

Fakulti Perladangan dan Agroteknologi





# **E-POSTER**

# AGROCHEMISTRY VIRTUAL POSTER COMPETITION 2022 AVPC 2022

13th MAY - 1st JULY 2022

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E-poster Agrochemistry virtual poster competition (AVPC 2022)

#### **PREFACE**

Agrochemistry Virtual Poster Competition 2022 is a platform to be formed for students / lecturers / staff to share creativity in applying the chemistry subjects learned in the world of Agrotechnology in the form of posters. This virtual poster competition takes place on 13 May 2022 and ends on 1 July 2022. This competition is an assessment of students in determining the level of understanding, creativity and group work for the subject of chemistry and being able to apply it to the field of Agrotechnology. The AVPC 2022 program takes place from May 13 to July 1, 2022. The program was officiated by the Dean of the Faculty of Plantation and Agrotechnology, namely Prof. Ts. Dr. Azhan Hashim @ Ismail. The program involves students from 3 faculties and HEP participating in AVPC 2022, namely the Faculty of Plantation and Agrotechnology (FPA), the Faculty of Applied Science (FSG), the Faculty of Education and Pre-Higher Education. This program involves 8 campuses namely Jasin Campus – 83, Perlis Campus – 35, Kuala Pilah Campus – 12, Shah Alam Campus – 7, Mukah Campus – 6, Puncak Alam Campus – 4, Kota Kinabalu Campus -3, Jengka Campus -2. Three categories are contested namely Pre Diploma, Diploma and Degree. To date, students from these programmes have shown remarkable achievements in academic performance and participations in national as well as international competitions.

This competition is an open door for the students and lecturers to exhibit creative minds stemmed from curiosity. A number of e-content projects have been evaluated by esteemed judges and that has led to the birth of this E-Poster Book. Ideas and novelty are celebrated and participants are applauded for displaying ingenious mind in their ideas.

It is hoped that such an effort continues to breed so that there is always an outlet for these creative minds to grow.

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# AGROCHEMISTRY VIRTUAL POSTER COMPETITION 2022 (AVPC 2022).

#### 1<sup>st</sup> JULY 2022

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# ABOUT FACULTY OF PLANTATION AND AGROTECHNOLOGY

The Faculty of Plantation and Agrotechnology was established in 2010 in Universiti Teknologi MARA (UiTM). The mission of the faculty is to play the vital role of producing well-trained professionals in all areas of plantation and agriculture related industries at national and international levels.

The Diploma in Planting Industry Management (DPIM) program was the flagship when it was established in 1967 at Jalan Othman Campus, Petaling Jaya, Selangor. The faculty continues the legacy of offering the well-established DPIM program until today in Perlis, Pahang, Sabah, Sarawak, and Melaka campuses. During these 51 years of establishment, the program has produced over 7,000 graduates that have been well-received and recognised by private and public sectors. Some of them have become reputable leaders and captains of the plantation industry, and heads of government agencies.

The faculty is highly committed in disseminating, imparting and fostering intellectual development and research to meet the changing needs of the plantation and agriculture sectors. With this regard, numerous undergraduate and postgraduate programs have been offered in accordance with the government's intention to produce professionals and entrepreneurs who are knowledgeable and highly skilled in the plantation, agriculture and agrotechnology sectors.

#### **MISSION**

To strengthen academic excellence of international standing through teaching and learning, research and professional services to stimulate transformation in the plantation and the agricultural sectors.

#### **VISION**

To become a leading faculty in the field of Plantation Management and Agrotechnology through teaching and learning, research and consultancy activities.

#### ABOUT FACULTY OF APPLIED SCIENCES

Founded in 1967, the Faculty of Applied Sciences or Fakulti Sains Gunaan (FSG) has a history that has witnessed 40 years of progression in the development of Science and Technology in UiTM. Formerly known as the School of Applied Science or Kajian Sains Gunaan (KSG), it was located in Jalan Othman, Petaling Jaya, Selangor, which was the ITM campus. ITM was previously known as Maktab MARA in 1965 following the change of the name of the Rural and Industrial Development Authority (RIDA) to Majlis Amanah Rakyat (MARA). In 1967, the name was upgraded to Institut Teknologi MARA (ITM) allowing it to offer diploma courses. The setup of the KSG is in line with the First Malaysian Plan (1966-1970) which was an economic development implemented by the government with the objective of promoting the welfare of all citizens and to improve the living conditions in rural areas, particularly among low-income groups.

The Faculty of Applied Sciences is one of the university's core science and technology faculties. Starting with only five courses since it was first established in 1967. The faculties strive to continuously provide a dynamic environment that seeks to foster academic innovations and excellence in teaching, learning and research. In all of our activities, be it teaching, research or outreach, we aim to operate with a forward-thinking, results-oriented and community-responsive approach, in the pursuit of realizing our vision of becoming a premier institution in science and technology. The early years of the faculty started with a small number of about 200 students, 26 academic staff and 15 support staff. At that time, the students had access to eight science laboratories, six classrooms and a small plot of land for field work. Malaysia's economy was then highly dependent on her wealth of agriculture-based resources. The government sought to continue the development that had been first brought about by the First Malaysian Plan. Institut Teknologi MARA (ITM) was given a significant role in assisting Bumiputera's involvement in contributing towards the nation's economic growth, in tandem with the New Economic Policy.

#### ABOUT PRE-HIGHER EDUCATION PROGRAMME

UiTM offers a Pre-Higher Education Programme or Program Pra Pendidikan Tinggi (PPT) that assists SPM graduates with academic strengthening activities at the Pre-Diploma level. Students who pass the Pre-Diploma will be absorbed into Diploma studies, which will give them more opportunities to continue their studies at the Bachelor's, Master's, and Doctor of Philosophy levels.

Pra Pendidikan Tinggi (PPT) UiTM was previously known as Program Mengubah Destini Anak Bangsa (MDAB). The programme is based on the university's philosophy, which reckons that, through the transfer of knowledge and the application of noble values, an individual is capable of striving for excellence.

The PPT programme's major goal is to enrol students who have graduated from Sijil Pelajaran Malaysia (SPM) but whose SPM results do not fulfil UPU's requirements. The PPT programme is offered to both B40 and non-B40 students, allowing them to advance their education

#### FOREWORD MESSAGE

by Dean of FPA

First and foremost, I would like to extend my most resounding praise to Allah S.W.T who has bestowed His blessing to us in producing the AVPC 2022 E-Poster compilation E-books.

My heartiest congratulations to the AVPC 2022 committee for successfully on organizing the Agrochemistry Virtual Poster Competition 2022 which is the foundation of this E-Poster book. This programme would not have happened without the synergy between the organizing committee and participants

Alfred North Whitehead, a British Mathematician, logician and philosopher once mentioned that "Ideas won't keep. Something must be done about it." All of us have great ideas but what matters is what we do with the ideas. This E-Poster book records the ideas from students, facilitated by the lecturers, materialized into a form of innovation.

Once again, my deepest appreciation and congratulations to the Faculty of Plantation and Agrotechnology, Faculty of Applied Sciences and Pra Pendidikan Tinggi for providing the students an outlet to do something about their ideas instead of just keeping it.

As for the Degree, Diploma and pre-diploma students, may this participation be a kickstart to many more innovation and creative products in the future.

Thank you.

Prof. Ts. Dr. Azhan Hashim @ Ismail Dean of Faculty Plantation and Agrotechnology Universiti Teknologi MARA Cawangan Melaka

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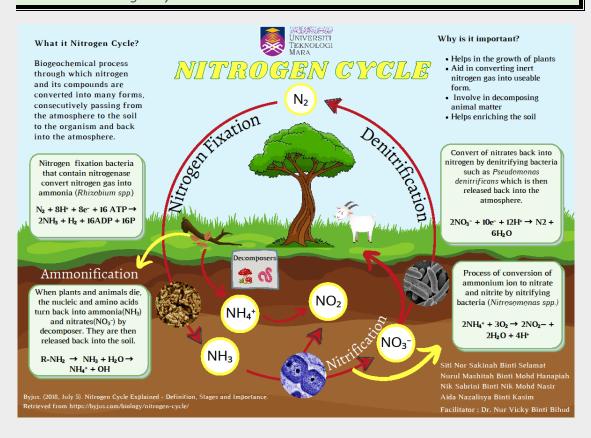
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DEGREE POSTER (GOLD)







The primary source of plant nutrients is the soil. Soil-supplied nutrients are known as mineral nutrients. Carbon (C), hydrogen (H), and oxygen (O) are non-mineral nutrients that are derived from air and water during photosynthesis. The macronutrients and micronutrients are two distinct classes of soil mineral nutrients. The macronutrients are further classified into two parts: basic and intermediate nutrients. The primary nutrients are required in relatively substantial amounts by plants. The most well-known are nitrogen (N), phosphorus (P), and potassium (K), also known as NPK. The intermediate nutrients calcium (Ca), magnesium (Mg), and sulphur are required by plants in moderate amounts (S). Micronutrients are necessary in relatively small amounts. Iron (Fe), boron (B), manganese (Mn), copper (Cu), zinc (Zn), molybdenum (Mo), nickel (Ni), and chlorine are among them (Ci). Even though soil nutrients are classified into distinct groups, each nutrient is equally essential. Any nutritional deficiency can inhibit the growth and productivity of a plant.

#### WHAT IS NATURAL FERTILISER?

Natural fertiliser is an organic matters include plant, mineral and animal sources for be nutrient ingredients such as bone, manures, dead plant, rock, and compost materials from microorganisms.

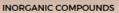


#### WHAT IS INDUSTRIAL FERTILISER?

Industrial fertiliser is a manufactured nutrients from minerals, gasses from the air and inorganic waste to feed the plant directly without involving the microorganisms.









KO S OK Potassium Sulfate

#### WHY USING NATURAL FERTILISER?

Eco-friendly because increases in soil-borne microorganisms. The fair trade between microorganisms and plant by promoting water, nutrient and natural defense against pest infection for plant, microorganisms can get food from composing the natural fertiliser like bone, manure and dead plant.



#### WHY USING INDUSTRIAL FERTILISER?

Fast-acting because the variety froms such as liquid, pellet, granule and spike. Easily to absorb by plant because it is water-soluble. A quick boost for plant to growth and provide the outcome to the farmer. Suitable use for the industrial farming where it can provide the consumer request.

#### **HOW TO IMPROVE SOIL NUTRIENTS?**

Organic fertilisers are substances obtained from plant and animal droppings, such as weed residues, tree trimmings, urine, green manure, farmyard manure, and crop leftovers. These are used for soil fertilisation. Grazing livestock also play a significant role in nutrient transfer to farmland. Nitrogen, phenols, and lignin are the three chemicals found in plants that determine their value as organic fertilise

Microorganisms and macroorganisms in the soil are responsible for the decomposition of organic matter and creation of humus, and are therefore necessary for a healthy soil. It serve an essential role in the recycling of soil nutrients and significantly increase their availability to plants. Earthworms are particularly significant among macroorganisms because they feed on dead and decaying matter. After digesting, then excrete nutrient-rich faeces. A quantity of high-quality compost encourages earthworms. Vermiculture is the cultivation of earthworms in organic wastes, while vermicomposting is the processing of wastes using



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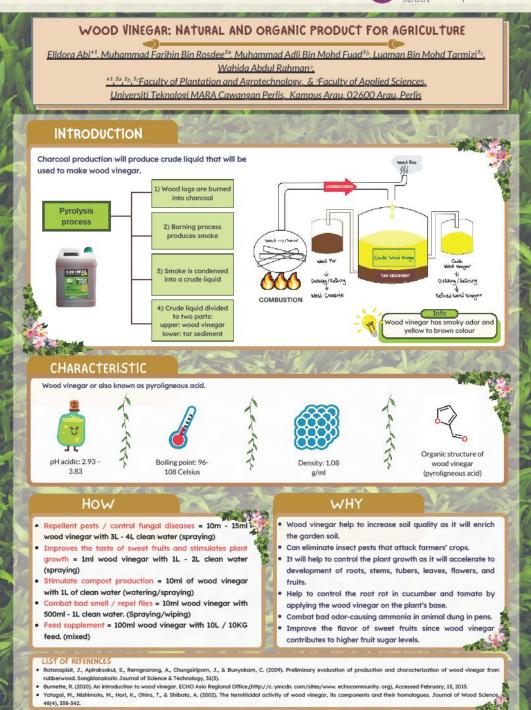


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# Fertilizer Management



#### Introduction

Fertilization is an important component in farming as it impacts both crop productivity and the quality of the environment. The aim is to make sure that there are adequate nutrient levels based on the crop requirements, peak harvest seasons and the soil's natural ability to give nutrients. Proper handling of fertilization equals to dynamic balance while any imbalance leads to economic losses as well as groundwater and surface water contamination. That is why fertilizer management is important.

#### What?

Fertilizers are described as any organic or inorganic products that provides one or more of the chemical components essential for plant development.

Fertilizer management is the process of controlling the amount, source, timing, and technique of fertilizer application in order to maximise farm productivity while minimizing nutrient losses that might cause environmental issues.



#### Why?

- To provide each plant with sufficient nutrients in a well-balanced ratio to support healthy vegetative development and high yields.
- To apply the fertilizers in the appropriate method over the farm's areas that are most likely to result in the most effective nutrient absorption.
- To reduce contamination to waterways by plant nutrients

#### How?

- Determine the growth and yield targets.
- Assess the nutrient requirements to attain the target and prevent nutrient efficiency.
- Ensure the most efficient and cost effective fertilizer to meet the nutrient requirement.
- Monitor the outcome including the economic returns and decide on further action required.



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# EGG SHELL CHEMISTRY

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### o<sup>Ŭ</sup>o.Ca²⁺</sup>ANATOMI OF EGG

#### Calcium carbonate

#### EGGSHELL

- Eggshell is made almost entirely of calcium carbonate (CaCO3).
- The shell also has a thin outermost coating called the bloom or cuticle that helps keep out bacteria and dust.

#### INNER AND OUTER MEMBRANES

 These two transparent protein membranes provide efficient defense against bacterial invasion.

#### YOLK

- Less water and more protein than the white
- Some fat
- The majority of the egg's is vitamins and minerals.
- Iron, vitamin A, vitamin D, phosphorus, calcium, thiamine, and riboflavin.
- Lecithin, a powerful emulsifier.

#### **ALBUMEN**

 The egg white is known as the albumen, contain approximately 40 different proteins

# COMPOSITION OF EGGSHELL

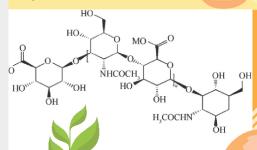
#### **CALCIUM CARBONATE**

- The main composition in eggshells
- Nanoparticles of calcium carbonate are arranged into ordered crystals by proteins
- Forming a calcite shells
- The colour of eggshells comes from porphyrin pigments on the shell's surface

#### **HYDROGEN SULFIDE**

- Formed by the reaction of sulfur cointaining proteins in albumen
- Gives cooked eggs their characteristic smells





#### EGGSHELL FUNCTIONS

- Treating and controlling soil pollution as well as fertilizing agricultural crops.
- Get rid of radioactive materials such as uranium as much as 88%.
- Raising the pH value of the soil
- Get rid of heavy metals such as zink, manganese, cadmium by 95%

pH 7.6

Eggs pH pH 9.2

Albumen pH of freshly laid eggs

pH after several days of storage

### COMPOSITION OF HEN'S EGGS

- The sources of the characteristic color of an egg yolk are orange and red carotinoids.
- Mixed with the green mash the hens are fed.
- Lutain red

  Canthavanthin res

  Canthavanthin res

  Canthavanthin reserved to the control of the c

#### HOW TO MAKE FERTILIZER FROM EGG SHELLS

- Collect eggshells in one container /
  place
- Whisk the eggshells until crushed
- Dry the egg shells until completely dry until the skin changes color from whitish brown.
- Sprinkle and loosen on the tree
- Don't forget to water the trees

SOIL

Referrence: T Nakano, NI Ikawa, L Ozimek. Chemical composition of chicken eggshell and shell membranes, Poultry Science. Volume 82, Issue 3,2003. Pages 510-514. ISSN 0032-5791. retrieved from:https://doi.org/10.1093/ps/82.3.510. (https://www.sciencedirect.com/science/article/pii/S0032579119449791)



# PESTICIDE RESIDUE

#### INTRODUCTION

Pesticide means any substance, or mixture of substances of chemical or biological ingredients intended for repelling, destroying or controlling any pest, or regulating plant growth



Pesticides are chemical substances that are meant to kill pests. In general, a pesticide is a chemical or a biological agent such as a virus, bacterium, antimicrobial, or disinfectant that deters, incapacitates, kills, pests.



#### **WHY PESTICIDE ARE USED**

- Controlling pests and plant disease vectors
- Controlling human/livestock disease vectors and nuisance organisms.
- Controlling organisms that harm other human activities and structures.







#### **HOW TO USE PESTICIDES SAFELY**

The proper use of pesticides includes avoiding pesticides in the garden during periods of rainfall or in windy conditions. To avoid adverse effects of pestice use, always read and follow the directions for proper application and apply only the amount specified.



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DR NURUNAJAH AB GHANI

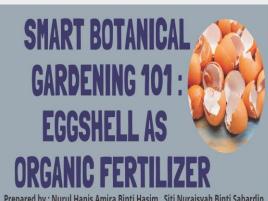
MEGAT IRMAN I AMIN IQHWAN

MUJAHID

AVPC-Deg\_26

# DEGREE POSTER (SILVER)

#### Poster 7 Smart Botanial Gardening 101: Eggshell as organic fertilizer



Prepared by: Nurul Hanis Amira Binti Hasim, Siti Nuraisyah Binti Sabardin, Nur Izzah Binti Yusoff , Nurul Asyiqin Binti Muhamad

Facilitator : Dr Nurunajah Binti Ab Ghani REF NUMBER : AVPC-Deg 01

#### CHEMICAL COMPOSITION IN EGGSHELL



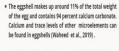
#### **CALCIUM CARBONATE**

The main component of eggshells is calcium carbonate. Proteins arrange nanoparticles of calcium carbonate into orderly crystals, generating the calcite mineral that makes up the shell. The colour of the eggshell comes from porphyrin pigments on the shell's surface.

#### PROTOPORPHYRIN IX

Protoporphyrin IX is a pigment that gives shells a brown colour.

#### RESEARCH EVIDENCE TOWARDS THE **EFFICIENCY OF EGGSHELL USAGE IN** PLANTS PRODUCTION



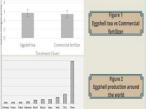
EGGSHELL CALCIUM AS

ALTERNATIVE SUPPLEMENT

· Eggshell calcium is 90 % more absorbable than limestone or coral sources. One teaspoon of powder is made from a medium eggshell. This can be used to treat blossom-end-root (BER) plants as a fertilizer.

. Calcium from eggshells is thought to help with calcium deficiencies and has a high bioavailability. As the plants absorb the calcium from the eggshells and develop generally problem-free, the calcium carbonate in eggshells serves to strengthen a plant's roots, allowing it to grow fast and stronger.





Based on chemical analysis, it shows that eggshell tea fertilizer contains essential nutrient for plants. The eggshell tea fertilizer contains nitrogen, phosphorus, potassium, magnesium, calcium, Sulphur, zinc and chloride.

Figure 1, shows comparison between eggehell tea fertilizer group and commercial fertilizer group in soil growing medium, this shows the use of eggehell as fertilizer is better because there is no chemichal material and s cost as well and the result is also the same.

Figure 2 shows that china produces the highest number of eggshells and china is also one of the major importers of chicken eggs. In addition, China is also ranked as the country that uses the most eggshells as fertilizer.

### HOW TO MAKE ORGANIC 1) CRUSH THE EGGSHELL Wash and rinse eggshells and let them dry Crush the eggshells into a fine powder using **FERTILIZER USING** mortar and pestle EGGSHELL 2) GRIND THE EGGSHELLS · Grind the eggshells using coffee grinder to make Boil a galloon of water and add 10 to 20 clean, dry eggshell . Let the shells sit in water overnight then strain them out. Pour two cups of liquid onto each plant. Repeat the eggshell tea process every two weeks. APPLICATION OF EGGSHELL IN GARDENING (FLOVER AND VEGETATIVE PLANT)



- Provide a boost of calcium to the new broccoli
- Boost the growth of the broccoli plant efficiently · Shards of eggshell can be used in order keep
- certain pests away or out.

   The calcium from eggshells able to moderate soil acidity while providing nutrients for broccoli plant



- disturbances, eye infections, inflammation, and
- a variety of other ailments.

  Slugs and snails are a big challenge when it comes to raising marigolds in the garden because they eat them.
- Crawling bugs will be kept away from your marigold plant if eggshells are placed around it.



- . Provide a boost of calcium and nutrients to the new rose plant.
- Strengthening the walls of the plant's cell tissue and making rose plant parts more resistant to disease and pests.
- . Contributes to healthy green foliage on rose bushes, as well as to strong root systems
- . Keeps roses healthy enough to resist black spots.



- restructure the soil to make it porous, and
- increase the drainage of the soil. • Eggshells keep slugs away from the tomato plants because the slugs avoid the harsh edges of the shells.

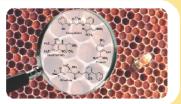
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### CHEMICAL DIVERSITY IN A STINGLESS BEI Plant Symbiosis

Bees are important pollinators on the planet, helping to maintain forest balance and human agriculture. The chemistry of the stingless bee-plant symbiosis is complicated and poorly understood.



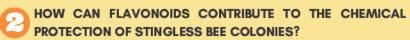




#### WHAT IS THE RELATIONSHIP BETWEEN BEES AND PLANTS?

Plants and bees form symbiotic connections that are essential for forest balance and human agriculture. Stingless bees acquire resins, pollen, and nectar from a variety of plants for use in hive construction and feeding. For these pollinators, nectar is the primary supply of carbohydrates, while pollen is the primary source of protein. Propolis is made by combining the resins of the plants with cephalic glandular secretions, which is necessary for sealing the colony cavities and inhibiting invading insects and microbes.





Extensive evidence shows flavonoids are antibacterial agents that eradicate various pathogenic organisms. These compounds have cytotoxic and antimicrobial properties, making flavonoids useful as a chemical barrier against invading microorganisms.

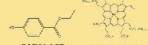
#### WHY FLAVONOID IS REALLY IMPORTANT TO STINGLESS BEE?



FLAVONOID



- The antioxidant properties of flavonoids can help mitigate the oxidative effects of honey, which has antibiotic properties due to hydrogen peroxide  $(H_2O_2).$
- The oxidizing effects of H<sub>2</sub>O<sub>2</sub> may be dangerous to the bees; thus, pollinators produce enzymes to eradicate H2O2. For example, catalase and peroxidase
- $(H_2O_2)$ , on the other hand, can oxidize originating compounds that these enzymes cannot neutralize, and flavonoids can play a vital function in HYDROGEN PEROXIDE, H₂O₂ neutralizing the remaining oxidizing agents.



CATALASE

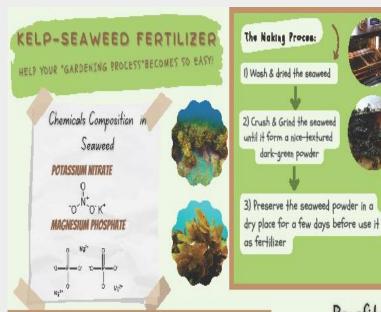
PEROXIDASE

REFERENCE

ACS Omega. (2019). Chemical Diversity in a Stingless Bee-Plant Symbiosis. Retrieved from https://pubs.acs.org/doi/10.1021/acsomega.9b02096

MOHAMAD AZMI ADNAN NAH THAQIF RUSYAIDI AHMAD NAH RODZI FARAH ADIBAH MOHAMAD KAMARULZAMAN

AISYAH'NADHIRAH ROZMAN FAZRIN WANISHA ISHAK





### How To Use For:

Seed germination: Spray seeds with liquid kelp fertilizer right after planting to help them sprout. Seedling root growth: Mixing seaweed fertilizer into a seedling's soil can nourish the microorganisms the plant needs to receive essential nitrogen compounds. Transplanting: Spray the root ball with liquid seaweed fertilizer

#### PREPARED BY:

NUR WAHIDA AMALIEN BINTI MOHD AZMERUDDIN 6 NUR AUNI SYAHIRAH SINTI SUFFIAN

FACILITATOR:

REF.NUMBER: DR. NURUNAJAH BINTI AB GHANI AVPC-DEG\_07

## Benefits

1) Great for soil structure. The alginates react with metals in the soil and form long, cross-linked polymers in the soil. These polymers improve the crumbling in the soil and swell up when they get wet and also retain moisture for a long time.

