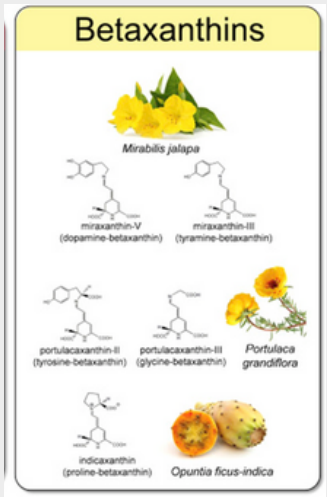
Anthocyanins are water-soluble flavonoid pigments. they are present in the plant vacuoles. The most common types of anthocyanidins are cyanidin, delphinidin, pelargonidin, peonidin, petunidin, and malvidin. Anthocyanins absorb ultraviolet, blue and green wavelengths and reflect blue and violet wavelengths of light. Based on pH, these pigments appear red, blue and purple. In acidic conditions, anthocyanins appear red while in alkaline conditions appear blue. Anthocyanins are anti-inflammatory as well as anti-carcinogenic. They protect the chlorophyll pigments by absorbing excess protons which would have otherwise harmed the green pigments. They are present in berries, plums, apples, grapes and red maples and red oaks.



Betalains

Betalains are water-soluble and synthesized from tyrosine. There are two subgroups; betacyanin which includes betanin, isobetanin, probetanin and neobetanin, and betaxanthin which includes indicaxanthin and vulgaxanthin. Betacyanins are red-violet in colour and betaxanthanin are yellow-orange in colour. Betalains owe their name to Beta vulgaris from where they were first extracted and identified. They are found in beetroots, amaranth, pokeberries and Indian cactus fruits. They are not as widespread as flavonoids. Further studies are being done to understand the role and importance of betalains.





AUTHOR: Chaitrali Deshpande

REFERENCE: https://letstalkscience.ca/educational-resources/backgrounders/plant-pigments

HOME REMEDIES

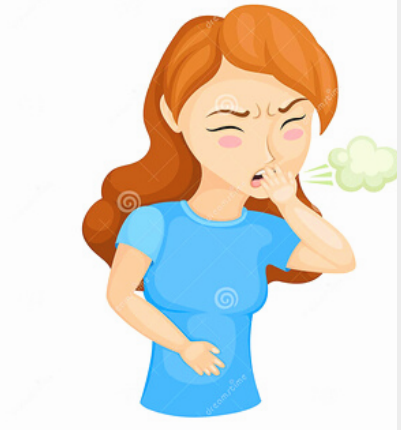
Treating common ailments with ingredients available at home is known has home remedies.

Many of the remedies are having years and years of history, which might have developed by trial and error method.

The most common diseases which are treated by this small remedies as they can be managed without consulting a physician, but the other aspects of this have to be zoomed up on. Merely taking medicine without understanding the pathology of the disease and without knowing whether it will cause harmful effect or can worsen the condition.

Many of which are recently proved to have effective by scientific researches. This articles aims reviewing at scientific evidence for some of the remedies which is in use since years.

Remedies for sour burps



Ingredients:

- Black mustard *(Brassica nigra* Family:Brassicaceae)
- Ajani *(Trachyspermum ammi* Family:Apiaceae)
- Turmeric *(Curcuma longa* Family:Curcumaceae)
- Betel leaf (Piper betle Family:Piperaceae)
- Garlic *(Allium sativum* Family:Amaryllidaceae)
- Ginger and dry ginger *(Zingiber officinalis* Family:Zingiberaceae)
- Asafoetida *(Ferula asafoetida* Family:Umbelliferae)
- Water

Preparation:

Step 1:First in the hot container add mustard seed and ajwain and roast it .

Step 2:Then add 500ml water to it and add turmeric, garlic, ginger, dry ginger (powder), betel leaf, asafoetida.

Step 3:Let all the Ingredients boil in water till get half of it.

Then allow it to cool and filter the water.

Properties of Ingredients:

Ajwain (indigestion problems, acidity and acid reflux problems)
Turmeric (Gradual increasing of antioxidants in body and anti-inflammatory)
Betel leaf (protects gastric system, antimicrobial)
Garlic (effective pain killer, boost immune system)
Ginger (good for gastrointestinal motility)

AUTHOR: Arockia Brightny

HOME REMEDIES

Asafoetida (cure stomach uneasiness, anti-inflammatory properties, remedy for menstrual problems)

Remedies for jaundice

- Raw milk
- Gale of wind *(phyllanthus niruri* Family:Phyllanthaceae)

Method :

In mixer add milk and phyllanthus niruri grind it.