2) Sustainable. Kelp seaweed fertilizer also has a more positive impact on the CO2 cycle than other types of fertilizer. Kelp absorbs a massive amount of carbon dioxide, some of which can be used by the plants you cover with seaweed fertilizer.

suitable for plant:







In a world where plant keep us living, there are an efficient system that are happening underneath our nose. Together with us, let's discover the secrets of the world where minerals and ores are playing the main actor. In this chapter of a story, we'll look on minerals involved in enhancing the health of the plant. Interested? Starts looking at the roots of the tree below

#### MACRONUTRIENTS

Macronutrients are elements that are found in enormous levels in plant tissues such as carbon, hydrogen, oxygen, nitrogen, phosphorus, sulfur, potassium, calcium, and magnesium.

These elements are essential for growth and reproduction to take place, cannot be replaced by another, and are involved in metabolism directly.

it is divided into two parts:

#### **Primary macronutrient**

- 1. Nitrogen
- 2. Potassium
- 3. Phosphorus

#### Secondary macronutrient

- 1. Magnesium
- 2. Calcium
- 3. Sulfur

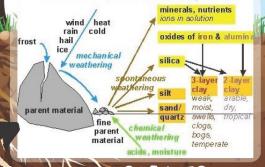
Weathering is the breakdown of rocks and minerals into soils. Rocks are broken into three major groups: sedimentary, igneous, and metamorphic. The breakdown of the rock was affected by the climate and weather surrounds it. Most of the soil in Malaysia were formed through physical weathering. Physical weathering were divided into three exfoliation, abrasion and root expansions.

The breaking of the rocks can produce fine soil that contains lots of mineral such as Magnesium and Calcium.

### MICRONUTRIENTS

Micronutrients are the elements that required and exist in smaller levels for the plants its can be known as "trace". it is including iron, manganese, copper, molybdenum, zinc, copper, boron, chlorine, and nickel.

# MINERALS IN SOIL & ITS NUTRIENTS FOR PLANTS

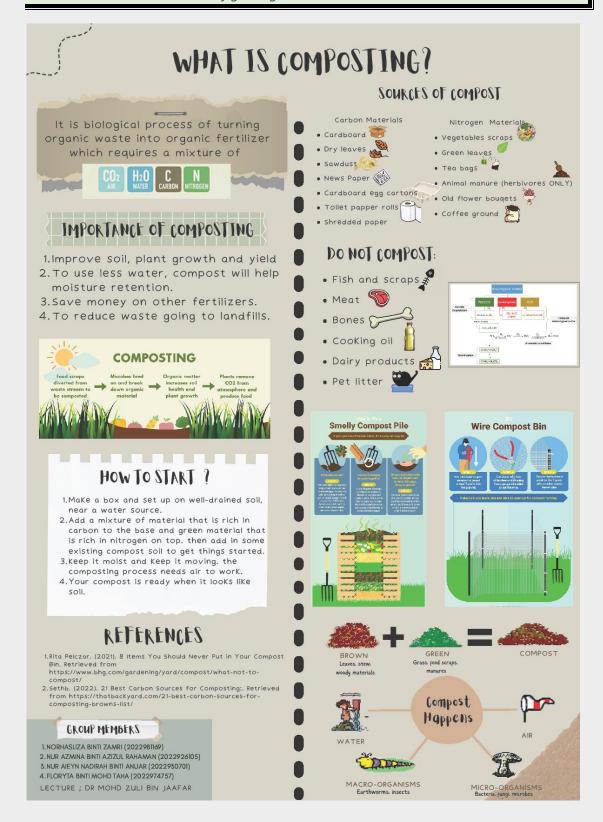


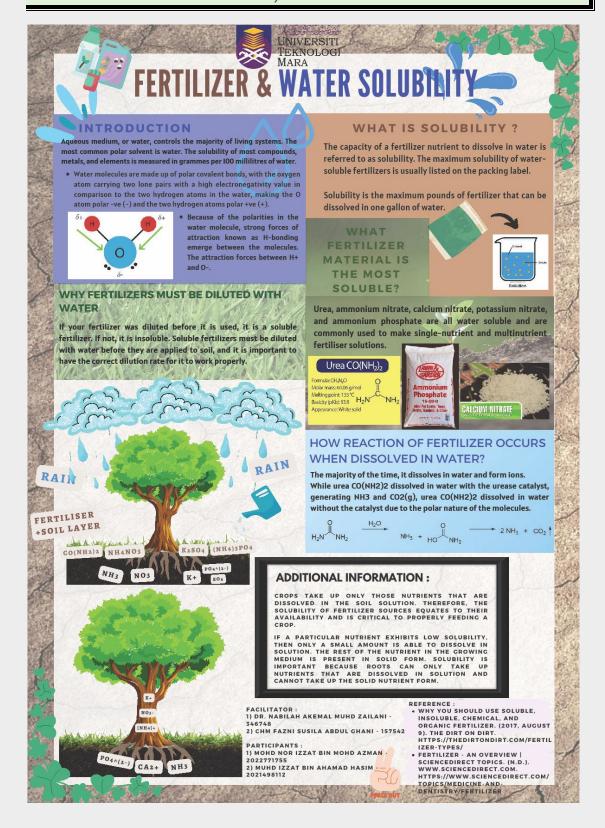
MORE INFO



By:
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'Imaad bin Khairun Aminudin
Nurul Nabiha binti Zainal
Muhammad Zakuan Adib bin Ab Aziz

Mahd Zuli bin Jaafar





# **COFFEE GROUNDS FERTILIZER**

# COFFEE GROUNDS BENEFITS

Coffee grounds contain nutrients,
minerals and vitamins to help the
growth of plant.

Act as natural pesticide, repell

Act as natural pesticide, repell insects and slugs from the plants.

#### **BENEFITS TO THE SOIL**

Improve drainage
Water retention
Aeration in the soil
Help microorganisms beneficial
to plant growth.



FACILITATOR: DR MOHD ZULI JAAFAR
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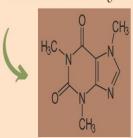
3. MUHAMMAD SHAREL BIN ABD MANAH (2022782651)

4. NUR ZULAIKHA BINTI MOHD ZAIDI (2022905589)



### CHEMICAL COMPONENTS

Caffeine and Chlorogenie acid



Organic Compound

Most common used to paralyze and kill all any organic life.

Highly acidic

Reduce ability to absorb nutrients from the soil



#### **IDEAL SOLUTION**

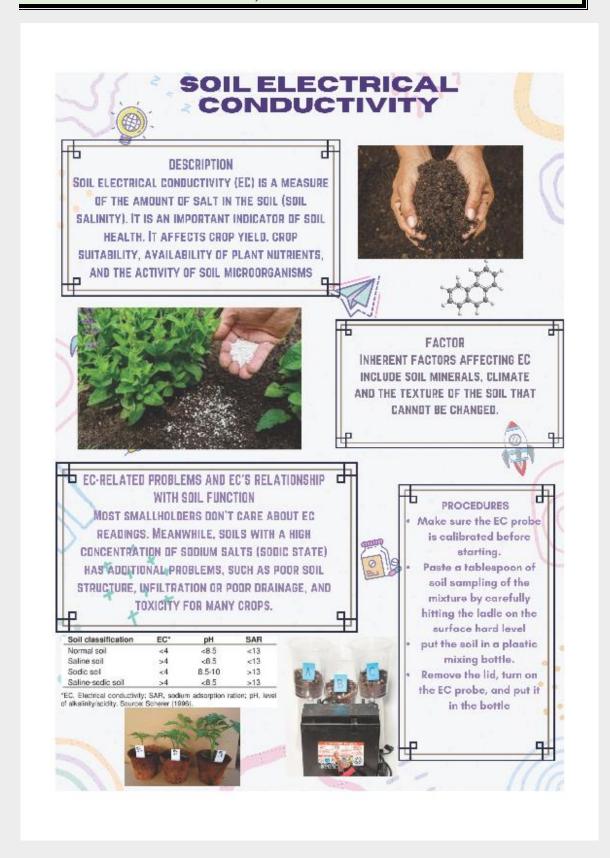
Mix coffee grounds with other organic materials like compost or leaf molds before used.

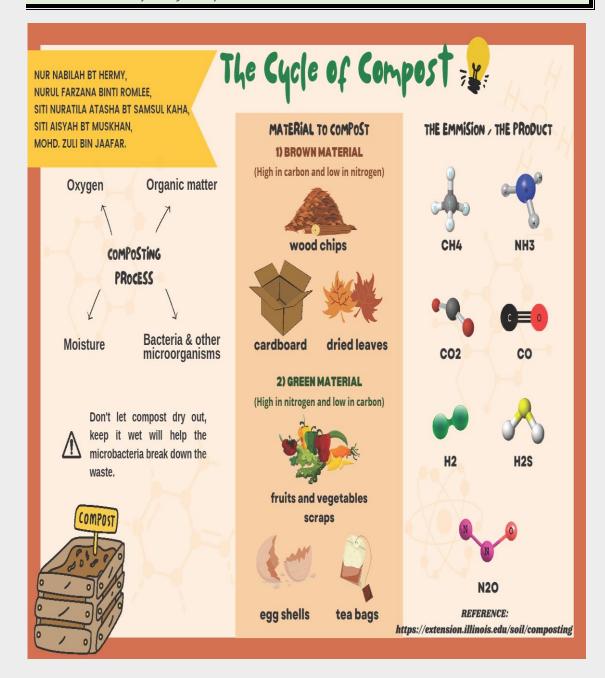
Mixing it with secondary material for balancing the pH of soil.

# EFFECT OF COFFEE GROUNDS ON LANDFILL

Coffee grounds contain oils and other compounds that acidify the soil. This produces an acidic leachate (liquid) in landfills, which can harm the surrounding soil.

Generate green house gases





Member: • ALYAA SOFIYA BINTI ZULKIFLI

MOHD HAFIZAN BIN HANIPHA





Facilitator: DR. MOHD ZULI BIN JAAFAR

### PESTICIDE AND CHEMISTRY

### WHAT IS PESTICIDE?

Pesticides are chemical compounds that used for destroying insects or other organisms harmful to cultivated plants or to animals. Pesticides are used to control various pests and disease carriers, such as mosquitoes, ticks, rats and mice. Pesticides are used in agriculture to control weeds, insect infestation and diseases.



These are grouped according to the types of pests which they kill:

- Insecticides insect
- · Bactericides bacteria
- Herbicides plants
- Fungicides fungi
- Rodenticides rodent . Larvicides larvae

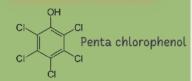
#### HOW DOES PESTICIDE MADE

A pesticide is made up of at least three different processes. The active substance is manufactured at a chemical plant then either formed there or transported to a formulator who makes the liquid or powder form. The pesticide is then sent to a farmer or other licensed applicator who dilutes it before applying it to the crops.

# CHEMICALLY-RELATED

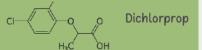
- Pyrethroid found naturally in chrysanthemums.
- Sulfonylurea herbicides for weed control.
- · Biopesticides generated from natural components such as animals, plants, microbes, and minerals.
- Organophosphate affect the nervous system by disrupting the
- Carbamate also affect the nervous system by disrupting an enzyme.
- Organochlorine insecticides were once widely employed (DDT, chlordane, and toxaphene)

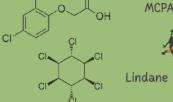
#### CHEMICAL FORMULA



INIVERSITI

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https://byjus.com/chemistry/pesticides/

### CHEMICAL COMPOUND OF HERBICIDE IN AGRICULTURE



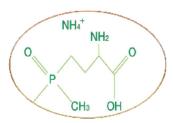
#### **BASTA 15**

Herbicides that's particularly effective on some of the most damaging and hard-tocontrol weeds in horticulture. Suitable for Oil Palm, Coffee, Fruits and Vegetables crops.

#### Chemical Herbicides?

Chemical Herbicides are intended to control nuisance plants such as grasses and weeds that may interfere with the development and productivity of nearby crops.

#### Glufosinate-Ammonium $(C_5H_{15}N_2\overline{O_4P})$

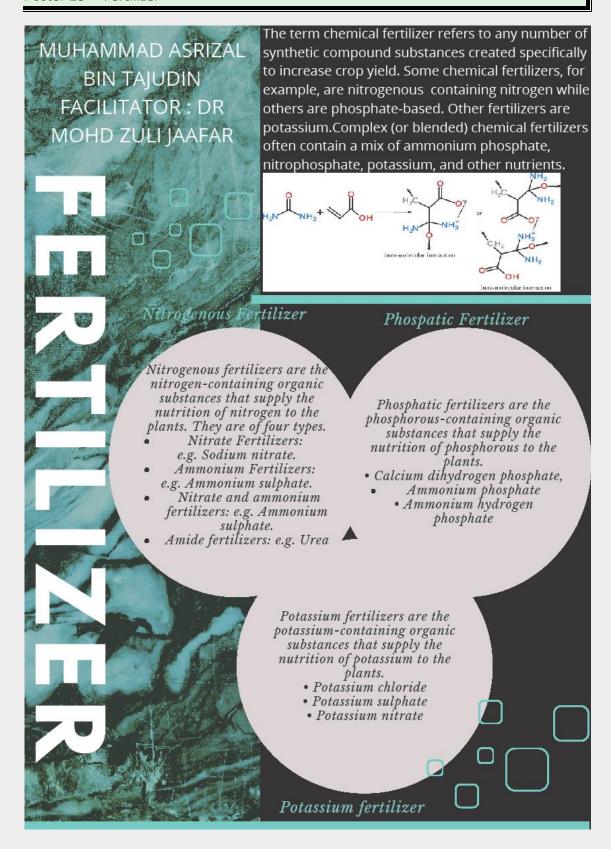


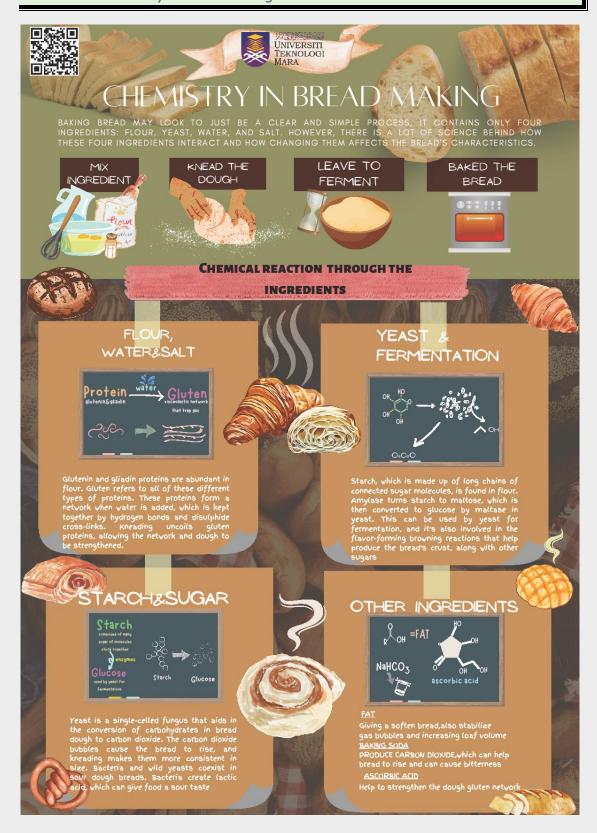
#### What is Glufosinate-Ammonium?

Glufosinate-ammonium is a highly effective herbicide used to control weeds in more than 100 crops in many countries worldwide. Farmers rely on Glufosinate-ammonium because it ensures a high degree of crop safety, as it only affects the parts of the plant where it is applied.

#### How Does Glufosinate-Ammonium Work?

Glufosinate-ammonium is a plant protection product that works by inhibiting an enzyme central to plant metabolism. The primary mode of action of Glufosinate-ammonium is the inhibition of the enzyme glutamine synthetase. This enzyme catalyzes the synthesis of glutamine from glutamate and ammonia and plays a central role in plant nitrogen metabolism. Plants absorb this substance primarily through their leaves and other green parts. This allows it to control weeds without affecting the roots or requiring tillage, which is important especially for erosion-prone areas such as slopes.







# **WHAT IS CHEMICAL SOIL?**



AVPC2022

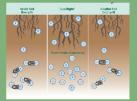
Chemical and biological reactions in soil that determine nutrient availability for plant growth and the potential environmental effects of inorganic and organic fertilization, particularly nitrogen and phosphorus fertilization

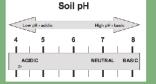
# soil composition • Top four elements — Carbon, Hydrogen, Oxygen

- and Nitrogen.

   Macronutrients —
  Phosphorus, Sulphur
  Calcium, Potassium, Magnesium. Micronutrients or trace
  - elements—Boron, Copper, Iron, Manganese, Molybdenum, Zinc and
  - Neutral pH—6.3-6.8 is ideal for most plants.

# soil pH





High rainfall
Rainwater is slightly acidic due to a reaction
with CO2 in the atmosphere. As this
rainwater passes through soil pores, it
leaches basic cations from the soil as
bicarbonates. Root respiration and
decomposition of organic matter also
release CO2, that increases the carbonic acid
(H<sub>2</sub>CO<sub>3</sub>) concentration resulting to leaching.

Some fertilizers such as ammonium  $(\mathrm{NH}_{\underline{\mathsf{A}}})$  fertilizers undergo nitrification process to form nitrate  $(\mathrm{NO}_{\overline{\mathsf{A}}})$  and during this process, H ons are released leading to acid soils

-Acid rain
Oxides of sulfur and nitrogen are released into the atmosphere when burning fossil fuels. Released oxides react with rainwater in the atmosphere to form tetraoxosulphate (vi) acid and trixonitrate (v) acid.

Weathering of silicate, aluminosilicate, and carbonate mineral complexes containing Nå, Cå, Mg, and K' enhances soil alkalinity. The above-mentioned minerals are frequently added to the soil as eroded sediments are deposited by water or wind. When watering with high-bicarbonate water, soil alkalinity can also be increased. Alkalinity can build-up in a soil if there isn't enough movement of water to absorb soluble saits. This is commonly happen in arid conditions or in situations with poor internal soil water drainage, where water is either absorbed by crops or evaporates either absorbed by crops or evaporates rather than moving through the soil.

# ion exchange



The reaction takes place in the soil colloids. In colloids, ion exchange (cation and anions) occurs. In agriculture, the phenomena of ion exchange are extremely important.

#### CATION EXCHANGE (BASE EXCHANGE)

$$\underbrace{ \begin{array}{c} CLAY\\ MICELLE \end{array}}_{} + 2H^* = \underbrace{ \begin{array}{c} H^*\\ MICELLE \end{array}}_{} + CLAY\\ MICELLE \end{array} + Ca^{**}$$

Cation exchange plays an important role in soil fertility, as well as in the causes and treatments of soil acidity and basicity. Changes in the physical properties of the soil influences the amounts and rates of water percolation. Plant nutrients such as calcium, magnesium, and potassium are mainly provided to plants in exchangeable forms. For example, Calcium is adsorbed on colloidal particle Hydrogen ion created as organic and mineral acid formed during the breakdown of organic materials in a near neutral soil. The H ion is adsorbed more strongly in colloid than the Ca<sup>2</sup> ion, and H is chemically comparable.

# ANION EXCHANGE (ACID EXCHANGE)

OH Clay  $+ H_2PO_4$   $\longrightarrow$   $H_2PO_4$  Çlay + OH Available Unavailable

The anion exchange process is similar to the cation exchange process. Anion exchange is a phenomena that occurs in relation to phosphate ions and their fixation. The exchange is mostly caused by the clay minerals' hydroxide (OH') ions being replaced. Clay particles adsorb phosphate ions from soil solution, reducing their availability to plants. Colloid bound phosphate fixing is another name for this process. When lime is used to raise the pH of acidic soil, the phosphate ion becomes available once more.

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- 4. Azyyatı Binti Dennes Zamlı (2022900857)





Managing waste effectively and efficiently help us preserve the planet. Due to a lack of knowledge and awareness, a substantial amount of trash has accumulated.

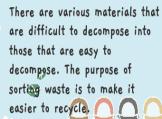


Waste management refers to the process used to manage waste across its full life cycle, from generation to disposal or recovery

Waste management includes the procedures and activities necessary to manage waste from its conception to its ultimate disposal.

This includes the collection, transportation, treatment, and disposal of waste, as well as the monitoring and control of the waste management process and the laws, technology, and economic systems related to waste.

SEPARATE THE TRASH ACCORDING REDUCE THE USE OF TO THE KINDS OF RAW MATERIALS PLASTIC OR OTHER WASTE.



The primary objective of waste management is to keep trash from negatively impacting people's health, the environment, impacting the planet's resources, and its looks as much as possible.

Waste management is critical because it protects the environment from the damaging effects of waste's inorganic and biodegradable elements. Waste mismanagement may lead to water contamination, land erosion, and air pollution.

> DISPOSE OF NON-RECYCLABLE WASTE AT A LANDFILL.

The importance of disposing of waste in landfills that cannot be recycled is that there are tools that can make it decompose even though it takes a long time.

TURN ORGANIC WASTE INTO FERTILIZER.

CHANGE THE GARBAGE DISPOSAL TO CARDBOARD MATERIAL.

You can apply this easy method so that you don't use a lot of plastic bags that are difficult to decompose, in contrast, to cardboard or paper materials.

# **BIODEGRADABLE WASTE**



the wastes that come from our kitchen and it includes food remains, garden waste, etc.

# NON-BIODEGRADABLE WASTE



P





known as dry waste. Dry wastes can be recycled and can be reused. Non-biodegradable wastes do not decompose by themselves and hence are major pollutants.

BRING YOUR OWN EQUIPMENT SO YOU DON'T USE PLASTIC TOOLS.

Self-awareness is certainly important to deal with waste so that you don't always use plastic materials. Now there are many tools made of stainless steel.

USING EQUIPMENT THAT IS NOT USED ONCE AND THEN THROWN AWAY.

BY AINNAZRIN, FAROUQ, ALIF

## REFERANCE

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enclosed hardward one forest

https://myethicalchoice.com/en/journal/waste-management/the-importance-of-wast management/#:-text=Waste%20management%20is%20mportant%20asif%20onlected%20ard%20ard%20managed%20efficient/

# **SOIL MANAGEMENT**

# WHAT IS A SOIL MANAGEMENT?

It is an application of practices to enhance the soil's fertility, regulating soil's pH and at the same time to preserve it.

## WHY SOIL MANAGEMENT IS SO IMPORTANT?

- · It is to increase the crops productivity.
- To preserve environmental sustainability.
- For providing healthy ecosystem for flora and fauna living inside it.

WHEN IS THE MOST SUITABLE TIME TO APPLY THIS PROCESS?

- When the agricultural land becoming less productive.
- The environmental issues becoming worse changing soil pH.

# **HOW DO WE APPLY IT?**

- Use the fertilizers which contains nitrogen, phosphorus and potassium. (N,P,K).
- Besides providing nutrient, fertilizers buffer solution for maintaining pH soil ranging 6.5 - 7.5 pH value.







Figure 1, 2, 3: Fertilizers is one of the effective method for soil management.

#### WHICH INTERNATIONAL AGENCIES / ORGANIZATION RESPONSIBLE FOR FERTILIZING THE SOIL?

- Asia Soil Conservation Network (ASOCON)
- International Soil Reference and Information Centre (ISRIC)
- World Overview of Conservation Approaches and Technologies (WOCCAT)

# WHO MOSTLY DEPENDS ON THIS METHOD?

- Farmers get their benefits so they could increase their yield output.
- Government depends on it for agroforestry to control soil erosion, maintain soil organic matter and to promote nutrient cycling.

DEGREE POSTER (BRONZE)





# Organic VS Synthetic Fertilizers



# **DEFINITION OF FERTILIZER**

A chemical or natural substance added to soil or land to increase its fertility

# **IMPORTANCE OF FERTILIZER**

Help strengthens the stalks of the plants

Increase plants' tolerance towards pests



# **ORGANIC FERTILIZER**

Fertilizers that are naturally produced
Eg: Manure
Advantage: Environmentally friendly
Disadvantage: Expensive

# SYNTHETIC FERTILIZER

Fertilizers that are manufactured artificially

Eg: Ammonium nitrate

Advantage: It has fast-acting chemicals in it

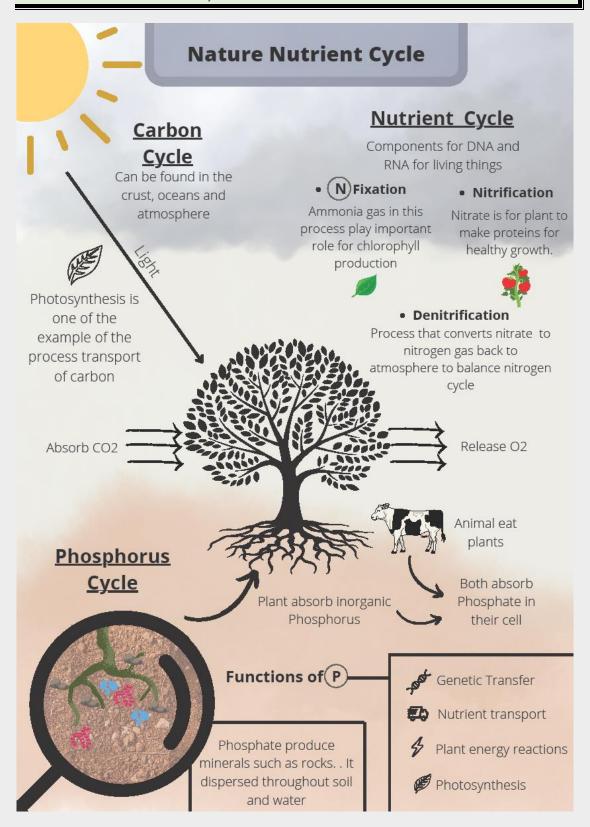
Disadvantage: Does not improve soil structure

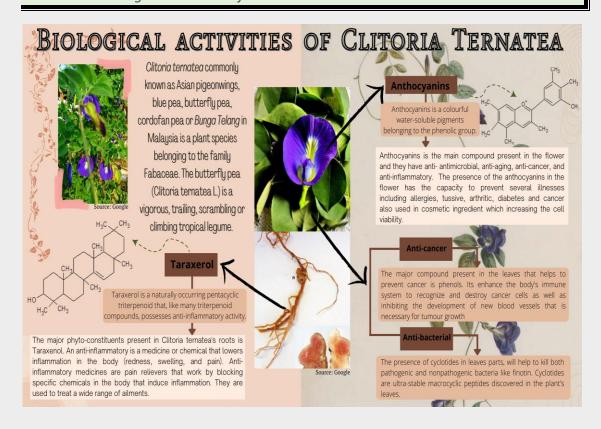




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- Inorganic Fertilizer Vs. Organic Fertilizer. (2022). Retrieved 8 June 2022, f https://homeguides.sfgate.com/inorganic-fertilizer-vs-organic-fertilizer 39528.html

BY: NURFAIQAH BINTI ZALZAIFULKHAFIZ, MANISA BINTI MOHAMED ISA, NOR FATIHAH BINTI JAAZIS FACILITATOR: NOR HABIBAH MOHD ROSLL NORIHAN YAHYA





# RECYCLING

# WHAT IS RECYCLING?

The process of converting waste materials into new products.



# WHY RECYCLING IS IMPORTANT?

- Reduces waste sent to landfills and incinerators.
  - 2. Provents pollution.
    - Conserves natural resources.
    - 4. Conserves energy.
    - 5. Creates jobs and producing economic benefits.

-Class bottles composed of these three materials: sand (silicon dioxide, or SiO2).

carbonate, or CaCO3), and

sodium carbonate (Na2CO3).

-Glass bottles recycled

become new glass bottles.

# WHAT TO RECYCLE?



## PAPER

- -Paper composed of cellulose fibres derived from wood, rags, grasses or other vegetable sources. -Some grade paper can be recycled until seven times.
- -Recycled to new paper.



# ALUMINIUM CANS

limestone (calcium

GLASS BOTTLES

- -Made from aluminium alloy.
  -Aluminium alloy is composed of aluminium itself and alloying elements such as copper. magnesium, manganese, silicon, tin and zinc
- -Recycled back into aluminium cans.



# oxygen. -Made from

- -Made from steel composed of alloy iron and carbon -Recycled back to use in steel products
- -Example: Car parts and construction materials



# PLASTIC

- -Most plastic contains organic polymers composed of various elements such as carbon, hydrogen, oxygen, nitrogen, sulphur and chlorine. -Recycled into new plastic
- -Recycled into new plastic bottles, carpet, clothes, etc.



**DIPLOMA POSTER (GOLD)** 



#### RADATION BEHAVIOUR OF CHLORPYRIFOS IN SPINACH (SPINACIA OLERACEA)

Siti Norhafiza Mohd Khazaai<sup>b</sup> , Sarah Laila Mohd Ja





# INTRODUCTION

#### Why Spinach?



- Best-known as one of the green leafy vegetables that have the richest contents of iron
- The leaf part contains high antioxidants and vitamins such as vitamin A, vitamin E, vitamin C, vitamin K, and vitamin B. folate or folic acid.
- The leaves are sources of protein and many minerals such as calcium, magnesium, phosphorus, zinc, copper and potassium that can be part of healthy diet, maintain healthy skin and prevent oral cavity
- However, some insects and diseases can be damaging those on the vegetables during the growing process [1].
- · In agricultural management practice, chemical were used to control the crops such as nematicides, herbicides, insecticides and fungicides.





However, frequent exposure of the pesticides can cause vegetable to be contaminated thus lead the vegetables to become very toxic [2].



# **WHAT**

- Chlorpyrifos are the most extensively used pesticides in agriculture purposes.
- · The existence of pesticides residues in food can be shown in direct result of pesticides used on crops [3].
- · The residues of pesticides on fruits and vegetables constitute a possible risk hazard to consumers.

**PUBLICATIONS** 

## WHY

- Extreme chlorpyrifos can cause nausea, dizziness, abnormal facial sensation and immune system, birth defects, leukemia, anorexia and fatigue [4,5].
- Moreover, chlorpyrifos can inhibit the cholinesterase and become toxic in human [4].

## **HOW**

- · Moreover, chlorpyrifos can inhibit the cholinesterase and become toxic in human. The toxic effects are caused by the disrupting of the
- · It occurs because of the accumulation of acetylcholine in the synapse
- avoiding the adverse on health effect and interference on surrounding such as ecosystem besides to ensure the maximum quality of the vegetables before it can be consumed











**INTEREST** 



Nurul Shazlinie Abdul Shukor, Siti Norhafiza Mohd Khazaai\*, Zurhana Mat Hussin, Sarah Laila Mohd Jan (2015). Degradation Behaviour Of Chlorpyrifos In Spinach (Spinacia Oleracea) And Soil. Malaysian Journal of Analytical Sciences, Vol 19 No 4 (2015): 722 - 729.

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# DIATOMACEOUS EARTH INSECTICIDES

NON-TOXIC PEST CONTROL FOR YOUR HOME AND GARDEN

# WHAT IS THE PURPOSE OF INSECTICIDES?

An insecticide is a chemical substance used to kill insects and other arthropods. An insecticide can be formulated to kill, mitigate, repel, or harm one or several species of insects.

Various insecticides work in different ways.

# WHY WE CHOOSE TO USE THIS INSECTICIDES?

- Non-toxic to pets or humans
- A versatile pest management tool
- · Easy to find in most communities
- Easy to find in most communities



INSECTICIDES
APPLICATOR



INSECTICIDES EXAMPLE

- https://learn.eartheasy.com/
- https://www.treehugger.com/
- https://www.youtube.com/watch?v=rtHHNNQT6g

# HOW TO APPLY THIS INSECTICIDES

- Once a week after seeing the pest on plant
- Spread it by using a hand-sized applicator, make sure well-spread it in every direction.
- NOTES: use this insecticide in the early morning and late evening to reduce its effect on beneficial garden insect such as ladybugs and bees

# FACILITATOR:

- MADAM NOR AZIRA IRMA MUHAMMAD
  CREATED BY:
  - MUHAMMAD IZZUDIN SYAH BIN MOHAMAD 'ASHRI
  - 2. MUHAMMAD FAKHRUL IMAN BBIN MOHD KAMAL AZMY
  - 3. MUHAMMAD AMIR HAZMI BIN AMRAN
  - 4. MUHAMMAD ASYRAF BIN MOHD KHAIRI



# THE CHEMISTRY OF TURMERIC

TURMERIC IS A COMMON SPICE THAT COMES FROM THE ROOT OF CURCUMA LONGA



# SCIENTIFIC NAME:

- Curcuma longa Rhizhomatous herbaceous perennial plant
- Turmeric is a plant of the family Zingiberaceae commonly known 👃 as ginger family and comprises about 70 species (Smart & Simmonds, 1992)

# MORPHOLOGY

- Bear long simple leaves with long petioles (leaf stems). The leaves emerge from the branching rhizomes that lie iust below the soil surface.
- Older rhizomes are scaly and brown in color and young rhizomes are pale yellow to brown-orange.

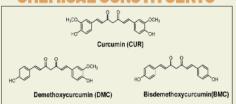


Figure 1: Chemical Structures of Curcuminoids (Kotha & Luthria, 2019)



Curcumin is a key chemical componnet of turmeric and also make it fluresce in the right condition.



If turmeric sprinkled into alcohol whilst illuminated by UV lights, a bright green-yellow fluorescence can be seen. Alcohol is used as curcumin is soluble in alcohol but not in water and this help make the fluorescence

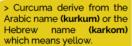


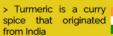
Curcuminoids is responsible for the orange-yellow color.

# BIOACTIVITY STUDY OF CURCUMINIODS

- CANCER: Curcumin has demonstrated powerful efficacy as an anticancer agent, which possess antiinflammatory, antioxidative, anti-Alzheimer and anticancer activities in both preclinical and clinical studies. (Meng et. al, 2018)
- CARDIOVASCULAR: Curcuminoids might reduce the risk factor of cardiovascular disease, effective against myocardial infarction and atherosclerosis, and decrease total cholesterol (Kotha & Luthria, 2019)
- DIABETES: Curcumin has hepatoprotective, neuroprotective, cardioprotective, hypoglycemic, antirheumatic, and antidiabetic activities. (Meng et. al, 03 2018)

# **DID YOU KNOW?**







T





PROTECTS HEART DISEASE









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# PREPARED BY:

Mohd Safuan Safuani<sup>1</sup>, Nur Azwa Sharlina Azwan Lai<sup>1</sup>, Elmyra Ellie Anak Elvin<sup>1</sup>, Muhammad Ariff Zulkiflee<sup>1</sup>, Nurain Johar<sup>1</sup> Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA (UITM) Sarawak Branch, Mukah Campus <sup>2</sup>Faculty of Applied Sciences, Universiti Teknologi MARA (UiTM) Sarawak Branch, Mukah Campus 'nurainjohar@uitm.edu.my

# AVPC-Dip\_12



Annona squamosa as a Potential Bio-pesticides for Aphids control

INTRODUCTION

Pesticides from plants are becoming increasingly important as pest management tools in various cropping types. Farmers have dramatically increased their use of synthetic pesticides and fertilisers in modern agriculture to get a faster and good quality of produce. Chemical pesticides destroy or repel pests, such as insects, weeds, and rodents, but may cause a range of harmful health effects in humans, including cancer, short- and long-term injury to the nervous system, lung damage, reproductive dysfunction, and possible dysfunction of the endocrine (hormone) and immune systems (Ajay et al. 2017). In order to reduce the negative effects of chemical pesticides, it is possible to use more environmentally friendly pesticides. The use of biopesticides is one method for controlling pests from naturally occurring substances with non-toxic pest control properties. They are derived from natural substances such as plants, animals, bacteria, and minerals.

#### HOW?

The combination of the extraction from both 7 grams of crushed leaves and seeds A. squamosa has been used by the simple extraction method using a hot plate technique for 30 minutes. After extraction, the sample was filtered out to remove solid material residue, then the filtrated solution is added with glycerine to 100 percent of volume. The solution was poured into a diluted white oil solution of 1:30.











## AUTHORS

Muhammad Aliff, M. F., Nur Alia Qistina, M. R., Nur Batrisya Zahirah, A., Nur Atikah Shahkila, M. S., and Nazalyyussma, Y. Diploma in Planting Industry and Management, Faculty of Plantation and Agrotechnology, UiTM Perlis.

The pesticides from were reported to give a promising response to tropical plants. Extract from seeds, leaves, bark, twigs, and fruits have been extensively tested in recent years for bioactivity against several pests (Prithusayaket  $\it et al.$  2018). The seeds extract of several species have been reported to have toxic and potent growth-reducing activity to insects (Leatenia and Isman, 2004). Annona-based bio-pesticides can be used as an alternative to reduce the usage of chemical pesticides. The application on aphids should be tested because the population increases rapidly and will damage the plants by sucking the plants' sap and resulting in lower agricultural yield. It also becomes a carrier of any viruses in the host plant when the aphid moves to a different plant to begin a new colony and can be a serious pest of agricultural crops, especially when they are able to transmit phytopathogenic viruses (Emilio and Maria, 2008). 200

#### WHY?

The aqueous leaf extract of A. squamosq was found to be an effective antifeedant agent. Since the antifeedant activity was concentration-dependent, most probably the flavonoids contained in the leaf (It is reported that the seeds of *Annona squamosa* have insecticidal and abortifacient properties). The oil extract from seeds of *A. squamosa* at 2.5 percent concentration shows significant results where it can reduce the leaf damage caused by larvae and adult beetles (Irwan et al. 2021). Although aphids are small species of insect, they will suck the sap of the plant, especially in the vegetative stages. It caused plants to wither and die due to removing of plant sap. Plant also become stunted. Aphids feed on flower buds and fruit and caused flowers and fruits to malformed.

### CONCLUSION

It is interesting to note that A. squamosa may give a positive response as bio-pesticides. A study to evaluate the effectiveness of these potential bio-pesticides on aphids should be conducted to get a

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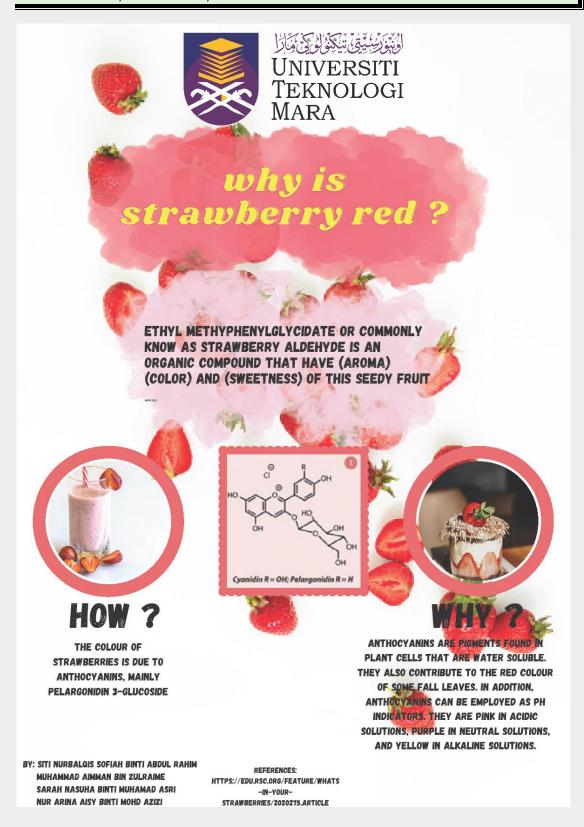
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# Introduction

A pesticide is any substance that is used to kill, repel, or control pests in plants or animals. Herbicides are used to kill weeds and other undesired plants, insecticides are used to control a wide range of insects, fungicides are used to prevent mould and mildew growth, disinfectants are used to prevent the spread of bacteria, and compounds are used to control mice and rats. People are exposed to low quantities of pesticide residues in their foods due to the widespread use of agricultural pesticides in food production. According to other data, children are particularly vulnerable to the negative effects of pesticide exposure, including neurodevelopmental problems. Pesticides are utilised in a number of contexts, including homes and schools, and people may be exposed to



## What

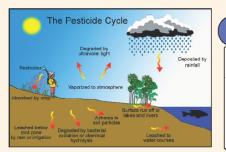
Pesticides are defined as any compound or mixture of substances designed for preventing, eliminating, repelling, or minimising any pest, according to the Environmental Protection Agency (EPA), the federal agency in charge of pesticide regulation in the United States. Pesticides include herbicides, fungicides, and a variety of other compounds used to manage pests, while the phrase is frequently misconstrued to mean just insecticides. Plant regulators, defoliants, and desiccants are examples of pesticides.

# Why pesticides are used

Pesticides are used to control various pests and disease carriers, such as mosquitoes, ticks, rats and mice. Pesticides are used in agriculture to control weeds, insect infestation and diseases. There are many different types of pesticides which meant to be effective against specific pest

# How how pesticides affect the environment

esticides are poisonous substances that are released into the environment on purpose. When pesticides flow off from fields, escape storage tanks, are not properly removed, and are sprayed aerially, they can readily contaminate the air, land, and water. Other issues arise as a result of inefficient production, transportation, storage, and disposal methods. Repeated pesticide treatment builds pest resistance over time, while its impacts on other species can aid the pest's resurgence.



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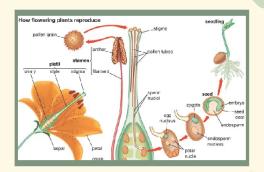
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# CHEMICAL REACTION OF PLANT REPRODUCTION

# WHAT IS CHEMICAL REACTION OF PLANT REPRODUCTION.

Chemical reaction of plant reproduction refers to lowering plants reproduce sexually through a process called pollination. The flowers contain male sex organs called stamens and female sex organs called pistils.



# PHOTOSYNTHESIS Light 6CO2 Carbon diaxide + Chlorophyll RESPIRATION C4Ht004 C4Ht004

# WHAT IS CHEMISTRY APPLICATION IN THE TITLE

Plant growth involves both chemical and physical changes. Photosynthesis and respiration are chemical changes which convert light, water and carbon dioxide into oxygen and glucose, which is then used as energy by the plant. Chemical reactions are used to produce most of our energy.

# WHEN IT IS USE IN AGRICULTURE Most of the agricultural activities on a farm begin with seed and end with seed. Flowering, which marks the onset of reproduction, is a key regulator of life

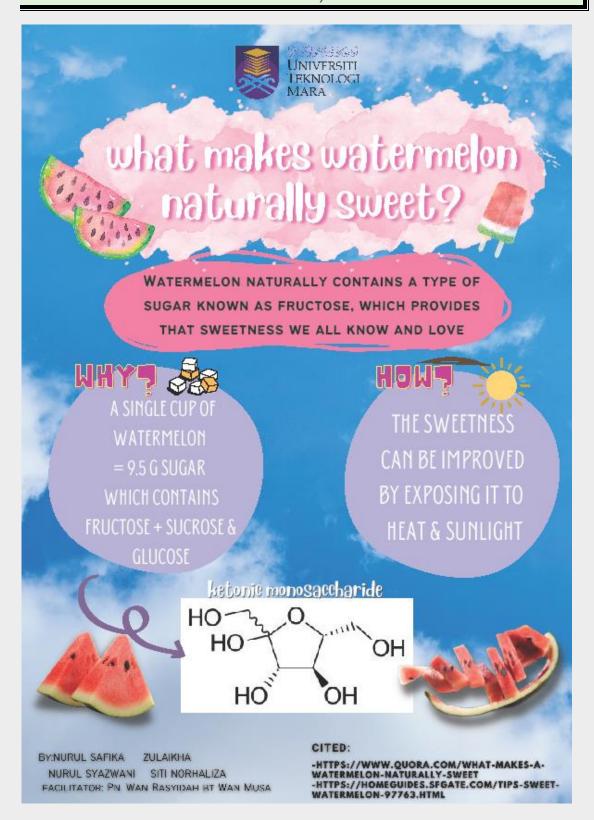
# WHY IT IS IMPORTANT IN AGROTECHNOLOGY

Plant reproduction plays an important role as it supplies food to animals and humans.
Plant reproduction is not only fundamental to the fitness of plant species, but also the success to the entire agricultural economy.

https://letstalkscience.ca/educational-resources/backgrounders/plant-reproduction https://sciencebriefss.com/nature/chemical-reactions-active-in-the-development-of-plants/

cycle and senescence.

INTAN NAJWAAISHA LEYA DALILA NUR HAIFA FAKHIRA MARIA ELISSA









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# CHEMICAL REACTION IN MAKING PESTICIDE

The word "pesticide" is a broad term that refers to any device, method, or chemical that kills plants or animals that compete for humanity's food supply or are otherwise undesirable.



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# What is chemical reaction

A chemical reaction is a process in which one or more substances, also called reactants, are converted to one or more different substances, known as products. Substances are either chemical elements or compounds.

# **Formulations**

active ingredient (a.i.) + inert ingredients = Pesticide formulation



200 grams/liter (1.67 pounds/gal) soluble liquid



+ 80 WP

# The Manufacturing Process

Manufacturing a pesticide involves at least three separate activities. The active ingredient is first synthesized in a chemical factory, then formulated in the same place or sent to a formulator, who prepares the liquid or powder form.

# **Examples of Chemical Structure**

# Types of pesticides

- Insecticide
- herbiciderodenticides
- fungicides

# **Facts**

Chemicals can be used to re-mediate areas that have been contaminated as a result of industrial accidents.

# Attempting to avoid incompatibilities

- Check the pesticide label to see which pesticide formulations should not be mixed. Ready-to-use (RTU) pesticide products and focused liquids which have been dissolved that according label instructions can both be mixed together. Undiluted liquid concentrations, on the other hand, should not be mixed.
- Regular shaking is required to reduce incompatibilities between flowable, wettable powder and water-dispersible granule formulations.

# References

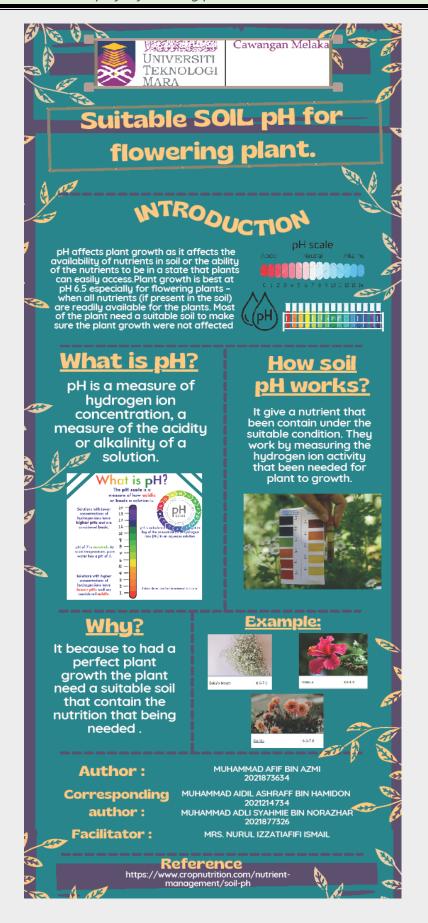
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# **GROUP 7**

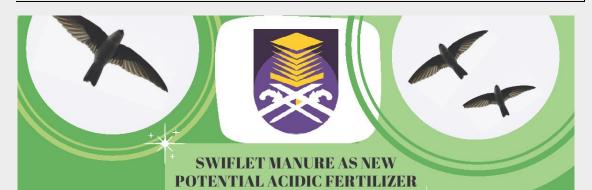
- 1. NUR ATIQAH BINTI ROSLI
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- 3. MUHAMMAD AMIR FARHAN
- 4. MUHAMMAD DANIEAL HELMYZAN











# Introduction?

Swiftlet manure a new potential acidic fertilizer. A breakthrough in organic fertilizer today has discover the swiftlet manure (Aerodramus fuciphagus O.) locally known as burung walit. Researchers in Malaysia claimed that swiftlet manure has high nutritional value. However, only limited studies were done on swiftlet manure making it a promising potential but still needed in depth research. Last but not least, this could help contribute to many producers all around Malaysia and Asia in producing high quality raw products by using local produce manure (Abdullah, 2017).



The production of bio-fertilizers from waste materials such as swiftlet droppings is combined with useful microbes such as mycorrhiza, yeast, lactic acid bacteria, and others that help add nutrients naturally and stimulate plant growth.