Do not filter it .



Note: After drink this extract nothing to be consumed including water.

Properties:

- Anti-oxidantactivity
- Anti-inflammatory
- Lipid lowering activity.
- Hepatoprotective activity
- Action on kidney stones
- Anti-cancer activity
- Decreases body heat

AUTHOR: Arockia Brightny

EXAM ALERTS (BIOLOGICAL COURSES)

MSc and PhD Entrance exams	Exam Conducting bodies	Programmes Offered	Important dates (Tentative*)
IIT JAM BT (Joint Admission Test Biotechnology) MSc Entrance Exam	IIT (Rotational basis) https://jam.iitg.ac.in/	MSc Biotechnology, Joint MSc-PhD, Integrated PhD Degree	**Application process:** Sept-Oct **Admit card:** Jan **Exam:** Feb **Result:** March **Admission process:** April **Admission Conclusion:** July
NEST (National Entrance Screening Test)	NISER Bhubaneshwar and University of Mumbai https://www.nestexam.in/	Integrated MSc in Biology	**Application process:** Feb-July **Admit card:** August **Exam:** August **Result:** September
MCAER CETMSc Entrance Exam	Maharashtra Council of Agriculture Education and Research, Pune https://www.mcaer.org/	MSc in Agriculture, MSc in Horticulture, MSc in Forestry, MSc in Agriculture Biotechnology, MBA in Agriculture	**Application process:** March **Admit card:** June **Exam:** June **Result:** June **Counselling:** July
TIFR Graduate School Admissions (GS)	Tata Institute of Fundamental Research http://univ.tifr.res.in/admissions	Ph.D. in Biology, Integrated MSc-PhD in Biology	**Application process:** October **Admit card:** November **Exam:** December
BHU PET	Banaras Hindu University (BHU) http://bhuonline.in/	M.Sc. in Environmental Science, M.Sc. in Applied Microbiology, M.Sc. (Ag.) Agroforestry, and various	**Application process:** Aug-Sept **Admit card:** September **Exam:** September **Result:** October

AUTHOR: Ankita Chauhan
REFERENCE: https://scoop.eduncle.com/bsc-and-msc-entrance-exams

EXAM ALERTS (BIOLOGICAL COURSES)

MSc and PhD Entrance exams	Exam Conducting bodies	Programmes Offered	Important dates (Tentative*)
FRI MSc Entrance Exam	Forest Research Institute (FRI) http://fridu.edu.in/	M.Sc. Forestry, M.Sc. Wood Science and Technology, M.Sc. Cellulose and Paper Technology, M.Sc. Environment Management	**Application process:** Feb-April **Admit card:** May **Exam:** May **Result:** July **Counselling:** July

Above mentioned are few entrance exams among various other PG entrance exams for numerous biological courses provided by universities in India. The links of the official websites are also provided in the "Exam conducting bodies" column.

Provided below is a website link for other entrance exams which are not mentioned above:
https://collegedunia.com/exams/msc

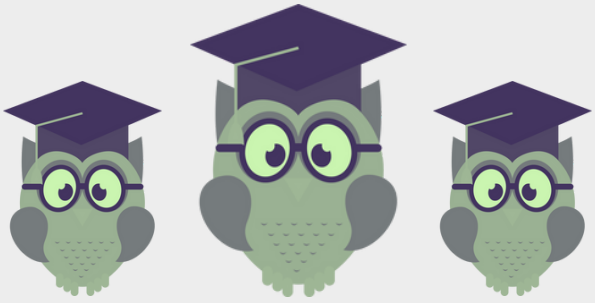


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Photo Gallery

Zingiber spectabile
Location :- Amboli hills
Clicked by Sanket Khambe (S.Y.B.Sc)

Auricularia auricula-judae
Location :- SGNP
Clicked by Vedant Khokrale (S.Y.B.Sc)

Barleria prionitis
Location :- Green Valley Park, Belapur
Clicked by Prasad Nayak (T.Y.B.Sc)

Pyrostegia venusta
Location :- RCF Colony,Chembur
Clicked by Chaitrali Deshpande (T.Y.B.Sc)

Sesamum indicum
Location :- Green Valley Park, Belapur
Clicked by Ankita Chauhan (T.Y.B.Sc)

Jatropha integerrima
Location :- Maharashtra Nature Park, Sion
Clicked by Geethanjali Jayaraj (T.Y.B.Sc)

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