# acidic fertilizer

- pH of 6.88, pH < 7 (acid)
- High organic matter content (67.08%),
- High total nitrogen, N (9.96%),
- Low total Phosphorus, P (1.15%)
- Total Potassium, K (2.54%).
   (Tampus & Escasinas, 2019)

# Hows



One kilogram of swiftlet manure samples was analyzed for pH, total N (%), P (%), K (%), and organic matter content (%). (Tampus & Escasinas, 2019)





Sergeeva & Gasimova, 2020

# **Why?**

- The application of fertilizers based on birds dropping improves the phytosanitary condition of the soil.
- Swiftlet manured has high nutritional value. The high content of nutrients in swiftlet waste is able to compete with other biofertilizer products
- Under the influence of powder in plants, nitrogen, phosphorus, potassium, and carbohydrate metabolism are enhanced. (Sergeeva & Gasimova, 2020)

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 Sergeeva, A. and Gasimova, G (2020) Prospects for application of organic fertilizer from bird litter. International Scientific-Practical Conference "Agriculture and Food Security: Technology, Innovation, Markets, Human Resources" (FIES 2020). 27, 00107. PROJECT LEADER:
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#### THE AUTHOR'S

Siti Nor Najla Siti Nur Aina Najeehah Nurdurra Qadeja Muhammad Adam Danial



# CHEMICAL PESTICIDES AND PLANT HEALTH

# INTRODUCTION

Pesticides defines as: Any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest. Any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant.

- Insecticides
- Herbicides
- Rodenticides
- Fungicides

# WHAT IS PESTICIDES?

A substance that use for removing insects or others useful things that usually harms the plants or crop at the field usually used by a farmer. It is useful for plants bu it is considered as a danger product to human because it can cause a death or damage peoples health.

The ingredients in the pesticides can devide into three steps or categories:

- 1. An active ingredients
- Can control the pests
- It can be identified by name, product's label together with it's percentage by weight.
- 2. Inert ingredients
- Inerts are chemical, compound and other substance, including common food commodities.
- All inert ingredients must be approved by Environmental Protection Agency (EPA) before they can be included as pesticides.
- 3. Evaluating pesticides ingredient
- After all the process of making the pesticides, and before the process to sell it to the market EPA must be evaluate them throughly.

# REFERENCES

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# WHY WE SHOULD USE PESTICIDES?

- Used to control various pest and disease
   carriers
- Used to kill or inhibit the growth of unwanted plants ( also known as weeds )
- A good alternative organic product
- Can be used to protect the plantation sector in an efficient, safe, cost effective, and environmentally friendly manner
- · Used to control insects
- Used to kill or slowing the growth of algae
- · Able to increase agricultural yields
- Very easy to use

# **HOW DO WE USE PESTICIDES?**

- Before mixing pesticides, make sure you have the required training. See the section on pesticide certification for further information.
- Rather than treating all of the plants in the greenhouse, only treat the infested one.
- 3. Before adding insecticides, verify the pH of the water and adjust it if necessary.
- When mixing insecticides, be precise with your measurements.
- 5. Spray the mixture of a pesticide and water right away or within a few hours. Never wait the night before applying a chemical that has been mixed.

# Sollacion

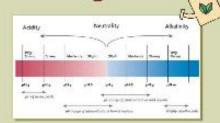


# WHAT IS SOIL ACIDITY?

Soil acidity is a situation where the pH of the soil does not exceed the neutral pH which is below?

# CAUSES OF SOIL ACIDITY

- Soil additioation occurs as the concentration of hydrogen ions in the land rises.
- The major cause of soil acidification is impractical nitrogen use, preceded by importation of alkalinity in produce.
- Once soil becomes too soidio. Laffeo is the existing supply of introgen phosphorus, potassium, and magnesium, All of those are main nutrients that plants take in large quantities in order to survive and develop.



The pH range which usually found in soils under native or environmental causes Lawer pH values under V netleet the increased soil acidity as they decrease.

# Types of Soil Acidity

hydrogeniona existing in the meelum.

# Active acidity | Reserve acidity

Addity adsorption on the exterior of sail and organic compounds mo equies.

# MANAGEMENT OF ACIDIC SOILS:



Understanding how soil pH features and additioation rates differ all over the land will enable you to handle soil phimore attentively.

INTERPERETING pH RESULTS

• Agricultural lime may be required to manage or tix pH to an adequate level, depending on the pH data collecter.



# 5.5 RECOVERY LIMING IS RECOMMENDED



il ining is the most cost effective way of minimizing soil ah. The quantity of lime needed is determined by the pH profile of the soil, the value of the Irme, the organic matter content, the crop management, and the distribution of rain.

# References:

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Members: Model Zuli Bir Jacker Aide Cialina Hirribbers Nur Ume rah Brit Suhaimi

# AMMONIA IN AGRICULTURE







A study was done to increasing food demand with growing population and limited land for agriculture. Conventional agriculture, on the other hand, is a major source of ammonia (NH3) emissions, which contribute to haze pollution and harm to human health. To address these multiple difficulties, organic and conservation agriculture (OCA) methods are advised; however, whether OCA provides cobenefits for both air quality and crop productivity is debatable. We use data from China, a global hotspot for agricultural NH3 emissions, to undertake a meta-analysis and machine learning method to estimate the effects of OCA on NH3 emissions, crop yields, and nitrogen usage efficiency (NUE).



# What Is Ammonia?



Colourless gas with distinct odour composed of nitrogen and hudrogen atoms.



90 percent of ammonia produced is used in fertilizer to help sustain food production.

Makes the most important crop nutrient, nitrogen, available for nitrogen fertilizer production



# Why plants need ammonia

Ammonia present in soil, water and air which is important source of nitrogen for plants

Nitrogen enhances plant growth and fruit and seed production, resulting in a higher yield.

> Facilitator Dr. Mohd Zuli Bin Jaafar



**Anhydrous** Ammonia







# Chemical Properties

Ammonia (NH3)

N Content	82%
Boiling Point	-33 °C (-27 °F)

## Agua Ammonia (NH40H)

N Content	20 to 24%
рН	11 to 12

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# WATERING PLANT

Let's get ready to learn together!



# INTRODUCTION

Water is amazing. It is basically responsible for all life on Earth since it is composed of H and O2. Watering your plant is obvious, but determining how much and how frequently is more difficult. Fortunately, we have a few suggestions for watering for maximum plant health.



# VHAT?

Water is required for all living things to survive, and plants are living things! Plants wilt when they are not adequately watered. This is due to turgore, which is water pressure inside the cells that comprise the plant's skeleton. Plants have more water than mammals, which contain around 90% water.

# HOW?

Water enters the stamp of a plant and goes up to the leaves. Water evaporates from the leaves as the plant exchanges water for CO2. This is known as transpiration, and it occurs through microscopic holes in the plant's leaves known as stomata. Water evaporates from the leaves through the stomata, and CO2 enters the stomata to replace the water. The exchange of H2O for CO2 is known as transpiration

# WHY?

All living things require water because life necessitates a great deal of chemical interaction. Water is commonly used to dissolve chemicals. Plants combine water and CO2 to produce sugar. Even if the plant is not constructed of wood, water helps it stand tall.

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# INTRODUCTION

Most plant processes, such as photosynthesis, transpiration, respiration, germination, and blooming, are influenced by temperature. Photosynthesis, transpiration, and respiration all increase as temperature rises (to a point). Temperature influences the transition from vegetative (leafy) to reproductive (flowering) growth when paired with day length. The effect of temperature can either speed up or slow down this transition, depending on the situation and the unique plant.

# **PHOTOSYNTHESIS**

Photosynthesis is a process through which plants and other organisms transform light energy into chemical energy, which is then released to power the organism's activities through cellular respiration.

# RESPIRATION

The process of respiration in plants involves using the sugars produced during photosynthesis plus oxygen to produce energy for plant growth. In many ways, respiration is the opposite of photosynthesis. In the natural environment, plants produce their own food to survive.



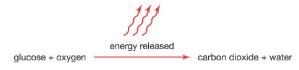
# **TEMPERATURE**

Most plants effectively grow with daytime temperature but preferably grow in night–time. It helps them to stay moist and their color most likely increasing and live a longer life. The night–like temperature which is 55 to 60 degree celcius is the great temperature for plant growth

# NOTE:

TEMPERATURE
CHANGES ARE
TOLERATED BY
MOST PLANTS.
FOLIAGE PLANTS
PREFER
TEMPERATURES
OF 70 TO 80
DEGREES
FAHRENHEIT
DURING THE
DAY AND
60 TO 68
DEGREES
FAHRENHEIT
AT NIGHT.

# The release of energy during cellular respiration



$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$$

MUHAMMAD SAMIR RAZIQ BIN RAHIMI \* AHMAD RAZIQ BIN RAMLAN \* MUHAMMAD ZIKRY BIN YUSRI \* MUHAMMAD IQBAL BIN RUKIMIN \*\*DR MOHD ZULI BIN JAAFAR\*\*

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[https://extension.oregonstate.edu/gardening/techniques/environmental-factors-affecting-plant-growth]





| Cawangan Melaka

# DOES THE PH OF WATER AFFECT THE GROWTH OF BEAN PLANTS?

#### INTRODUCTION

THE PH OF WATER IS A VERY IMPORTANT FACTOR WHEN IT COMES TO HOW WELL PLANTS WILL GROW, INCLUDING BEAN PLANTS OF ALL TYPES. SOME PLANTS PREFER LOWER PH LEVELS AND SOME PREFER HIGHER PH LEVELS. IT IS IMPORTANT TO KNOW HOW EXACTLY THE PH OF WATER CAN AFFECT THE GROWTH OF BEAN PLANTS. THE LOWER THE NUMBER, THE MORE ACIDIC THE LIQUID, WHILE A HIGHER NUMBER LEANS TOWARD MORE BASIC. ANYTHING THAT REACHES 7.0 IS CONSIDERED NEUTRAL. THE REASON WHY BEAN PLANTS NEED THE EXACTLY PH RANGE IS FOR AVOID THE BEANS FROM DAMAGE AND BEAN PLANTS PREFER SUCH A NARROW PH RANGE IS THAT ANYTHING TOO ACIDIC OR BASIC COULD DAMAGE THE SEED OR PREVENT UPTAKE OF CERTAIN NUTRIENTS

...

# WHAT IS THE BEST PH OF WATER FOR GROWING BEANS

- BEANS GROW IN SLIGHTLY ACIDIC CONDITION
- BEANS PLANTS GIVE PRIORITY TO ACIDIC WATER OVER ALKALINE
- WATER FOR BETTER GROWTH PREFER NARROW PH RANGE BETWEEN 5.8 AND 6.5
- - THE ACID HELPS IN LIBERATES THE IONIC NUTRIENTS TO BECOME SOLUBLE AND EASY TO ABSORB BY THE PLANT ITSELF.



# pH Scale Acidic Neutral Alkaline 6 7 8 9 10 11 12 13 14

## PH FOR BEAN PLANTS 5.8 TO 6.5 PH

# WHY PH OF WATER IS IMPORTANT FOR GROWING BEANS?

- ANYTHING TOO ACIDIC OR BASIC COULD DAMAGE THE
- SEED OR PREVENT THE UPTAKE OF CERTAIN NUTRIENTS.
  WATER THAT IS TOO ACIDIC COULD STRIP AWAY AT THE
  SEED'S WAXY COATING, DAMAGING THE INTERNAL
  SPROUT AND MAKING IT SUSCEPTIBLE TO DISEASE.
- THE PH BALANCE OF WATER AFFECTS THE ACID AND
  - ALKALINE CONTENT OF THE SOIL
- CALCIUM, MAGNESIUM, AND POTASSIUM LEVELS ARE REDUCED.

## HOW DOES THE PH OF WATER EFFECT PLANT GROWTH OF BEANS?

- PH 0 6 ( ACID ) CARBONATED WATER IS SIMPLY DISTILLED WATER WITH CARBON DIOXIDE ADDED. ADDS OTHER NUTRIENTS INCLUDING CALCIUM AND MAGNESIUM. THIS MAKES THE WATER NUTRIENT-RICH AND HIGHLY DIGESTIBLE TO PLANTS. THIS MAY RUN THE RISK OF OVER-FERTILIZATION. IF USING SODA, THAT IT CONTAINS SUGAR, NEGATING THE BENEFITS OF THE CARBONATION FOR YOUR BEAN PLANTS.
- @ PH 8 14 ( ALKALINE )
- SALT WATER IS A DESICCANT FOR ALL PLANTS, IT DRAWS MOISTURE FROM THE PLANT. LIKE SUGAR, SALT IN WATER IS RECOGNIZED BY PLANTS AS AN IMPURITY. AS A RESULT OF BEING WATERED WITH SALT WATER, PLANTS TAKE IN LESS WATER OVER TIME AND ABSORB SOME OF THE SALT IN THE WATER THEY DO TAKE IN. THE PLANTS BEGIN DEHYDRATING DUE TO LACK OF WATER INTAKE. THE BEAN PLANTS ALSO DEHYDRATE FROM THE INSIDE OUT DUE TO THE SALT THEY ABSORB FROM THE WATER. SALT WATER IS DEADLY TO YOUR BEAN PLANTS.



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# **ORGANOPHOSPHOROUS INSECTICIDE**

# MY QUESTION

WHAT IS INSECTICIDE ? WHAT IS THE USE OF INSECTICIDE IN PLANTATION WORLD ? HERE WE TAKE A LOOK ABOUT HOW CHEMISTRY INVOLVED?

# INSECTICIDES USED IN DAILY LIFE

INSECTICIDE ARE CHEMICALS THAT KILL INSECTS. THEY INCLUDE OVECIDES AND LARVACES AND LARVACE.
AGRICULTURE: MEDICINE: INDUSTRY: AND CONSUMERS ALL UTILISE INSECTICIDES. INSECTICIDES ARE CHEDITED WITH HELPING TO HOOST AGRICULTURAL OUTPUT IN THE YOTH CONTURY: ALMOST ALL PESTICIDES HAVE THE POTENTIAL TO AFFECT ECOSISSIEMS: MANY ARE HAZEROOUS TO PECHE AND ANIMALS: AND SOME GROW CONCENTRACED AS THEY MOVE OUT THE FOOD CIVIN.

CHEMICALS THAT CONTAIN IN ORGANOPHOSPHORUS!

OLGANOFHOSPHOLUS INSCRICTORS CONTAIN A PHOSPHANT GROUP AS THEIR BASEL STRUCTURAL FRAMEWORK AS DEFINED BY SCHRADER'S FORMULA.

TYPES OF WIDELY USED IN ORGANOPHOSPHORUS INSECTICIDE

# PARATHION

H<sub>3</sub>C O CH<sub>3</sub>

0,0-Diethyl 0-(4nitrophenyl) phosphorothioate

# MALATHON

15C C15

Diethyl 2-(dimethoxyphosphorothioy) sulfanyl butanedioate

## DIAZINON

CE S C CH CH.

O.O-diethyl O-2-isopropyl-6-methylpyrimidin-4-yl phosphorothioatet

# WHY USING ORGANOPHOSPHORUS INSECTICIDE

Parachion is a broad-spec- frum insecticide used to control a wide variety of insects and mites on more than 80 crops. It is also used in forestry, aquaculture, mosquite control, and other non-crop applications. Aerial and ground spraying are two methods of application.

Malathion is an organophosphate insecticide that is primarily used in agriculture and public health programs to control insect infestations such as ants, aphids, fleas, fruit flies, hernets, mites, mosquitees, moths, spiders, thrips, ticks, wasps, and weevils.

Diazinon is a non-systemic insecticide used to control soil and foliage insects and posts on a wide range of fruit, vegetable, mut, and field crops. Diazinon is also used in an insecticidal cartagion neerlactating cattle.

CREATED BY: MCHAMAD AARON HAKMY BIN MOHD NIZAM, MUHAMMAD HAKMI DANIEL BIN AHAMAD ADZHA, KHARUL SHAH NAJMI BIN KHARUL NIZAM REFERENCES:
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# THE POWER OF FERTILIZERS ON AGRICULTURE

# INTRODUCTION

**Agrochemical** are chemical products including fertilizer, adjuvants, pesticides, insecticides, herbicides, fungicides, and nematicides. It was applied in agriculture to enhance crop productivity and protect the crops from pests, insects, weeds, and fungi.

**Fertilizer** is a chemical or natural substances that are added to soil or land to improve its fertility as well as act a nutrient supplier to the plant.



# **BOOSTING GROWTH**

The content of nitrogen in fertilizer considered as a growth booster and a greening agent.

## **ENHANCE RESISTANCE**

Potassium can strengthen the stalks and straws of plants, enabling to hold more water and become more resistant to drought conditions

CONDITIONING SOIL

natural chemical composition

can help improve the chemical

of the soil. Organic fertilizer

Proper application of

balance of the soil by improving their usage

fertilizers can restore the

# **BENEFITS OF FERTILIZERS**

# ACCELERATION OF MATURATION

The phosphorus nutrient in fertilizers is mainly responsible for plant maturity

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### ORGANIC FERTILIZERS

made from natural and organic materials-mainly manure, compost, or other animal and plant products.

# TYPE OF FERTILIZER AVAILABLE IN MARKET



made of chemical components that contain necessary nutrients.

# NITROGEN FERTILIZERS

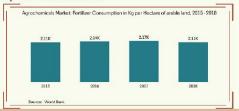
responsible for growth during the middle stages of plants lifespan.

# PHOSPHATE FERTILIZERS helps to strengthen the root system and

Phelps to strengthen the root system and stems of a plant, especially for process of flowering, seeding, and fruiting.

#### POTASSIUM FERTILIZERS

help plant grow deeper and stronger roots, also protect the plants from harm when deprived of other nutrients.



# EFFECT OF FERTILIZER ON PLANT GROWTH

- Provide crops with nutrients: -Potassium, K
  - -Phosphorus, P
  - -Nitrogen, N
- The substances such as vitamins, black rot acid, fulvic acid, brown rot acid, and low molecular weight organic acid, and butyric acid in fertilizer have a direct impact on nutrition functions of plants in physical activity and simulation, respiration enhancement and root growth promotion.

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# ADVANTAGES AND DISADVANTAGES OF AGROCHEMICALS

#### INTRODUCTION

Agrochemical, often known as an agricultural chemical, is a chemical substance used in agriculture. Pesticides such as insecticides, herbicides, fungicides, and nematicides are commonly referred to as agrichemicals.

Synthetic fertilizers, hormones, and other chemical growth stimulants, as well as concentrated stockpiles of raw animal excrement, may be included. Agrochemicals are included in the category of specialized

Such as fertilizers, liming and acidifying agents (which affect the pH), soil conditioners, pesticides, and chemicals used in livestock production such as antibiotics and hormones are all examples of agrochemicals.

Agro



#### **HOW TO HANDLE** AGROCHEMICALS?

- Do not transfer chemicals into smaller bottles and keep them in their original containers.
- Labels on containers must not be removed.
  Store chemicals in a secure, well-ventilated shed with spill-proof floors.

  • Chemicals and personal protective equipment
- should be kept separate areas

## PROS OF **AGROCHEMICALS**

- Fertilizing agrochemicals contain nutrient are injected into soil to aid the growth of plants.
   Plants become lethal to other insects that tries to
- · COST-EFFECTIVENESS
- Example, Anhydrous ammonia is way cheaper than organic derived alternatives.

#### CONS OF **AGROGHEMICALS**

- UNSUSTAINABLE SOIL CONDITIONS
   Repetitive usage of nitrogen, an affordable fertilizer, may cause pH imbalance of the soil.
   This will increase the cost by needing to purchase
- additional nutrients for the soil.
- TOXICITY AND REGULATION
- TOXICITY AND REGULATION
   High concentrations of the gas emitted from anhydrous ammonia may be fatal to humans.
   A discrete amount of agrochemicals have been found in urine samples of those who consume vegetable grown



# WHY AGROCHEMICALS ARE

Agrochemicals are used in the field or on crops to boost nutrient levels. They help agricultural growth by eradicating pests that cause havoc.

They are often used in landscaping, dairy farming, poultry, crop shifting, and commercial planting, among other farming sectors.

- AUTHORS

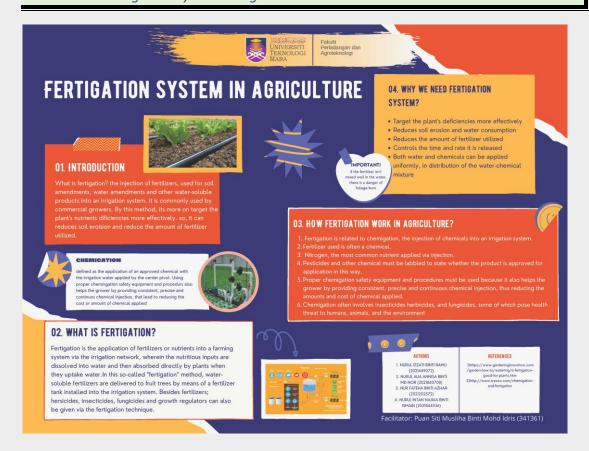
   DR. NORLIZA DZAKARIA

   FIRZANAH ARESYA
   SITI AISHAH
   QISTINA NAYLI
   ZUHAIRAH

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Fakulti Perladangan dan Agroteknologi

# CHEMICAL REACTION IN AGRICULTURE

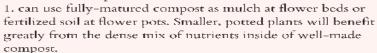
Compost contains nutrients that are beneficial for the optimal growth of plants (such as nitrogen, phosphorus, and potassium) and is also an excellent supplier of macronutrients that are needed by plants.

# 1.What is chemical reaction in composting?

Compost is the agriculture waste product. The process of decomposition or rot is the process by which dead organic substances are broken down into simpler organic or inorganic matter such as carbon dioxide, water, simple sugars and mineral salts.

# 2. How to use compost as fertilizer?

How to use compost as fertilizer?



2. If using it as mulch, make sure that you apply it in a 3 to 6-inch layer and then rake until it's even all around. You can use it as plant food for any kinds of plant types, which will also benefit from its biogenic beneficence.

# 3. Why compost are used in agriculture?

Compost improves soil structure, provides a wide range of nutrients for plants, and adds beneficial microbes to the soil. The maximum benefits of compost on soil structure (better aggregation, pore spacing, and water storage) and on crop yield usually occur after several years of use.

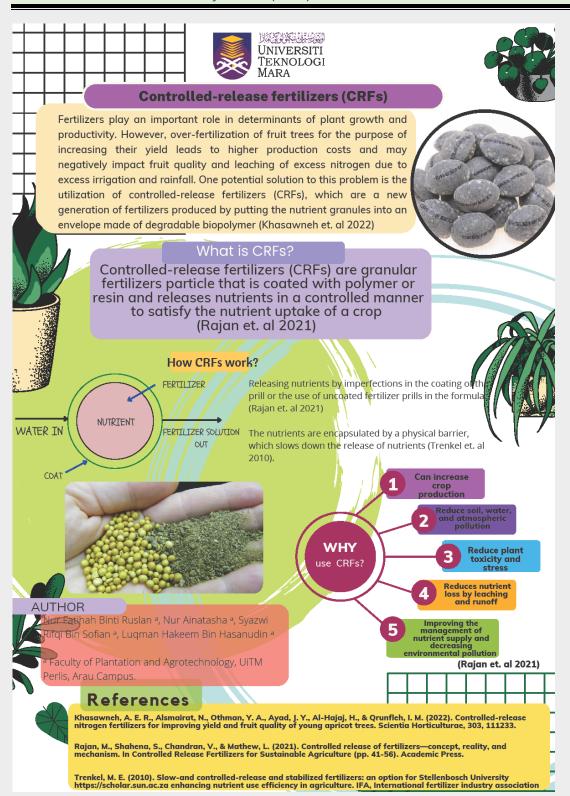


3. Nurul Hanis Maisarah 4. Husna Nadira

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#### 17 ESSENTIAL NUTRIENTS FOR PLANT GROWTH

#### THE ESSENTIAL NUTRIENTS FOR PLANT

Plants require 17 essential elements for growth: hydrogen (H), carbon (C), oxygen (O), nitrogen (N), phosphorus (P), potassium (K), magnesium (Mg), sulfur (S), calcium (Ca), boron (B), chlorine (Cl), manganese (Mn), iron (Fe), nickel (Ni), copper (Cu), zinc (Zn) and molybdenum (Mo).

#### THE IMPORTANCE OF NUTRIENTS

To grow, develop, and produce at their best, plants must have specific elements or compounds called essential plant nutrients.

A plant that lacks an essential nutrient cannot complete its life cycle.

The seed may not germinate; the plant may not develop roots, stems, leaves, or flowers properly; or it may not be able to produce seeds to create new plants.

Often the plant itself will die.

#### **HOW DO PLANTS ABSORB NUTRIENTS?**

#### **ROOT INTERCEPTION**

Roots grow through the soil profile to come in contact with nutrients

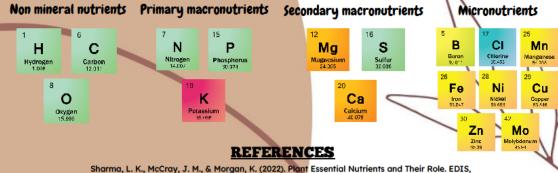
#### **MASS FLOW**

Nutrients move to the roots via water.

#### DIFFUSION

Roots grow throughout the profile and use nutrients directly around the root system.

#### CLASSIFICATION OF ESSENTIAL NUTRIENTS



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# Soil Colloids

Soil colloids, which contain organic and inorganic clay, are the most active location in the soil. The internal and exterior soil colloids surface are small particlesized minerals with a large external surface area and a high CEC.



## What is soil colloids?

Soil colloids is the colloidal complex of soil that consists chiefly of clay and humus that plays an important rale in ion exchange and fertility.



# Types of soil colloids

There are got four (4) types of soil colloids which are:-

- Crystalline silicate clays
- Nom-crystalline silicate clays
   Iron and aluminium oxides.
- Organic (Humus) colloids.



# soil colloids

- 1. Always in motion because of charge particles.
- 2. Have ability to absorbed gases, liquid and solid
- from their suspension. 3. Never pass through a semipermeable membrane.
- Have the properties of cohesion and adhesion.



#### Importance of soil colloids

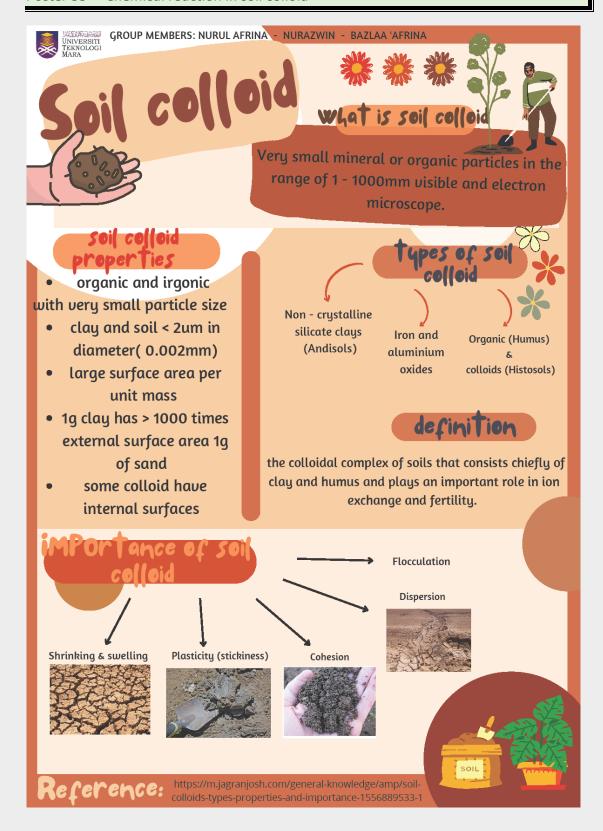
- Soil colloids are important because their surfaces attract soil nutrients dissolved in soil, water as positively charged mineral ions, or cations,
- Without soil colloids, most vital nutrients would be leached out the soil by percolating water and carried away in streams



#### Member's name

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- 2. Muhammad Haziq Iman bin Hamri

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# THE USE OF HERBICIDE FOR BANANA



#### INTRODUCTION:

HERBICIDES ARE CHEMICALS USED TO MANIPULATE OR CONTROL UNDESIRABLE VEGETATION. HERBICIDE APPLICATION OCCURS MOST FREQUENTLY IN ROW CROP FARMING, WHERE THEY ARE APPLIED BEFORE OR DURING PLANTING TO MAXIMIZE CROP PRODUCTIVITY BY MINIMIZING OTHER VEGETATION. THEY ALSO MAY BE APPLIED TO CROPS IN THE FALL, TO IMPROVE HARVESTING.

#### WHAT ARE THE HERBICIDES WE CAN USE?

CLIFOSINATE-AMMONIUM IS A HIGHLY EFFECTIVE TOOL FOR CONTROLLING A BROAD SPECTRUM OF WEEDS IN BANANAS AND HAS THUS ENABLED A SIGNIFICANT INCREASE IN YIELDS OVER THE LAST THREE DECADES. THE HERBICIDE IS APPLIED AROUND THE BANANA PLANTS AND EVEN IF SMALL AMOUNTS LAND ON CROP LEAVES THERE IS MINIMAL TO NO DAMAGE.



#### HOW TO USE IT?

THE HERBICIDE SHOULD BE APPLIED IN A FINE LAYER WHEN THE CL MATIC CONDITIONS ARE FAVOURABLE AND BEFORE THE WEEDS HAVE STARTED PRODUCING SEEDS. THE EQUIPMENT MUST BE IN GOOD CONDITION AND CALIBRATED. IT'S IMPORTANT TO BE PRECISE TO AVOID SPRAYING THE BANANA PLANTS, THE NAKED SOIL, OR THE USEFUL COVER CROPS.

#### WHY IT IS IMPORTANT?

A HERBICIDE IS A CHEMICAL USED TO KILL OR OTHERWISE MANAGE CERTAIN SPECIES OF PLANTS CONSIDERED TO BE PESTS. PLANT PESTS, OR WEEDS, COMPETE WITH DESIRED CROP PLANTS FOR LIGHT, WATER, NUTRIENTS, AND SPACE. THIS ECOLOGICAL INTERACTION MAY DECREASE THE PRODUCTIVITY AND YIELD THE CROPS, THEREBY RESULTING IN ECONOMIC DAMAGE.

LEADER: SHAHRUM SIN ABD HARDI MEMBERS: NURUL QURRATU AIN BINTI MOHD KHAIRI, SHARIFAH SHAHIRA MAISARA BINTI SYED MOHSIN & SITI KHALIDAN BINTI MOHD AZMURIN

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FASILATOR: Tx. SETT FATIMAH BINTI SAIPUDDIN





#### Universiti Teknologi MARA (UiTM) Sarawak Branch, Mukah Campus

# The Chemistry of Tea

#### **Did You Know?**

Tea (Camellia sinensis) is one of the oldest and common beverage in the world. Tea grown in 30 countries including Malaysia but is consumed worldwide. Current studies have revealed the chemical composition and biological effects of tea at molecular level

#### **Composition of Tea**

A cup of strong tea contain 180-240 mg of polyphenols, which give tea its astringent flavor and have many health benefits.

Tea contains polyphenols, amino acids, enzymes, methylxanthines(such as caffeine).Flavanols, hydroxyl-4-flavanols,anthocyanins,flavones and phenolic acid are main compound in polyphenols of tea



Structure formula of tea theoflaving (Yashin et. al,2015)

#### **Health Benefits of Tea**

Anti-inflammatory



Fight obesity



· Improve bone health



 Protective against cardiovascular diseases (Mandel & Youdim, 2004)



 Protective against neuro diseases
 (Butt et al., 2015)



Control diabetes



 Protective aginst certain cancer (Yang & Koo, 2000)



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#### Prepared by:

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**DIPLOMA POSTER (SILVER)** 



# CHEMICAL ELEMENTS IN FERTILIZER

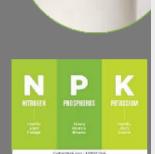
# WHAT IS CHEMICAL?

- Include one or more of the three elements that are most important in plant nutrition
- Importance elements sulfur, magnesium, and calcium.

# CHEMICAL ELEMENTS IN FERTILIZER

- NITROGEN (N)
- POTASSIUM (P)
- PHOSPHORUS (K)





# HOW CHEMICAL MADE?

MADE BY COMBINING

- NITROGEN AND HYDROGEN TO PRODUCE AMMONIA (NH<sub>3</sub>)
- AMMONIA + CO<sub>2</sub>

# REFERENCE

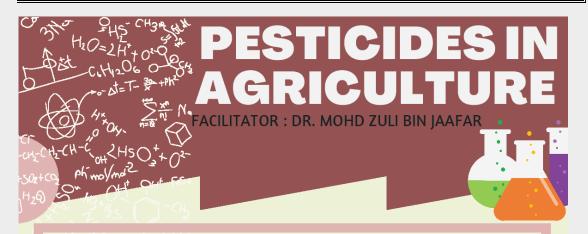
https://www.britannica.com/topic/fertili er

https://thefactfactor.com/facts/pure\_scie nce/biology/chemical-fert/lizers/2225/

> HAZIQ AKMAL SOLEH NUKMAN

# THE FUNCTIONS OF CHEMICAL ELEMENTS IN FERTILIZER

- To increase their productivity
- To provide additional nutrients to the plants



In agriculture, pesticides are used to manage weeds, insect infestations, and illness. Pesticides come in a variety of forms, each of which is designed to combat certain pests.

#### Benefits of pesticide:

- Control pests and plant disease vectors.
- Control human or livestock disease vectors and nuisance organisms.
- Control organisms that harm other human activities and structures.



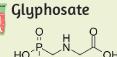
#### Examples of pesticide:

- fungicides
- herbicides
- insecticides

#### Effects of pesticide:

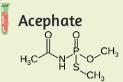
- Can cause short-term adverse health effects for HUMAN.
- Causing the ANIMALS to relocate.
- The WATER will be polluted.

#### Examples of specific synthetic chemical pesticides:





Metaldehyde



#### TEAM MEMBERS

- 1.NUR 'AIN BINTI SHAHRIN
- 2.NOR HIDAYAH BINTI MOHD FEISAL
- 3. NOR SHARIYANIE BINTI OMAR
- 4. NAJWA SYAHIDA BINTI SHAHIRU

%2C%20Malathion%2C%20etc

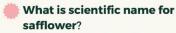
# ORGANIC MERCURRIAL: BENEFITS OF SAFFLOWER

#### FACILITATOR: MOHD ZULI BIN JAAFAR

TEAM MEMBERS:

NORADIBAH BINTI AMIN NORA AMIRA BINTI MOHD RAFFI NUR AFRINA JASMIN BINTI HASSANUDIN NUR AFRINA NAZIHAH BINTI MOHD ZAMAN





**Charthamus Tinctorius** 



#### **Reduces inflammation**

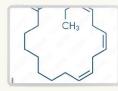
Alpha Linoleic Acid (ALA) reduces inflammation and boosts the immune system

#### **Promotes Healthy skin**

The linoleic acid stimulates skin regeneration, fights blackhead and acne, controls sebum

#### **Reduces PMS symtoms**

The Linoleic acid can control prostaglandins that causes hormonal changes and PMS



Alpha Linolenic Acid (ALA) is an omega-3 fatty acid that is sourced from plants. Oils like flaxseed oil, soy, canola, walnut and perilla oils all have alphalinolenic acid in them.

#### Safflower seed oil (weight %)

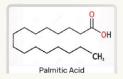
fatty acid	weight percentage
Linoleic acid	75.0
Oleic acid	12.6
Palmitic acid	8.4
Stearic acid	2.6
Myristic acid	1.4





linoleic acid structure

oleic Acid



Palmitic acid



#### REFERENCES

- 1. https://www.webmd.com/diet/health-benefits-of-safflower-oil
- 2. https://www.sciencedirect.com/science/article/abs/pii/S0378874113007757
- 3. https://nootriment.com/alpha-linolenic-acid/

UNIVERSITY TEKNOLOGI MARA (UITM)

# CHEMICAL FERTILIZER



FACILITATOR: DR. MOHD ZULI BIN JAAFAR

STUDENTS: AHMAD AMIRUN AZIM BIN FAZLI
MUHAMMAD DANIEL BIN ZAIDI
MUHAMMAD DANISH AMILI BIN ZAMZARI
MUHAMMAD NURAIMAN NAIM BIN HASNI

#### WHAT IS CHEMICAL FERTILIZERS?

 Fertilizers are chemical substances that are applied to crops in order to boost their yield. The fertilizers include nitrogen, potassium, and phosphorus, that are vital minerals for plants.
 They improve the quality of soil.





#### **CHEMISTRY INFO:**

 to any of a range of synthetic chemical substances used to boost agricultural yield.

# TYPES AND FUNCTION OF CHEMICAL FERTILIZERS SUITABLE APPLY TO CROPS:

- Nitrogen (N) To maximise yield, make sure energy is available when and where the plant needs it
- Pottassium (K) Helps strengthen plants'
   abilities to resist disease and plays an important
   role in increasing crop yields and overall quality
- Phosphorus (P) Helps a plant convert other nutrients into usable building blocks with which to grow

#### N.P.K ratio:

- A suitable N.P.K of fertilizer ratio is 16-16-16, for example, contains 16% nitrogen, 16% phosphorus, and 16% potassium, or
- A 25-4-2 formulation are good for fertilizer ratio on contains 25% nitrogen, 4% phosphorus, and 2% potassium.

# BENEFITS OF CHEMICAL FERTILIZER:

- Chemical fertilizers have a high level of predictability and dependability.
- Fertilizers can be used to make poor soil fruitful right away.
- They provide the plant with the nutrients it requires.
- They are less expensive than organic fertilisers and are simple to apply.
- https://byjus.com/biology/fertilizers/
- https://thefactfactor.com/facts/pure\_science/biology/chemical-fertilizers/2225/
- https://www.greenwaybiotech.com/blogs/gardening-articles/whats-the-function-of-potassium-k-inplants



#### Facilitator: Nurul izzatiafifi Ismail

#### CHEMICAL REACTION TOWARDS PEST

Chemical reaction towards pests
It is the pest control using the chemical
pesticides. A pesticide is a chemical used to
prevent, destroy, or repel pests. They
combat pests and deseases occuring on
our cropslivestockand our possessions.

#### Use in Agriculture

Agricultural chemistry often aims at preserving or increasing the fertility of soil, maintaining or improving the agricultural yield, and improving the quality of the crop. When agricultural is considered with ecology, the sustainability of an operation is considered insecticides to control insects, insect Growth Regulators to disrupt the growth and reproduction of insects. Rodenticides to lidis rodents like mice, rats, and gophers. Wood Preservatives to make wood resistant to insects, furgus and other pests.

## IMPORTANT IN AGRICULTURE

Now there are even some types of chemicals that increase the production rate of livestock. For example there are many scientists that have studied these experiments of chemicals on animals and some have been successful. Chemistry is very important throughout the agricultural community. There are even people going to universities to major in agricultural chemistry.

WRITE BY:
MOHAMAD YAMUL AKHBAR BIN MOHD SUHANI
AYU AZRIESYA BINTI AZHAR
NURUL FARHANAH BINTI IDRIS

#### **Pesticides**

Pesticides – also known as agricultural chemicals – are substances that are used to protect plants against pests. They include herbicides to kill weeds, fungicides to get rid of diseases and insecticides to kill bugs. Those chemicals are unfortunately not only getting rid of the unwanted but can also cause harm to our health and the environment.

#### **Pesticides**

Pesticides or plant protection products contain at least one active substance and are used to:

- -protect plants against pests and diseases:
- -influence how much the plants grow;
- -preserve plant products:
- -kill or prevent the growth of undesired plants;

# IMPORTANT IN AGRICULTURE

Once a farmer ensures that the crops will grow abundantly they depend on the use of chemistry to produce chemicals or fertilizer that will ensure that the crops are well grown. Fertilizers play a major role in agriculture because of the way they help produce very large yields of crops with the smallest amounts of chemicals. Fertilizers help the growth of crops so you end up with a bigger production. Chemical fertilizers like emmonium sulphate, uree, calcium, and nitrate are used for the better production of crops so that these fortilizers help produce will not only be effective in the growth of the plant but they also have to be nontoxic due to the fact that the plant ususally fruits or vegetables will be consumed by people.

Refferences: https://extension.missouri.edu/publ ications/g7520







Cawangan Melaka Kampus Jasin

#### INTRODUCTION

THE IMPORTANT UNDERGROUND PART OF ALL VASCULAR PLANTS. THIS PART OF THE PLANT IS MAINLY RESPONSIBLE FOR ANCHORING IT DOWN INTO THE GROUND AND ABSORBING THE ESSENTIAL MINERAL ELEMENTS, NUTRIENTS, AND WATER FROM THE SOIL. IT IS ALSO USED TO STORE FOOD.

#### WHAT USE OF ROOTING

#### **HORMONES?**

PLANT ROOTS SECRETE MANY EXUDATES THAT POSE BENEFICIAL AND HARMFUL EFFECTS TO RHIZOSPHERE MICROBIAL POPULATIONS. SUCH COMPOUNDS INCLUDE INORGANIC IONS AND SUBSTANCES, AMINO ACIDS, VOLATILE AROMATIC COMPOUNDS, PROTEINS, AND ENZYMES. THESE EXUDATES CAN VARY ACCORDING TO THE DIFFERENT PLANT SPECIES AND CONDITIONS. PRUNED TEA BUSHES, FOR EXAMPLE, SECRETE MORE ROOT EXUDATES THAT INFLUENCE MICROBIOLOGICAL AND BIOCHEMICAL PROPERTIES IN THE RHIZOSPHERE THAN UNPRUNED TEA PLANTS.

ROOTING HORMONES ARE USED FOR PLANT PROPAGATION THAT GROWING FROM CUTTINGS IN PARTICULAR.

#### HOW

AUXINS ARE PRODUCED IN TERMINAL BUDS AND SUPPRESS THE GROWTH OF SIDE BUDS AND STIMULATE ROOT GROWTH. THEY ALSO AFFECT CELL ELONGATION (TROPISM), APICAL DOMINANCE, AND FRUIT DROP OR RETENTION.

#### WHY

THE AUXINS HELP PLANTS PRODUCE ROOTS, IT IS ONLY NATURAL THAT SOMEONE CREATES PRODUCTS THAT CAN BE APPLIED TO PLANTS TO HELP THEM MAKE ROOTS.

#### REFERENCES

#### GARDEN FUNDMENTAL

HTTPS://WWW.GARDENFUNDAMENTALS.COM/ROOTING-HORMONES-WHAT-ARE-THEY/

#### SCIENCEDIRECT

 ${\tt HTTPS://WWW.SCIENCEDIRECT.COM/TOPICS/EARTH-AND-PLANETARY-SCIENCES/PLANT-ROOT}$ 







# PESTICIDES

Pesticides with a chemical connection are substances used to destroy insects harmful to cultured plants or animals

# 1 BIOPESTICIDES

Originating from natural sources such as animals, plants, microbes and minerals.

E.g Baking soda, NaHCO3

# 2 CARBAMATE

Used as a spray, similar to organophosphate which is used to kill insects by affecting their brains and nervous system.

E.g Aldicarb, C7H14N2O2S

# 3 ORGANOCHLORINE

It is commonly used, but many countries have been removed this chemical from their market due to their health and environmental effects.

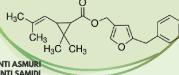
E.g Heptachlor, C10H5C17



# 4 PYRETHROLD

A synthetic version of pyrethrin that found in chrysanthemums (flower) and developed in such a way as to maximize their stability in the environment.

E.g Resmethrin, C22H26O3



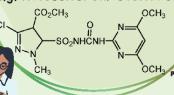
Project leader: A LA EX ATI BINTI ASMURI Team Members: A LA SO IA BINTI SAMIDI AINA SYAZLEEN BINTI SAMSUL BAHRI NUR'AIN NISA BINTI ZULKIFFLI

# E SULFONYLURBA

HEROICIDES

Sulfonylureas are a class of herbicides that stop plants from making branched-chain amino acids by inhibiting the enzyme acetolactate synthase.

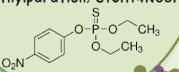
E.g. Halosulfuron, C13H15CIN607S



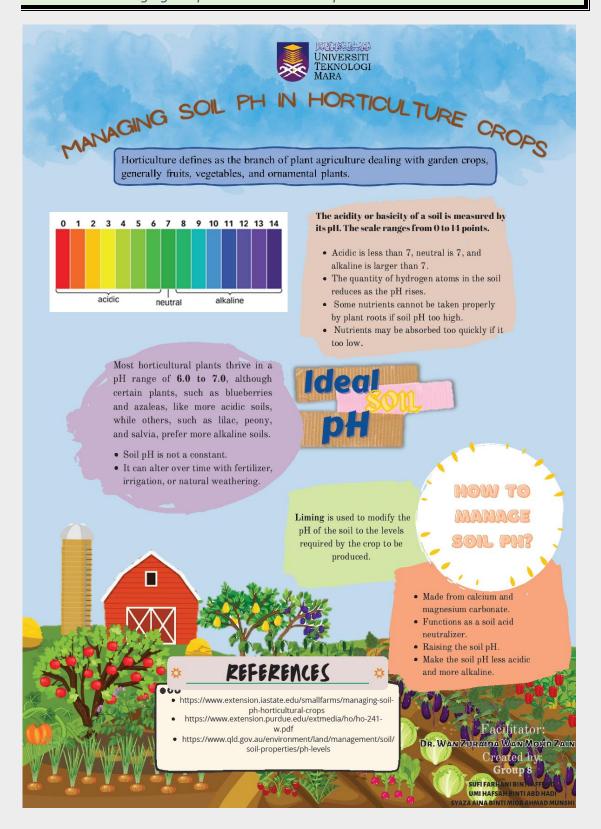
## ORGANOPHOSPHATE

It is affect the nervous system by isrupting the enzyme that regulates a neurotransmitter.

E.g Ethylparation, C10H14N05PS



PROJECT LEADER: ALIA EZZATI BINTI ASMURI TEAM MEMBERS: AINA SOFIA BINTI SAMIDI AINA SYAZLEEN BINTI SAMSUL BAHRI NUR'AIN NISA BINTI ZULKIFFLI HTTPS://BYJUS.COM/CHEMISTRY/PESTICIDES



## HOW DOES TEMPERATURE EFFECT PLANTS GROW

#### 

- · STI MURFATIN SYRYOMA
- STA SYRZMANI
- · MONOMOD SOLENN



#### INTRODUCTION

Temperature can affect most plant processes including photosynthesis, transpiration, respiration and other processes. The effect of temperature increase showed a greater effect on grain yield than vegetative growth due to the minimum temperature increase.

# HOW IS THE EFFECT OF HEAT TEMPERATURE ON PLANTS?

When there are heat waves and the soil temperature rises, the plant roots are less able to compensate for the varying soil moisture levels in the soil profile. When soil temperatures rise above the optimum threshold, plant water and nutrient uptake can be inhibited, causing damage to plant components.

#### HOW IS THE EFFECT OF COLD TEMPERATURE ON PLANTS ?

Cold weather will freeze cells in plants, causing damage and disrupting the pathways for nutrients and water to flow. The consequences of the cold weather also cause the xylem to live more than the cambium and phloem.

## THE BEST TEMPERATURE FOR PLANT GROW

The best temperature for a tree to grow is between 70 degrees and 80 degrees F. In general, foliage plants grow best between 70 degrees and 80 degrees F. During the day and between 60 degrees to 68 degrees F.



#### ----

#### REFERENCES

- https://www.gardeningknowhow.com/plantproblems/environmental/temperature-on-plants.htm
- https://www.google.com/search? q=the+best+temperature+for+plant+grow&bih=729&biw=1507&hl=en &sxsrf=ALiCzsac3oLcLJJUVQwXdj3QDoBQlxMFQ%3Al653327l8584 Q&ei=UcWLYuaAM9CcseMP6euumAM&oq=&gs\_lcp=CgdndMdd2l6E AEYAzIHCCMQ6glQJzIHCCMQ6glQJzIHCCMQ6glQJzIHCCMQ6glQJzIHCCMQ6glQJzIHCCMQ6glQJzIHCCMQ6glQJzIHCCMQ6glQJzIHCCMQ6glQJzIHCCMQ6glQJzIHCCMQ6glQJzHCCMQ6glQJzHCCMQ6glQJzHCCMQ6glQJzHCCMQ6glQJxHCCMQ6glQJcNACPAFAAWABgkxNo AXABeACAAQCIAQCSAQCYAQCgAQGwAQrAAQE&sclient=gws-wiz



Cawangan Sabah Kampus Kota Kinabalu



**REFERENCE NUMBER:** AVPC-Dip\_17



#### EFFECT SUBSTRATE RATIO ON PHOSPHORUS RECOVERY FROM PALM OIL MILL EFFLUENT SLUDGE USING ANAEROBIC DIGESTION TECHNIQUE

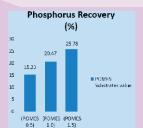
Irfan, R¹, Rasydan, C¹, Rozlan, M¹, Raif, M¹ and Selaman, R², <sup>1</sup>Faculty of Plantation and Agrotechnology, UiTM Kota Kinabalu, Sabah, Malaysia <sup>2</sup>Faculty of Applied Science, UiTM Kota Kinabalu, Sabah, Malaysia. \*Corresponding email: rafidah5045@uitm.edu.my

#### INTRODUCTION

Palm oil mill effluent sludge (POMES) is referring the sludge that formed in the open dumping pond. Generally, the oil palm industry produced about 60% of raw POME and it is dump into the open pond system (Akhabari et al., 2020). It is a cheap treatment method compared with other treatment. However, this waste can cause the water and air pollution due to the runoff of nutrient to river and releasing greenhouse gases to the surrounding. Instead being dumped, this waste can be examined for it potential to recover valuable products (such as Phosphorus) and in order to turn this waste into useful resources. This can be done by using anaerobic digestion process. Anaerobic digestion is a process where organic material decomposes in the absence of oxygen. The process is including hydrolysis, acidogenesis, acedogenesis and methanogenis process. Therefore, this study was carried out to investigate phosphorus (P) recovery at different ratio value of substrates with distilled water (0.5:1.5, 1.0:1.0, and 1.5:0.5) throughout the digestion process. The substrate used in the anaerobic digestion

Bottle containing different substrates to distilled was POMES which was collected from the open pond and already fermented about 3 weeks. This study is very important in resources recovery from wastes as it provides information on a new strategy for phosphorus recovery from POMES.

#### RESULT AND DISCUSSION



Substrates to Distilled water ratio (1.5:0.5) show high P recovery compared others ratio.

Anaerobic Digestion (AD) can be used as a technique in recovery of phosphorus (P).

Figure 1: Anaerobic digestion of POMES with different ratio of substrates and distilled water for Phosphorus Recovery

#### CONCLUSION

- 1. Anaerobic Digestion (AD) of POMES with ratio substrates to distilled water 1.5:0.5 produces highest phosphorus recovery (25.78%) in 7 days of digestion.
- 2. POMES can be used as a source in fertilizer production which indicated by its higher phosphorus recovery.

References Akhabari, A., Prashad, K.T., Onn, C.C & Inrahim, S. 2020. A study of palm oil mill Akhabari, A., Prashad, K.T., Onn, C.C & Inrahim, S. 2020. A study of palm oil mill effluent treatment. processing and environmental assessment of palm oil mill effluent treatment. Environmental Engineering Research. 25(2):212-221.

iskandar, M.J., Azizah, B., Farah, H.A. & Rizafizah, O. 2018. Palm oil industry in South east asia and effluent treatment technology- A review. Environmental, Technology and Innovation. 9: 169-185.

Mohammad, S. Siti, B. Kobayashi, T. Leh, C.P. 2021. Palm Oil Mill Effluent Processes - A Review. Processes. 9-739-743.

#### OBJECTIVE

To investigate substrates to distilled water ratio of POMES in recovering phosphorus by using anaerobic digestion techniques

#### METHODOLOGY



water ratio of POMES.



POMES substrates were put in water bath with T=350 C for (7 Days) (Ratio Substrates to distilled water: 0.5:1.5, 1.0:1:0, 1.5:0.5).



Determination of phosphorus using UV-Vis method



Cawangan Sabah Kampus Kota Kinabalu



REFERENCE **NUMBER:** AVPC-Dip\_19



#### EFFECT OF RATIO ON PHOSPHORUS RECOVERY FROM PROTEIN RICH FOOD WASTE USING ANAEROBIC DIGESTION TECHNIQUE

Celine, N1, Bibiericka, W1, Deeaan, R1, Nurul, S1 and Selaman, R2, <sup>1</sup>Faculty of Plantation and Agrotechnology, UiTM Kota Kinabalu, Sabah, Malaysia <sup>2</sup>Faculty of Applied Science, UiTM Kota Kinabalu, Sabah, Malaysia Corresponding email: rafidah5045@uitm.edu.my

#### ABSTRACT



Phosphorus is a limited resource which is anticipated will be exhausted in 21st century. But ironically, in the living environmental system, much phosphorus is discharged and as a result eutrophication has become a serious problem in receiving waters with a resultant deterioration of water quality. For example, protein rich food waste (PRFW) and water treatment sludge (WTS) that containing substantial amount of nutrient, are hugely produced in a daily basis and being disposed to the environment for final disposal. Instead of being dumped, these wastes can be examined for its potential to recover valuable products in order to turn this waste into useful resources. In this study, the recovery of phosphorus was performed by using anaerobic single and mixed digestion technique. The both digestion digestion was carried out at 35°C, and the pH was controlled between pH 6.8 to 7.2 for 7 days. The initial results show that mixed digestion of PRFW and WTS can recover phosphorus up to 31% compared to 12-17% when using single digestion. Thus, this study will not only alleviate environmental problems, but also to recover phosphorus that can be used as fertilizer or soil conditioner.

# **METHODOLOGY**



**Protein Rich Food Waste** (PRFW)

**Water Treatment** Sludge (WTS)





Single and mixed digestion of both substrates were put in water bath with T=35°C and pH 6.8 to 7.2 for (7 Days)

**Determination of** phosphorus using <u>UV-Vis</u> method

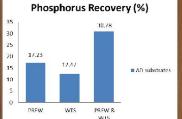
#### WHAT'S THE OBJECTIVE?



To investigate the effect of single and mixing substrate AD of protein rich food waste (PRFW) and water treatment sludge (WTS) on phosphorus recovery.

#### Result & Discussion





Single digestion shows PRFW and WTS recover P alues 17.23% and 12.47% respectively.

Mixed digestion of PRFW and WTS contributes the highest of P recovery with

PRFW and WTS can undergo AD for P recovery.

#### **CONCLUSION:**



- AD of mixed substrate PRFW and WTS recover the highest of P compared with single digestion.
- 2. Both substrates PRFW and WTS can be used as a sources in fertilizer production which indicated by its higher phosphorus recovery.

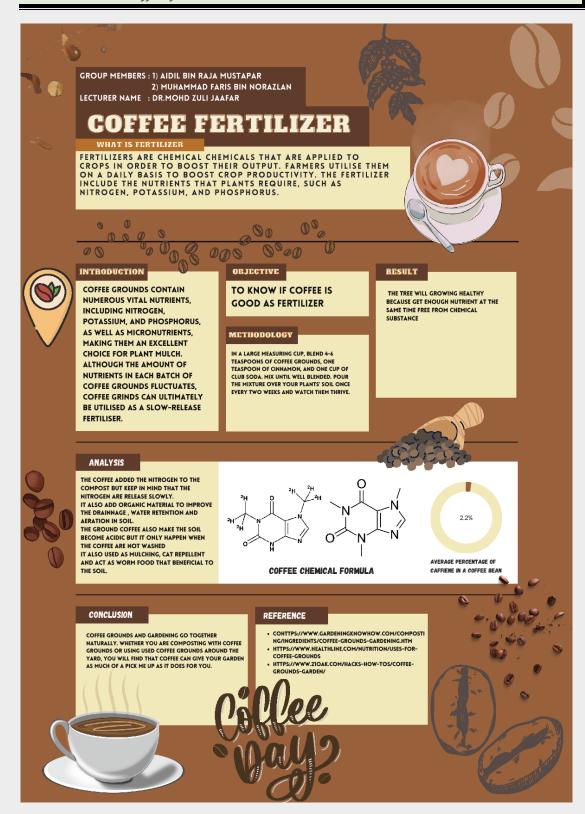
Figure 1: Anaerobic single and mixed digestion of PRFW and WTS for phosphorus

#### REFERENCES

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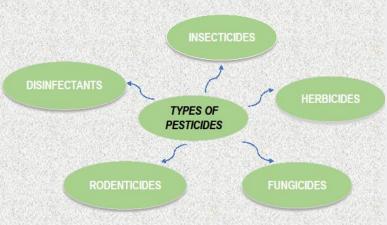






#### What?

Agrochemistry or agricultural Chemistry is the study of chemical compositions and changes happening in the production, protection, and use of crops and live stock. In agriculture, pesticides are one of the example of agricultural chemistry where it is chemical substances that are used in homes, gardens or agricultural fields to destroy insects or other organism harmful to cultivated plants or to animals.



# ALL ABOUT | PESTICIDES



How?

## Why?

#### Improving productivity

Food grain production, which stood at a mere 50 million tons in 1948-49, had increased almost fourfold to 198 million tons by the end of 1996-97 in India

# Quality of food

Lewis et al. (2005) discussed the nutritional properties of apples and blueberries in the US diet and concluded that their high concentrations of **antioxidants** act as protectants against cancer and heart disease.

#### Protection of croplosses

Weeds reduce yield of dry land crops (Behera and Singh, 1999) by 37-79%. Severe infestation of weeds, particularly in the early stage of crop establishment, ultimately accounts for a yield reduction of 40%.

# PROTECT CROPS FROM PEST AND DISEASE.

26% to 40% of the world's potential crop is lost annually due to pests, pollution, and diseases. (Gianessi & Reigner, 2005)

# KILLS OR INHIBIT THE GROWTH OF UNWANTED PLANTS

Chemical herbicides control often saves on the cost of labor and are considered non-toxic to animals and humans (Petruzzello, 2019)

AUTHORS: FARISHA MADIHA . NUR ILLYYIN . NUR FATEEN FARISHA . NOR AFFANAILI FAZYHA

# THE POWER OF FERTILIZER



Introduction

fertilizer, natural or artificial substance containing the chemical elements that improve growth and productiveness of plants. Fertilizers enhance the natural fertility of the soil or replace chemical elements taken from the soil by previous crops.

Soil fertility is the quality of a soil that enables it to provide compounds in adequate amounts and proper balance to promote growth of plants when other factors (such as light, moisture, temperature, and soil structure) are favourable plants need at least 16 elements, of which the most important are carbon, hydrogen, oxygen, nitrogen, phosphorus, sulfur, potassium, calcium, and magnesium.

How to choose fertiliser?

There are two types of fertilizers available
to the home gardener:

granular and water soluble. Granular fertilizers deliver food to a plant slowly but have the advantage of longevity. Since they must be broken down by water before a plant can use them, granular fertilizers do not leach out of the soil as rapidly as water-soluble types. Water-soluble fertilizers are faster acting but more transient, which means they must be applied more frequently than the granular type.

Why do we require fertiliser? The goal of improving soil structure and texture is to increase oscil moisture and water holding capacity while also controlling soil acidity.

- Nitrogen is essential for plant growth from the germination stage to the leaf formation stage.
- Phosphorus (Phosporus) or 'P' is required for the formation of roots and branches.
- Potassium (K) is required for the formation of flowers and fruits.

Why is it necessary to fertilize a crop?
-Fertilizers replace the nutrients that crops remove from the soil. Without the addition of fertilizers, crop yields and agricultural productivity would be significantly reduced. That's why mineral fertilizers are used to supplement the soil's nutrient stocks with minerals that can be quickly absorbed and used by crops.

How to make fertilizer:



NITROGEN- Mixing nitrogen and hydrogen to create ammonia with the high level temperature. Natural gas are used to power the synthesis process.

PHOSPHORUS- Phosphate rock is treated with sulphutic asid in order to produce phospharuc acid and mixed with ammonia to make phosphate (P205) fertilizer.

POTASSIUM- Chemical such as potassium chloride, sulphate and nitrate are used to convert the potash rock into plant food...

HTTPS://STUDY.COM/ACADEMY/LESSON/N PK-FERTILIZERS-DEFINITION-USES.HTML

REFERENCE

HTTPS://WWW.BRITANNICA.COM/TOPIC.

Group members
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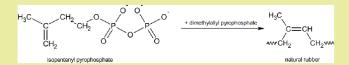




# CHEMICAL PRACTICE IN MAKING RUBBER

#### RUBBER

Rubber is the primary component of tyres used in automobiles, aeroplanes, and bicycles due to its flexibility, durability, and hardness.



#### Dimethylamine

A major chemical used in synthetic rubber which possess superior performance and quality. The other side of its use is that it minimizes the use of ammonia in the industry

#### WHAT MAKES RUBBER SO ELASTIC ?

Like plastic, rubber is a polymer, which is a chain of repeating units called monomer

#### **Z**ine Oxide

Traditionally ZnO is used in rubber formulations in concentrations of 3-8 parts per hundred rubber. Its addition also protect rubber from fungi (see medical applications) and UV light.

#### Zinc Stearate

It is an "activator" for rubber vulcanization by sulfur and accelerators. As discovered in the early days of vulcanization, zinc has a beneficial effect on the reaction of the sulfur with the polyolefin.



#### Styrenated Phenol(STP)

A clear, yellow, viscous liquid. It is a stabilizer for dry rubber and latex compounds such as SBR, BR, NBR, EPDM, CR. The rubber articles that use Styrenated phenol are sheets and straps, rubber tubing, conveyor belt covers and latex dipped products (such as industrial gloves, surgical gloves, feeding bottle teat)

#### Stearic Acid

Also known as octadecanoic acid, which is a saturated fatty acid stearic acid for rubber vulcanization accelerator. It is required as a part of all type of sulphur vulcanizing system. Stearic acid activates accelerators in presence of zinc oxide forming zinc stearate. There are plenty of functions of stearic acid.

#### WHY THIS HAPPENED?

Chemical agents are used to turn the individual polymers into polymer chains. This forms a rubber substance. In a process called vulcanisation, the rubber substance will be processed into a rubber product. Vulcanisation works by converting polymers into more durable material by adding accelerators such as sulphur.

MUHAMMAD AIMAN AKID BIN MOHD SADLI \* MUHAMMAD AMEER AIZAT BIN HAMIZIE \* MUHAMMAD AKMAL BIN AHMAD SOFFI \* MUHAMMAD IMRAN BIN A HALIM

[https://www.halcyonagri.com/en/natural-rubber-structure-and-function/] [https://www.aquasealrubber.co.uk/articles/the-synthetic-rubber-production-process/]
[https://www.chemtradeasia.in/bloq/chemicals-used-in-rubber-industry]



#### WHAT IS PESTICIDES?

A SUBSTANCE USED FOR DESTROYING INSECTS OR OTHER ORGANISMS HARMFUL TO CULTIVATED PLANTS OR TO ANIMALS

#### **@HLORPYRIFOS**\*

Is an organophosphate pesticide that has been used in crops, animals, and buildings, to kill a number of pests, including insects and worms.

#### FEEDING THE WORLD!



Food production will have to increase by 70% in order to feed all those people without using more land



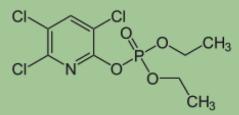
The food and Agriculture
Organization of the United
Nation (FAO) estimates up to
40% of global crop yields are
lost each year due to plant
pests and disease



Global trade in plants that carry pests and disease can result in disastrous consequences for farmers and food production around the world.

## CHEMICAL COMPOUND

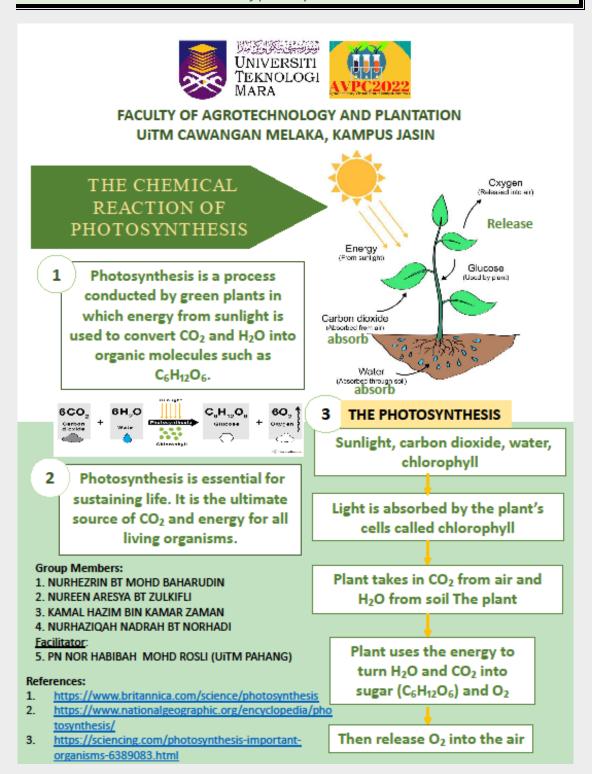
diethoxy-sulfanylidene-(3,5,6-trichloropyridin-2-yl)oxy-λ5-phosphane



It acts on the nervous systems of insects by inhibiting the acetylcholinesterase enzyme.



CAMEO Chemicals and all other CAMEO products are available at no charge to those organizations and individuals (recipients) responsible for the safe handling of chemicals.



## MAKING ORGANIC COMPOST





#### INTRODUCTION

- · Composting is the natural process of turning organic matter like leaves and food scraps into a beneficial fertilizer that can benefit both soil and plants.
- · Composting simply boosts the decomposition process by providing an optimal habitat for bacteria, fungi, and other decomposing organisms (such as worms, sowbugs, and nematodes) to work in.
- Compost is the decomposed stuff that looks like fertile garden soil after it has decomposed.

#### **WHAT ARE THE COMPOST MATERIALS?**



FRUIT SCRAPS

NEWS 7/2



CARDBOARD



SHREDDED PAPER &



**EGG SHELLS** 



VEGETABLE

GRASS & **PLANTS** 

JAMS & **PRESERVES** 

#### **HOW TO COMPOST**

brown material (to produce carbon) green material (to produce nitrogen) water

- 1. Select a dry, shady spot with a water source nearby.
- 2. Add 3 parts of brown and 1 part of green materials in alternate layers.
- 3. Keep the compost moist, not wet. This will help with the breakdown of the compost.
- 4. Turn the mixture occasionally to help with
- 5. As the pile breakdown, it will get warm.
- 6. The process is done when the mixture turns dark with no remnants.



#### **CHEMICAL REACTION**

- · There are two types of bacteria in an organic waste. One is called mesophilic and the other is thermophilic. They typically grow in moderate to higher temperature.
- · At the beginning of the process, mesophilic bacteria predominate. As they break down chemical compounds in waste, they generate heat and the compost pile becomes increasingly warmer. One reaction that takes place during aerobic composting is the oxidation of glucose ( C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> ), a simple sugar present in plants, as follows:

 $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + heat energy$ 

#### REFERENCES

PAPER

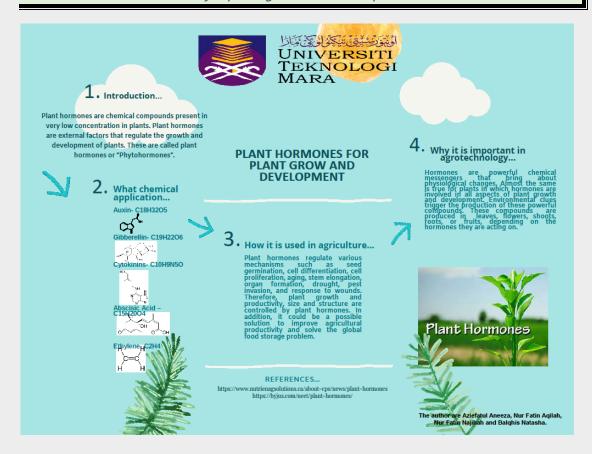
TOWELS

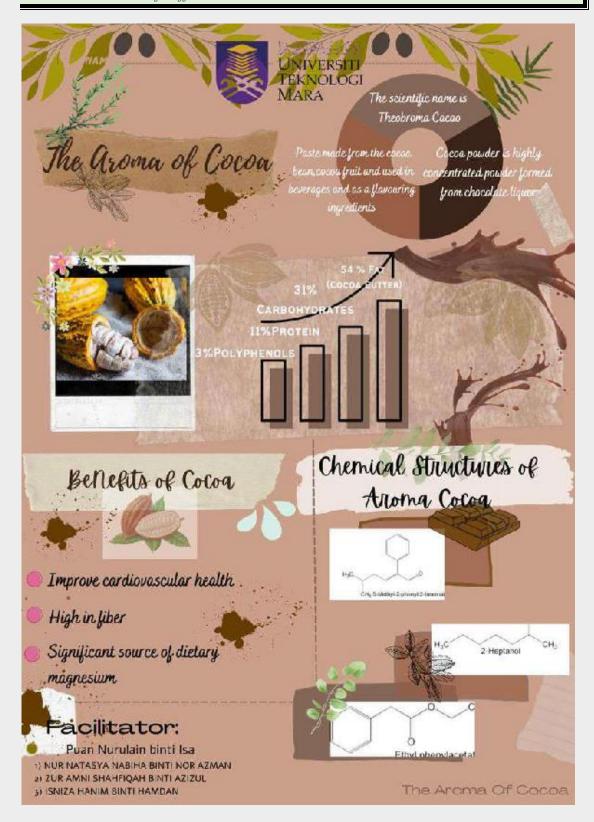
- https://www.nrdc.org/stories/composting-101 https://www.acs.org/content/acs/en/education/resources/ highschool/chemmatters/past-issues/2017-2018/october2017/composting-your-trash-natures-treasure.html#:~:text-the%20bacteria%20in%20an%20aer obic.via%20proteins%20and%20nucleic%20acids

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# PC 2022

# **CHEMISTRY OF MILK**



MIK

#### INTRODUCTION OF MILK

Milk is essentially an emulsion of fat and protein in water, along wit dissolved sugar (carbohydrate), minerals, and vitamins. These constituents are present in the milk of all mammals, though their proportions differ from one species to another and within species.

#### BENEFITS OF MILK

- I. Milk is packed with nutrients
- 2.It's a good source of quality protein 3 Milk benefits bone health
- 4. Help prevent weight gain
- 5. Milk is a versatile ingredient

Disadvantages of milk (for allergic people commonly):

- 1 Heart diseases
- 2. Lactose intolenrance
- 3. Food allergies
- 4. Bleeding from the intestines during Infancy

#### MILK NUTRITION FACTS YOU **NEED TO KNOW!**

- 1. Milk has 8g of high-quality protein
- 2. Milk is an excellent source of Vitamin B12
- 3. Milk is a good source of Vitamin A
- 4. Milk provides exceptional hydration
- 5. Milk is a great post-workout recovery drink
- 6. Drinking whole milk over low-fat milk help you avoid gaining weight

#### COMPOUND OF MILK

On dry basis, raw whole milk contains 29.36% fet, 26.99% protein (22.22% casein, 4.76% whey proteins), 38.1% lactose, and 3.56% ash. The composition of non-fat solids of skim milk is: \$2.18% loctose, 38.71% protein (31.18% casein, 7.53% whey protein), 1.08% fat, and 8.06% esh.

#### **LACTOSE (38.1%)**



Lactose is a sugar found in milk. People who are lactose intolerant are unable to digest it. Lactose can be fermented by microorganisms to form lactic acid, causing the milk to sour

GALAKTOSE

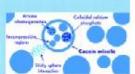


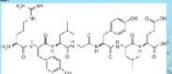
FERMENTATION



#### **PROTEINS (38.71%)**

Milk contains hundreds types of protein which is casein as the main types. The milk protein can form the miscile. These miscile scatter light, causing milk to appear white. That's why milk is white.





#### FAT (26.98%)

Fat in the milk have many varieties such as skim, low fat milk and also whole milk. In the past, whole milk was considered unhealthy because of its saturated fat content, but recent research does not fully support this recommendation



# PH LEVEL OF SOIL

NEUTRAL

#### Definition

The acidity or basicity of a soil is measured by its pH.

Soil pH is an important feature that can be utilised to conduct qualitative and quantitative analyses of soil properties.

The negative logarithm of the activity of hydronium ions in a solution is known as pH.

# When pH of soil is use?

Often or not we use to level out the pH value is when we used our fertilizer.

Most Fertilizer ranging between 3.0 until 7.5 ph value depending on how much Nitrogen(N) in them.

Hence after fertilizing, we need to apply a material that contains some form of lime

# fun fact PUE TO THE EXTENSIVE SURFACE COVER

DUE TO THE EXTENSIVE SURFACE COVER
AND CONSTANT AVAILABILITY OF FOOD
FROM LEFTOVERS AND ANIMAL WASTES,
EARTHWORM POPULATIONS ARE
GENERALLY HIGH AND ACTIVE IN
GRASSLAND. EARTHWORMS CAN
ACCLIMATISE TO PH 5-8, WITH CERTAIN
SPECIES SURVIVING EVEN MORE ACIDIC
ENVIRONMENT

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- Wear, J. I., & Patterson, R. M. (1962). Effect of soil pH and texture on the availability of watersoluble boron in the soil. Soil Science Society of America Journal, 26(4), 344-346.



9,0 8,5 8,0

7.0

6,5

level of soil

For crop and pasture productivity and nutrient uptake, The availability of nutrients and general soil health are influenced by soil pH.

Acidification of the soil can also be a sign of too much nitrogen fertiliser.



# Why it's Important?

The study of soil pH is crucial in agriculture because it governs plant nutrient availability by managing the chemical forms of various nutrients and influencing their chemical interactions. As a result, the pH value of the soil influences soil and crop productivity.

Some crops, on the other hand,

Some crops, on the other hand, have evolved to flourish at pH levels outside of the ideal range.

Created by: Rizal,Danial,Syauqi,Dhiyaʻ

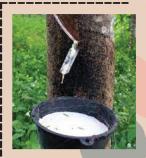


#### CARBON COMPOUNDS IN NATURAL RUBBER





- Latex comes from tapped rubber trees and is a milky liquid.
- Latex also is a colloidal liquid that contains rubber particles suspended in water.
- In addition, the process of latex conversion called coagulation. Rubber goods may be used for a variety of purposes, including in agriculture.



#### 

#### APPLICATION OF NATURAL RUBBER

We choose the chemical application of Natural Rubber which is one of the carbon compounds. Before we can convert a rubber product to a solid form, we first must know how it is produced. Latex must first be coagulated by using a weak acid like methanoic or ethanoic acid. As a result, the acid's hydrogen ions neutralize the negative charges on the colloidal particles' membrane surfaces. The membranes will then break, releasing the rubber polymers into lumps. As a result, the latex solidifies.

#### WHEN IT USE IN AGRICULTURE



- Rubber is extremely important in our daily life.
- Rubber can be used in agriculture at any time to enable speed it up the planting process, increase crop yields. and make farmer's work easier.

Examples of agriculture tools used in farming:

- protective gloves.
- boot soles.
- rubber hose.
- tractor tyres.







#### WHY IT IS IMPORTANT IN AGROTECHNOLOGY?



Rubber is important in agrotechnology especially for the industry which based on industry sector in the world. In other words, the production of rubber is a large and diverse industry. Besides, the part of farm rubber in the agriculture industry will resists chemical intrusion and seal openings from dust and can protect against contaminants and moisture. We can identify new uses for rubber by continually using it, improving the quality and automating the tapping system to solve labour shortages.

#### REFERENCES

- 1. https://www.halcyonagri.com/en/natural-rubber-structure-and-function/
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nvuseliviu Aciu aliu pases



**CHM138** 

#### WHAT IS ASID BASE

Originally recognized by taste, feel, reactions with indicators. Acid taste sour and reaction turn blue

litmus to red. Base are bitter, feel slipper, and turn









Acidio

red litmus to blue.



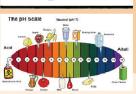
Alkaline

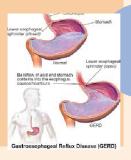
To reduce the risk of acids and bases mixing, it is a good practice to store acids and bases in separate safety cabinets. If they cannot be stored in separate safety cabinets, acids and bases must be store in separate compartments within the cabinet



# WHY ACIDE MUST BE PLACE SUITABLE PLACE







# Bases in life

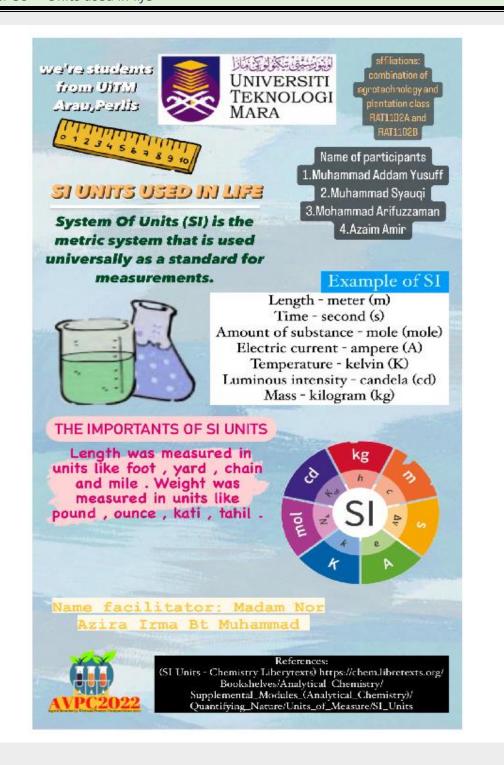
An acid is any substance that in water solution tastes sour, changes blue litmus paper to red, reacts with some metals to liberate hydrogen, reacts with bases to form salts, and promotes chemical

To determine whether a substance is an acid or a ase, count the hydrogens on each substance before and after the reaction. If the number of hydrogens has decreased that substance is reactions (acid catalysis). the acid (donates hydrogen ions). If the number of hydrogens has increased that substance is the base (accepts hydrogen ions).

#### Source

https://byjus.com/chemistry/acids and bases/

nttos://www.google.com/search? q=acid+and+base+examples&tbm=isch&hl=e-GB&prmd=ivn&rlz=1C9BKJA\_enMY1003MY100 3&sa=X&ved=2ahUKEwjY7J\_jm7L4AhXUzqACH TceBNFQrNwCKAB6BQgBFJ8C&biw=834&bih= 1075





## CHEMICAL FERTILIZER

#### INTRODUCTION

Fertilizers are chemical that are used to increase the yield of crops. Farmers utilise these on a daily basis to boost crop productivity. The fertilisers contain nitrogen, potassium, and phosphorus, all of which are important nutrients for plants. They increase the soil's fertility while improving its water retention capacity.



2

#### CHEMICALS THAT CONTAIN IN CHEMICAL FERTILIZER

Ammonium sulfate, ammonium phosphate, ammonium nitrate, urea, ammonium chloride



release pellets and spikes, tablets, and water-soluble powders, among other formulations. They usually have an N-P-K ratio of the three primary macronutrients, nitrogen, phosphorus, and potassium. There are also commercial chemical fertilisers that contain secondary and micronutrients.



### WHY USING CHEMICAL FERTILIZER

Chemical fertilisers enable growers to increase crop yield on a specific plot of land by allowing the plant to grow as much as possible. Fertilizer is used to guarantee that each plot of land produces as much as feasible.

CREATED BY:MUHAMMAD UMAR HAFIZ BIN MD FARIDH MUHAMMAD ILMAN HAIKAL BIN MOHAMAD MUHAMMAD SHAHZERIN BIN MD SANI

#### REFERENCES:

https://fruitgrowers.com/the-importance-of-fertilizers/#:~:text=Chemical%20fertilizers%20allow%20growers%20to.produces%20as%20efficiently%20as%20possible.



# PESTICIDE **OVERV**

Any agent or mixture of substances that prevents. eliminates, repels, or mitigates any pest is referred to as a pesticide. A pest is an animal or plant that has the potential to harm the environment or the health of the people who live there.

# **HOW TO USE PESTICIDE?**

When using a pesticide, follow these guidelines to guarantee optimal safety:

- Always read the label thoroughly and follow the directions to the letter.
- Properly dispose of insecticides and their empty containers.
- Choose the appropriate insecticide for the job - Purchase the appropriate quantity.
- When preparing and applying insecticides, use care.
- Pesticides must be transported and stored safely.

# WHAT IS PESTICIDE?

More than half of the world's crops would be lost to insects, illnesses, and weeds if crop protection, such as pesticides, were not available. Pesticides are crucial. They assist farmers in producing more food with less land by protecting crops from pests, diseases, and weeds while also increasing production per hectare.



# WHY WE USE PESTICIDE?

We should use pesticide because it is include food security, increased export revenues, and reduced international spread of disease. In the short-range, pesticides reduce waste of crops, land, water, time, and other valuable resources.

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Importance & Benefits of Pesticides. (n.d.). Pesticide Facts. https://pesticidefacts.org/topics/necessity-of-

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**FACILITATOR** DR. NUR FAEZAH BT OMAR NUR HUSNA BT MUHAMAD ANIS BT MOHD TRAJUDDIN





# THE REACTION NANOFERTELIZERS TO STAWBERRY

Nanofertilizers are defined as materials in the nanometer scale, usually in the form of nanoparticles, containing macro and micronutrients that are delivered to crops in a controlled mode

INTRODUCTION

# HOW?

NZS was applied as soil on a bed.

During sowing month, nano
fertiliser was applied twice. The
third treatment was made just
before the strawberry plants
bloomed, and the fourth once the
fruits showed.

# WHY?

The Nano zeolite applied to the soil (NZS) enhanced plant height, leaf count, fruit weight, and total production compared to hybrid nanocomposite (HNC).

THE EFFECTS OF SOIL-APPLIED NANO ZEOLITE (NZS),
FOLIAR AND SOIL-APPLIED HYBRID NANOCOMPOSITE
(HNCSF), AND HNCF+ NZS ON STRAWBERRY GROWTH,
COMPOSITION, AND ANTIOXIDANTS. COMPARED TO
HNCSF AND [HNCSF+ NZS], NZS INCREASED GROWTH
PARAMETERS EXCEPT CHLOROPHYLL CONTENT. HNCSF
AFFECTED ASH, PROTEIN, AND FAT, BUT [HNCSF+ NZS]
BOOSTED CARBOHYDRATE AND ENERGY.



PN AISHA NAILLA NUR NASARIAH RATI PURNAMA SARI NUR SITI HAJAR YUHAN

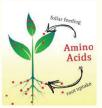
# ACID IN PLANTS

# WHAT DOES ACID DO FOR PLANTS:

ACIDITY CAUSES REACTIONS THAT REDUCE OR ENHANCE NUTRIENTS' ABILITIES TO MOVE. THIS MEANS THAT A NECESSARY NUTRIENT CAN BE PLENTIFUL IN YOUR SOIL, BUT PH CAN TIE UP THAT NUTRIENT SO YOUR PLANTS CAN'T USE IT AT ALL. THE NEUTRAL RANGE FROM PH 6.5 TO 7.5 IS IDEAL FOR MOST PLANTS.

What happens to amino acids in plants?

Amino acids have various prominent functions in plants. Besides their usage during protein biosynthesis, they also represent building blocks for several other biosynthesis pathways and play pivotal roles during signaling processes as well as in plant stress response



2



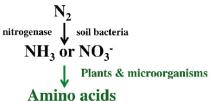


Are Amino acids help photosynthesis?
Without proper photosynthesis, plants will not grow. This process relies on the production of chlorophyll, which needs to absorb energy from the sun.
Amino acids will help in the production of chlorophyll, which leads to quality photosynthesis.

Do plants produce all amino acids?

These nutritionally essential amino acids must be taken up from the diet and by far the

from the diet and by far the greatest share is derived from plants.



FUNCTION OF AMINO ACIDS?

Many amino acids are synthesized in the chloroplast and transported into the cytosol for protein synthesis and secondary metabolite production, or transported and stored in the vacuole.

Plants require Nitrogen in the form of ammonia or nitrate.

Animals require nitrogen in the form of amino acids.

Both are dependent on soil bacteria to convert atmospheric nitrogen into useable forms.

FASCILITATOR: MOHD ZULI JAFAAR
PARTICIPANTS:1.MUHAMMAD HARIS
BIN MOHAMAD NAZRI
2.ADAM SHAUKIE BIN AZMIE

https://www.annualreviews.org/doi/abs/10.1146/annurev.bi.0 6.070137.003051?journalCode=biochem https://homeguides.sfgate.com/acid-plants-93404.html



# **PESTICIDE**

# INTRODUCTION

Pesticides are substances or mixtures of substances that are mainly used in agriculture or in public health protection programs in order to protect plants from pests, weeds or diseases, and humans from vector-borne diseases.

# WHY?

Pesticides are used to control various pests and disease carriers, such as mosquitoes, ticks, rats and mice. Pesticides are also used in agriculture to control weeds, insect infestation and diseases.



# HOW?

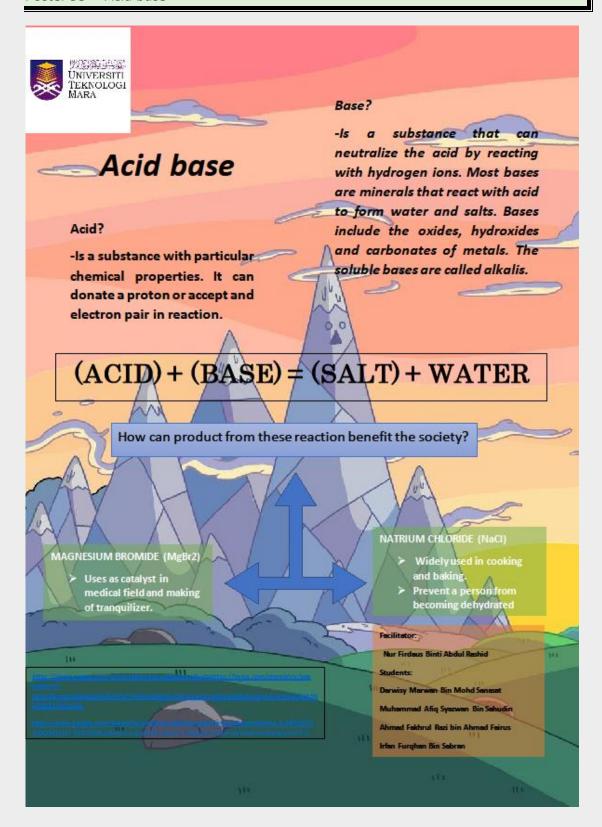
Most pesticides work by affecting the nervous system of the insect. The pesticide interrupts the information being sent by neurotransmitters in the synapses. The chemical produced by the body used to send information through the synapses is called acetylcholine.

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- NURUL HANIS BINTI RAZALI
- NURUL AFIQAH BINTI KAMARUDDIN
- NURFATEHAH BINTI ABD HALIM
- NUR HAZIRAH BINTI ZUNAIDI



# -HERBICIDES-

# WHAT??

They are two types of herbicides:

- > Selective herbicides (kills certain types of weed)
- > Non-selective herbicides (treating weeds in lawns and garden)

# INTRODUCTION

Chemicals that kill plants or prevent them from growing. Their method of killing plants is varied as the plant they kill. We must understanding the labels. It is illegal to use herbicides for any purpose or by any method other than as indicated on the label.

**HOW ??** 

> Pre-emergent herbicides : Applied to the soil and kill young seedlings soon after they emerge.

> Post-emergent herbicides: Usually applied to the foliage where they are absorbed into the plant tissue.

# **WHY??**

- > Control undesired plants on farms
- > Commercial forests
- > Manage landscape
- > Effectively weeds
- Cost-effective

# REFERENCES

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https://www.gardeningknowhow.com/plantproblems/weeds/using-herbicide-ingardens.htm Esha Binti Fadzil (2021201438)
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# Acid and Bases



# Introduction

Do you know that we use many acids and bases every day in our daily life? Yes, sometimes we even consume them! Although these household acid and bases are commonly used, not many know that they are using them, and many are unaware of the precautions that should be taken. This poster gives a run through of important acids and bases as well as to use them safely.

# What is bases?

A base is a molecule or ion able to accept a hydrogen ion from an acid.

# Why we need acid and bases in our life?

maintaining a stable internal environment in the human body, baking a delicious cake, or determining whether a lake can support aquatic life.

# Reference

BYJU'S. (n.d.). Acids and Bases - Definition, Examples, Properties, Uses with Videos & FAQs. Retrieved from BYJUS website:

https://byjus.com/chemistry/acids-and-bases/

# ACID AND BASE

# What is acid?

An acid is any hydrogen-containing substance that can donate a proton (hydrogen ion) to another substance.



# How acid and bases works?

Acids and bases are important in living things because most enzymes can do their job only at a certain level of acidity. Cells secrete acids and bases to maintain the proper pH for enzymes to work. For example, every time you digest food, acids and bases are at work in your digestive system. Consider the acidic environment of the stomach. The acidic environment helps with the digestion of food.

# Name of The Author

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- 2. Fauziah Hanim binti Abd Ghafar
- 3. Nuris Sofyah binti Aminul Hapiz
- 4. Nur Hana Insyirah binti Zamri

# Name of Fasilitator

- Miss Normardhiyah Roslan





# ERIODIC TABLE POSTER: FUN-TASTIC FOUR PERIODIC TABLE POSTER: FUN-TASTIC FOUR

The periodic table is a table that lists all of the chemical elements in order of atomic number, starting with hydrogen and ending with oganesson. The number of protons in the nucleus of an atom of a certain element is its atomic number.



combination of agrotechnology and pla 2 from class RAT1102A and RAT1102B



WHY

THE PERIODIC TABLE IS IMPORTANT BECAUSE IT IS ORGANIZED TO PROVIDE A GREAT DEAL OF INFORMATION ABOUT ELEMENTS AND HOW THEY RELATE TO ONE ANOTHER IN ONE EASY-TO-USE REFERENCE.

THE TABLE CAN BE USED TO PREDICT THE PROPERTIES OF ELEMENTS, EVEN THOSE THAT HAVE NOT YET BEEN DISCOVERED. COLUMNS (ROBUS) AND ROWS (PERSONS) PROCATE ELEMENT SCHOOL THAT SHARE SHALE CHARACTERISTICS.

THE TABLE MAKES TRENDS HE LELIENT PROPERTIES APPARENT AND EASY TO UNDERSTAND.



# **FUCTIONS**

SCIENTISTS USE THE PERIODIC TABLE TO QUICKLY REFER TO INFORMATION ABOUT AN ELEMENT, LIKE ATOMIC MASS AND CHEMICAL SYMBOL. THE PERIODIC TABLE'S ARRAGEMENT ALSO ALLOWS SCENTISTS TO DISCERN TRENDS IN ELEMENT PROPERTIES, INCLUDING ELECTRONEGATIVITY, IONIZATION ENERGY, AND ATOMIC



# HOW

THE ONE- OR TWO-LETTER SYMBOL IS THE ELEMENT'S SYMBOL. USUALLY, THE SYMBOL INCLUDES THE FIRST LETTER OF AN ELEMENT'S NAME, ALTHOUGH THERE ARE SOME EXCEPTIONS.

YET, HG IS THE SYMBOL FOR MERCURY

# HOW 2



# CONCLUSION

IN CONCLUSION THE PERIODIC TABLE IS A BASIC THING OR AN IMPORTANT THING AND IS OFTEN USED IN THE CHEMICAL INDUSTRY



# USE OF FERTILIZERS IN FARMING





# What is fertilizer?

Natural or synthetic substance that is applied to the soil or plants to improve growth and productivity.



# Why fertilizer important in farming?

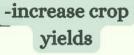
- -Fertilizers provide nutrients to the plants.
- -Without addition of fertilizers,crop yields and agricultural productivity would be significantly reduced.

When to fertilize your crop? -around the time plants begin to grow actively.

evening or early morning.

# Advantages of fertilizers







-less soil erosion



-protect against pests

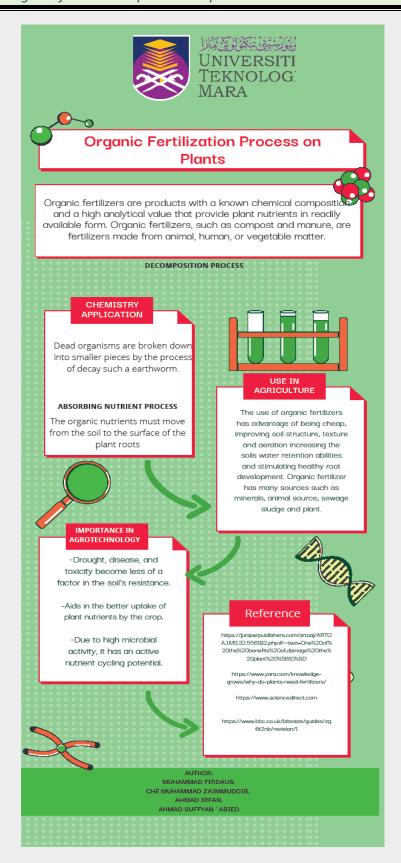
# **Conclusions and References**

-Today,use of fertilizers is seen as necessary agricultural technology.

-Fertilizers provide crops with essential nutrients like nitrogen, so that the crops grow faster, more healthy and produce more food.

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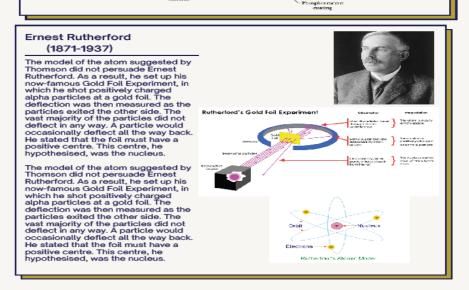


# Atomic structure throughout history

# The cornerstone for our present understanding of the atom is Dalton's atomism hypothesis, which he postulated in the early nineteenth century and drew from meteorological investigations. John Dalton is most recognised for his groundbreaking idea of atomism, despite being a schoolteacher, a meteorologist, and a colour blindness specialist.

The rule of conservation of mass and the law of definite proportions, according to Dalton, could be explained using the concept of atoms. All matter, he suggested, is made up of small indivisible particles known as atoms, which he envisaged as "solid, massy, hard, impenetrable, moving particle(s).

# J.J Thompson (1856-1940) All atoms include small negatively charged subatomic particles or electrons, according to J.J. Thomson's work with cathode ray tubes. The plum pudding model of the atom, which contained negatively-charged electrons immersed within a positively-charged "soup," was postulated by Thomson. J.J. Thomson declared on April 30, 1897 that atoms were formed up of smaller components. This discovery changed the way scientists thought about the atom and has far-reaching implications for physics.



# Application and impact on Agriculture



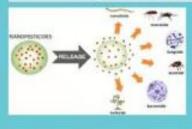
# Introduction

Nanopesticides are plant protection products that use nanotechnology to improve the efficacy or lower the environmental impact of a pesticide active component.

# Application

- 1) Nanofungicides
- 2) Nanoherbicides
- 3) Insect pest management
- 4) Micronutrient supply









# Impact: Advantages



- Controlled release
- Pest resistance
- Loss of pesticides
- Plant can absorb nutrient faster

# Impact: Disadvantages



- Can cause water and food pollution
- Low stability of some biopesticides
- · Lack of lifespan on plants



Participants

MER AMIRA SAHIRAK BINTI JEMAT (2021850820) PETERI ADLINA AISYAH HINTI ADDRAM (2021631644







# FACILITOR: MOHD ZULI BIN JAAFAR

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NIK HARRAZ SYAKIR BIN NIK HARMAN
NABIL HAFIZ BIN MOHAMAD SOFI
MUHAMMAD NURIMAN HAKIM BIN MOHD AMRAN

# SYNTHETIC AND NATURAL RUBBER



- -Natural is available in both natural and synthetic variation.
- -Both types demonstrate unique material characteristics (suitaible for use in different application)



# **NATURAL RUBBER**

- -High elasticity resilience and tensile strength
- -Monomers include cis-1,4-isoprene
- -Natural bio synthetic polymer (hevea brasiliensis)

$$H_{2C}$$
  $C = C$   $CH_{2}$   $CH_{2}$   $C = C$   $H_{3C}$   $C = C$   $CH_{2}$   $CH_{$ 

# SYNTHETIC RUBBER

- Man made polymer under control condition
- -Monomers are different in each synthetic rubber
- -synthesised from crude oil by product (solution/emulsion polymerization)



# REFERENCE

1.https://www.universalpolymer.com/blog/natural-rubber-vs-synthetic-rubber/
2.https://www.google.com.my/amp/s/pediaa.com/difference-between-natural-rubber-and-synthetic-rubber/amp/

# CHEMICAL CONTROL OF PEST

In this context, the phrase "chemical control" refers to the use of specially formulated pesticides to kill or control pest plants. The United States Environmental Protection Agency (EPA) defines a pesticide as "a substance or mixture of substances intended for the prevention, destruction, repulsion, or mitigation of any pest," including weeds. The term pesticide sometimes causes confusion as it covers a broad range of substances including herbicides (which target plants), insecticides (which target fingus) and others. Under United States Law, a pesticide is also a substance intended for use as a plant growth regulator, defoliant or desiccant.



# INTRODUCTION

Chemical control of pest is the pest control using the chemical pesticides. Pesticide is a chemical used to prevent, destroy, or repel pest.

# WHAT IS CHEMISTRY APPLICATION?

Insecticides -

Aldrin - CI2HBCl6 Dieldrin - CI2HBCl60 Endosulfan -C9H6Cl603S

# WHY IS IT IMPORTANT?

Reduce Illnesses and the Risk of Various Diseases: Pests can make you fall ill and cause various diseases through their bite or feces/droppings.

# REFERENCE

- littlehttps://www.epa.gov/ingredientsused-pesticide-products/typespesticide-ingredientsbit of body text
- https://plants.ifas.ufl.edu/manage/contr ol-methods/chemical-control/

# **OBJECTIVE**

The goal of chemical control is to control various pests and disease carriers, such as mosquitoes, ticks, rats and mice. Pesticides are used in agriculture to control weeds, insect infestation and diseases. There are many different types of pesticides, each is meant to be effective against specific pests.



# CONCLUSION

Chemical pesticide important to avoid loss, but need to be used properly.

# WHEN IT IS USE?

Chemical controls (pesticides) are often the dominant tactic used in IPM programs. Chemical controls are designed to reduce pest (insect, pathogen, rodent, etc.) populations below levels that will not negatively impact the crop.

# RISK OF CHEMICAL PESTICIDE

The widespread use of insecticides is ineffective and economically wasteful in the long run, Many insecticides do in fact accomplish the intended task of controlling pest populations. However, their detrimental health and environmental effects make them an inadequate long term solution.



# CHEMICAL POTENTIAL

# organic insecticides

# INTRODUCTION

Natural or organic pesticides, on the other hand, are compounds created by natural organisms for own defense or acquired from organic sources like minerals or plants. Natural pesticides, like standard pesticides, aim to kill, deter, or stop insects from causing damage. There are exceptions to the general rule that natural pesticides are safer and less hazardous than manmadé pesticides. Natural pesticides should be considered.

# HOW

- (1) Fill the pump 1.5 ML rice water
- 2) Combine I tablespoon of neem oil with I tablespoon of liquid soap in a small container
- 3) Fill a jar with a warm water and add the neem. soap solution
- 4) Pour the warm guard of neem solution in with the water is already in your sparyer
  - 5) Shake the solution and its ready to use.



material: 1.5 ML rice water ,1 tablespaon of neem oil, I teaspoon liquid soap,1/4 teaspoon aloe vera powder, few drop of essential oil.

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Authors: i) Nur Hazlina Syakira binti Haris

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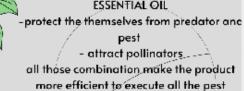


# NEEM OIL

- Best all purpose natural insecticides, killing all crop pest
  - -Help in fungus disease issue RICE WATER
  - protect plant from mites -fertilize and strengthen plants ESSENTIAL OIL
- attract pollinators\_ more efficient to execute all the pest

# REFERENCE

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- https://smithspestmanagement.com/blog/po st/natural-insecticides/





Generally, there are five types of plant hormones, namely, auxin, gibberellins (GAs), cytokinins, abscisic acid (ABA) and ethylene. In addition to these, there are more derivative compounds, both natural and synthetic, which also act as plant growth regulators.

UNIVERSITI TEKNOLOGI

MARA

# **What Is The Growth Chemical In Plants?**

Auxin and cytokinin are critical growth hormones in plant development and are naturally present within the plant at variable concentrations throughout the season. Their presence and activity are different from other hormones which act more in an on-off manner and are present only at specific times.



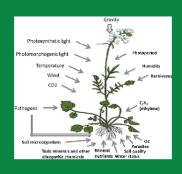
# <u>How Do Household Chemicals</u> <u>Affect Plants?</u>

Many household chemicals contain acids, which perform the main cleaning action. These acids change the pH of the houseplant's soil. If the plants have pH that's too low, the acids can drive the pH even lower, preventing the plant from taking nutrients up through the roots.

Element	Symbol	Remarks
Carbon	С	Photosynthetic elements
Hydrogen	II	
Oxygen	0	
Nitrogen	N	Primary plant food elements (macro- nutrients)
Phosphorus	P	
Potassium	K	
Calcium	Ca	Secondary plant food elements
Magnesium	Mg	
Sulfur	S	
Boron	В	Micro-nutrients
Manganese	Mn	
Copper	Cu	
Zinc	Zn	
Iron	Fe	
Molybdenum	Mo	
Chlorine	Cl	

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Cawangan Melaka

# Why Is Chemicals On Plants Bad?

In addition to killing insects or weeds, pesticides can be toxic to a host of other organisms including birds, fish, beneficial insects, and non-target plants. Insecticides are generally the most acutely toxic class of pesticides, but herbicides can also pose risks to non-target organisms.

# TALK TO US

MUHAMMAD AADAM FITRI BIN HANAFIAH MUHAMMAD ADAM BAKI BIN SALIM MUHAMMAD AFIQ BIN ALADAD

# Poster 107 Animal feed supplement (nutritional supplements)



# ACID AND BASE



# **Introduction**

An acid—base reaction is a chemical reaction that occurs between an acid and a base. It can be used to determine pH.



# **WHAT**

An acid is any hydrogen-containing substance that is capable of donating a proton (hydrogen ion) to another substance. A base is a molecule or ion able to accept a hydrogen ion from an acid. Acidic substances are usually identified by their sour taste.



# **HOW TO DETERMINE**

To determine whether a substance is an acid or a base, count the hydrogens on each substance before and after the reaction. If the number of hydrogens has decreased that substance is the acid (donates hydrogen ions). If the number of hydrogens has increased that substance is the base (accepts hydrogen ions).



# WHY IS IT IMPORTANT

Acids and bases are important in living things because most enzymes can do their job only at a certain level of acidity. Cells secrete acids and bases to maintain the proper pH for enzymes to work. For example, every time you digest food, acids and bases are at work in your digestive system.



# NAME OF THE

AUTHOR(S)

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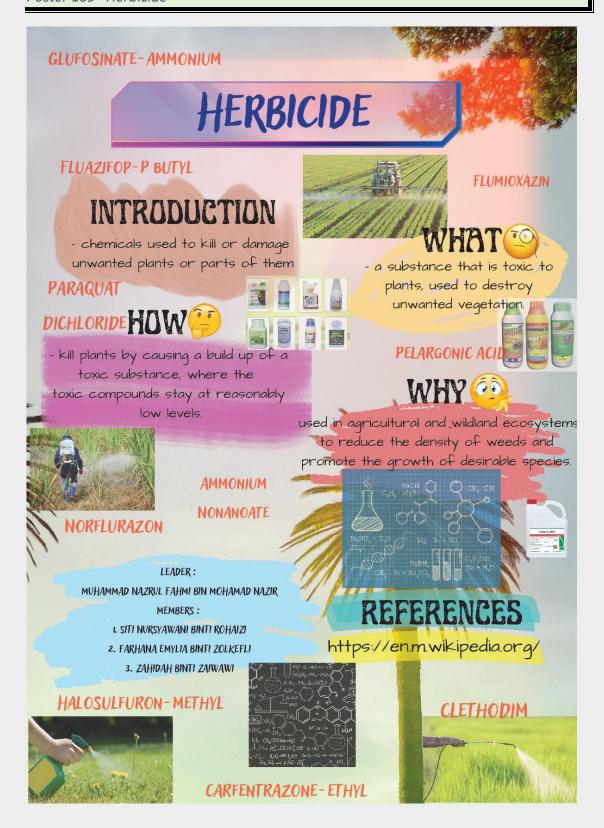
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MUHAMMAD FARIZ FAWWASH BIN ZAKARIA

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# **BIOPESTICIDE**

# What is it?

-Bio pesticides are biochemical pesticides that are naturally occurring substances that control pests by nontoxic mechanisms

# Benefit of using it...

- -Less toxic than conventional pesticides.
- -Biopesticides often are effective in very small quantities.
- -Difficult for insects to develop resistant to these pesticides.

# Type of biopesticide

- -Microbiol Pesticides.
- -Plant Pesticides.
- -Biochemical Pesticides.

# **EXAMPLE OF BIOPESTICIDE**

# **Bacillus Thuringiensis (Bt)**

- -Gram positive
- -Soil-dwelling bacterium
- -Used as a biological pesticide.
- -It makes a hole in their(pest)
  ts and effectively killing

# **Bacillus Thuringiensis Israelensis**

-Killing mosquitoes and black flies.

# **Bacillus Thuringiensis kurstaki**

-Killing Lepidoptera.

# Plant that can use as Biopesticide.

Most known compounds used as biopesticide are phyretrins, rotenone, nicotine and azadirachtin derived from species of Tanacetum, Derris, Nicotiana and Azadirachta respectively



Fertilizers are chemical substances supplied to the crops to increase their productivity. Fertilizers are composed of nitrogen, phosphorus, and potassium compounds. They also contain trace elements that improve the growth of plants. The primary components in fertilizers are nutrients which are vital for plant growth. Plants use nitrogen in the synthesis of proteins, nucleic acids, and hormones. These are used by the farmers daily to increase the crop yield. The fertilizers contain the essential nutrients required by the plants, including nitrogen, potassium, and phosphorus.

# HOW

How does fertilizer relate to chemistry? Modern chemical fertilizers include one or more of the three elements that are most important in plant nutrition: nitrogen, phosphorus, and potassium. Of secondary importance are the elements sulfur, magnesium, and calcium.

Fertilizers are chemical substances supplied to the crops to increase their productivity. These are used by the farmers daily to increase the crop yield. The fertilizers contain the essential nutrients required by the plants, including nitrogen, potassium, and phosphorus.

# WHY

Why are fertilisers added to soil chemistry? Fertilisers provide mineral ions needed for healthy growth in plants. As plants grow, they absorb mineral ions from the water in the soil through their root hair cells. Over time, the concentration of these ions decreases, so farmers and gardeners add fertilisers to the soil.

# REFERENCES

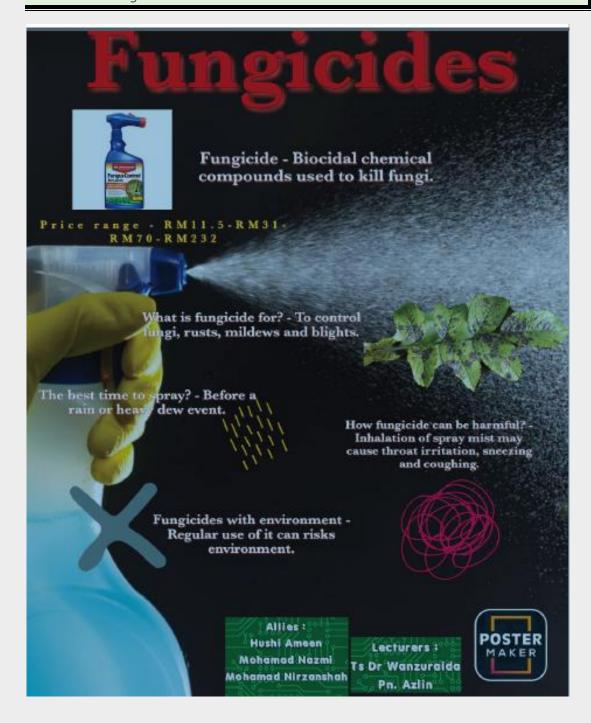
1.Authors Hope Townsend, Authors Andrea M. Heard, Authors Emily J. Zakem, & D. Authors Jackson R. Hall. (n.d.). Is too much fertilizer a problem? Frontiers for Young Minds. Retrieved June 16, 2022, from https://kids.frontiersin.org/articles/10.3389/frym.2020.00063

2. Encyclopædia Britannica, inc. (n.d.). Fertilizer . Encyclopædia Britannica. Retrieved June 16, 2022, from https://www.britannica.com/topic/fertilizer

**NUR FATIN ATHIRAH** 

**NUR MASITAH** 

**NUR NATASSHA** 



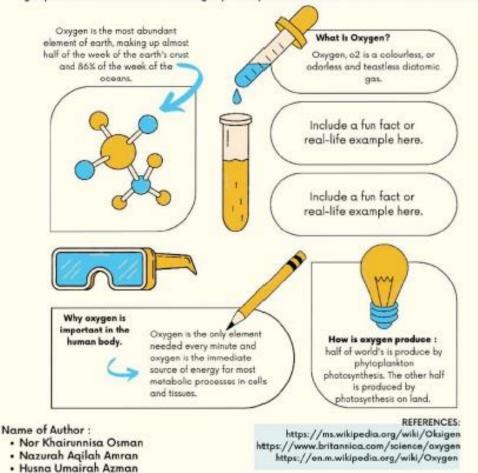
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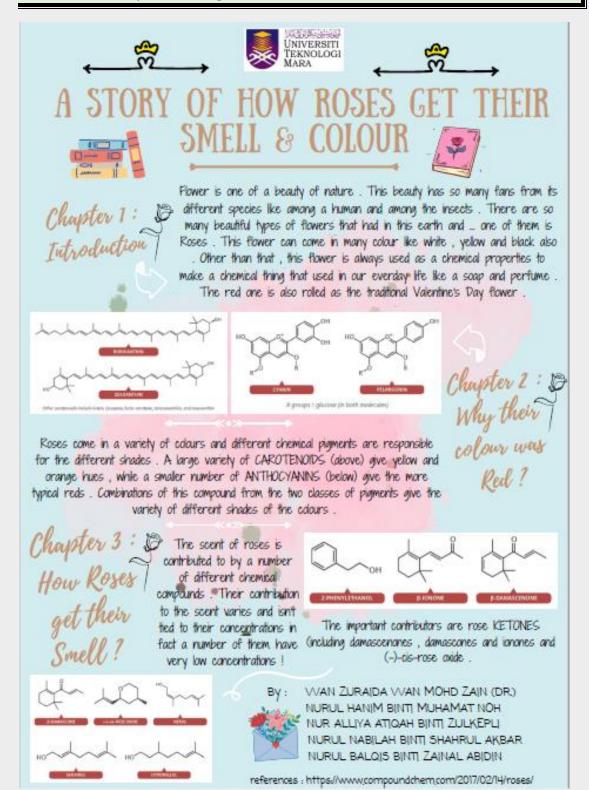


# **Elements in Chemistry**

# Introduction

The periodic table is a tabular display of the chemical elements. It is widely used in chemistry, physics, and other sciences, and is generally seen as an icon of chemistry. The table is divided into four roughly rectangular areas called blocks. The rows of the table are called periods, and the columns are called groups. Elements from the same column group of the periodic table show similar chemical characteristics.







# CHEMICAL THAT SIGNIFICANT IN SEED GEMINATION

- SEEDS COULD BE SOAKED IN 1% NACL2 OR 1% KH2PO4 FOR 12 HOURS TO IMPROVE GERMINATION AND VIGOUR POTENTIAL.
- TO IMPROVESEED GERMINATION AND VIGOURITY, THE SEEDS ALSO COULD BE SOAKED IN100PPM SOLUTION OF ZNSO4. MGSO4 AND MNSO4 FOR 4 HOURS

WHY OPTIMUM SEED GERMINATION PROCESS IS IMPORTANT IN AGRICULTURE

- TO SECURE CONTINOUS SUPPLY OF FOOD PRODUCT/ FOOD SECURITY
- SOURCES OF MEDICINAL PLANT AND ANIMAL GRAZING FEED, AND FOOD SECURITY
- SOME PLANTS CAN ONLY BE PROPAGATED BY SEED, AND IF THEY ARE DIFFICULT TO GERMINATE, THEIR SURVIVAL IS JEOPARDIZED.

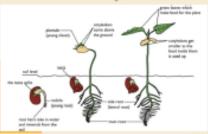


DIAGRAM SHOWING THE STAGES OF GERMINATION

# PRESENTED BY

I. DR. NURAINI MOHD NOOR/ FASILITATOR 2. EMIL MARZUQI BIN MAZLAN 3. NURSYAHIRA BALQIS BINTI ABDUL RAHMAN 4. DAYANA NUR FARZANA BINTI MOHD ZAILANI 5. NURSYAFILZA ALYSSA BINTI MOHD ROSLAINI

# CHEMISTRY IN SEED GERMINATION

SEED GERMINATION IS JUST LIKE CHEMICAL REACTION AS IT INVOLVES A SERIES OF PROCESS AMD CHANGES OF FORM .

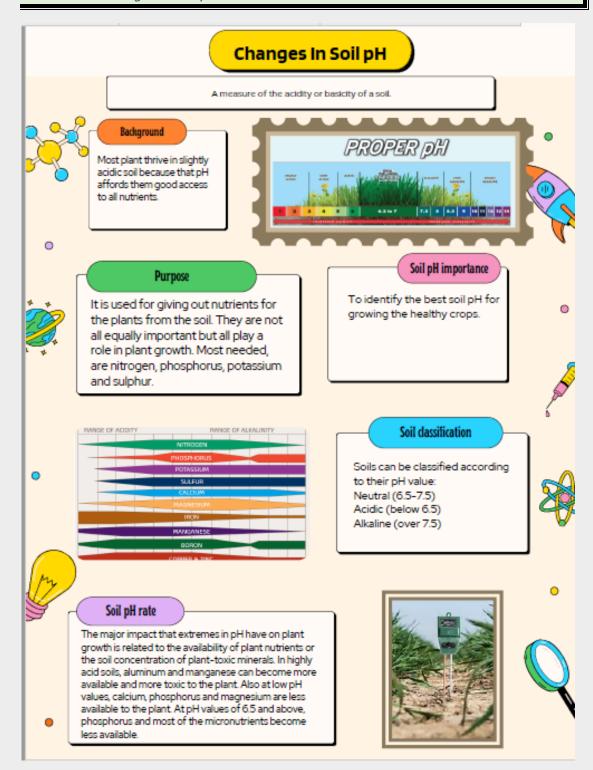
# SEED GERMINATION PROCESS

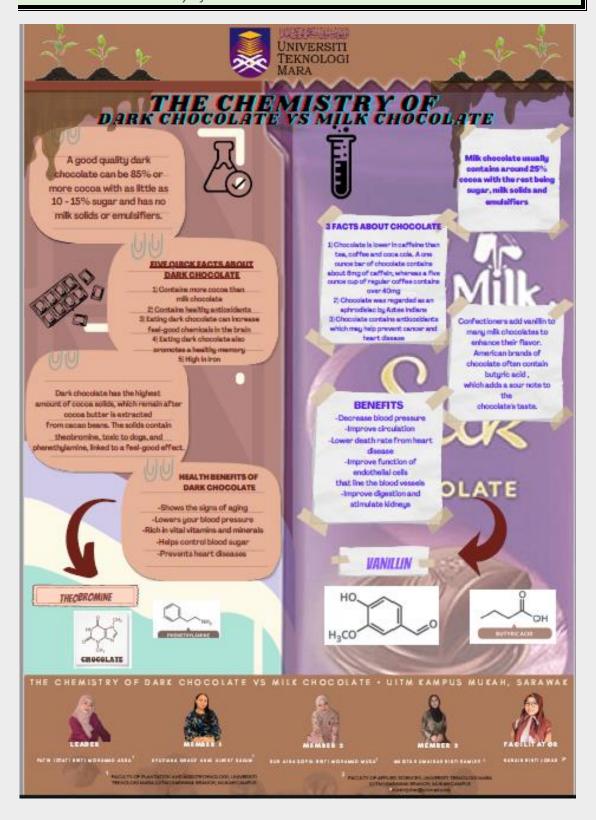
- 1.IMHIBITION
- 2. RESPIRATION
- 3.EFFECT OF LIGHT ON SEED GERMINATION
- 4. MOBILIZATION OF RESERVES
- 5. DEVELOPMENT OF EMBRYO AXIS INTO SEEDLINGS

- ENERGY IS NEEDED BEFORE A SEED CAN GERMINATE. THE FOOD STORED IN THE SEED IS USED UP TO PRODUCEENERGY FOR THE GROWING EMBRYOTHIS PROCESS IS CALLED RESPIRATION.
- OXYGEN IS REQUIRED FOR RESPIRATION AND IT COMES FROM THE AIR THIS OXYGEN COMBINESWITH THE FOOD DURING RESPIRATION, TO RELEASE STOREDENERGY USED FOR GROWTH.
- WATER ENTERS THE SEED THROUGH A SMALL HOLE IN THE TESTA CALLED THE MICROPYLE. THE WATER IS THEN USED IN CHEMICALREACTIONS INSIDE CHILS IN
- THE SEED, WARMTH ALSO SPEEDS UP THE MAKING OF NEW CELLS WHEN THE PLANT EMBRYO IS GROWING.THEREFORE LOW SOIL TEMPERATURES FOR EXAMPLE, WILL SLOW DOWN THE RATE OF GERMINATION, EACH SPECIES OF PLANT WILL HAVE A PARTICULAR TEMPERATURE RANGE THAT ITS SEEDS WILL GERMINATE IN
- THE RADICLE IS THE FIRST PART OF THE PLANT EMBRYO TO GROW ON DE WATER AND OXYGENENTER THE SEED SOON IT COMESOUT FROM THE SEED. NEXT THE PLUMULE EMERGES. THE GREEN LEAVES DEVELOP AND FUNCTION. THEY WILL NOW MAKE THE FOOD FOR THE PLANT USING THE PROCESSOF PHOTOS VINTHESIS

# REFERENCES









UNIVERSITI TEKNOLOGI MARA (UITM) SARAWAK BRANCH, MUKAH CAMPUS

# THE CHEMISTRY OF BEETROOT

BEETROOT PLANT

# Scientific Name:

- BETA VULGARIS
- BIENNIAL PLANT
- BELONGS TO FAMILY CHENOPODIACEAE
- ORIGINATED IN ASIA AND EUROPE

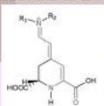
# Unique Characteristic of Beetroot:

- GOOD SOURCE OF **RED AND YELLOW** PICMENTS KNOWN AS BETALAINS
- BETALAINS CONSISTS OF BETACYANIN(RED) AND BETAXANTHINS (YELLOW) [VON ELBE ET AL. 1972]

# Health Benefits:

- HELP PREVENT CANCER
- **INCREASES STAMINA**
- TAKES CARE OF EYES
- SOURCE OF NATURAL COLOURANT AND ANTIOXIDANT





# **Beetroot Nutrition:**

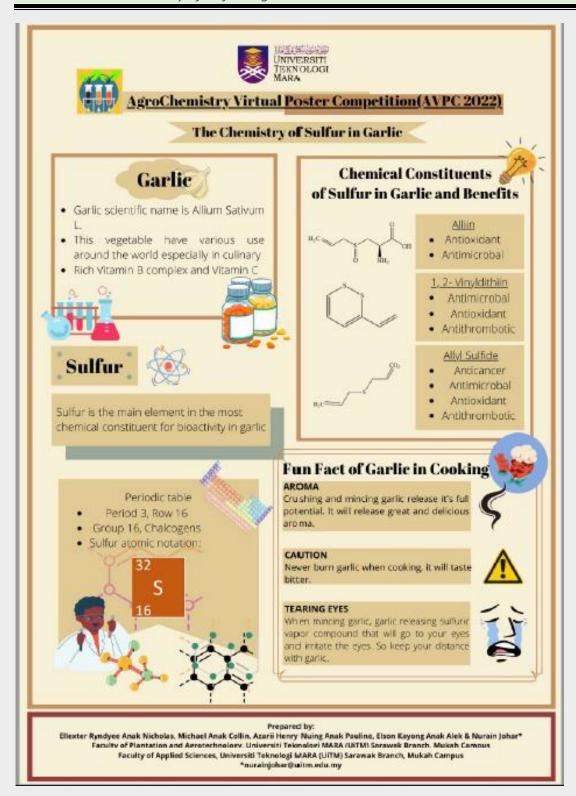
- CALORIES: 43
- WATER: 88%
  - PROTEIN: 1.6 CRAMS
  - CARBS: 9.6 GRAMS

FIGURE 1. BASIC STRUCTURE OF BETALAINS (ESATBEYOGLU ET. AL, 2015)

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# PREPARED BY:

VARNESSA SRIPRA ANGE DERNY., RAVITANNA LENIE BELATAU ANAE JEFFERY. AIN ANISKA SULAIMAN., ELLIYIA RUGELLA ANAE ERREDY. NY BAIN DOMAN TRACTION OF PLANTATION AND AGROTECHNOLOGY, UNIVERSITY TERROLOGY MARA (UTTM) SARAMAE BRANCH, MURAN CAMPUS LEACULTY OF APPLIED SCIENCES, UNIVERSITY TERROLOGY MARA (UTTM) SARAWAE SEARCH, MURAN CAMPUS













Masturah binti Haris Fatillah Aleez Syahrina binti Nohd Khairi Nohd Zuli bin Jaafar

# TITLE: CHEMICAL REACTION IN PLANT PHOTOSYNSTHESIS

1

# INTRODUCTION

 Photosynthesis is the process used by plants, algae and certain bacteria to run sunlight, carbon dioxide and water into food and oxygen.



# 9

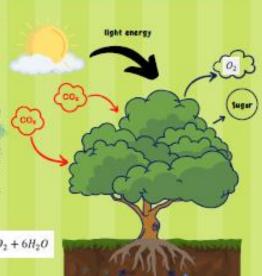
# PROCESS OF PHOTOSYNTHESIS

- Light energy transfers electrons from water (H2O) taken up by plant roots to CO2 to produce carbohydrates.
- In this transfer, the CO2 is "reduced," or receives electrons, and the water is "oxidized," or loses electrons. Oxygen is produced along with carbohydrates.



# **EQUATION OF REACTION**

Six molecules of carbon dioxide (CO2) combine with 12 molecules of water (H2O) using light energy. The end result is the formation of a single carbohydrate molecule (C6H12O6, or glucose) along with six molecules each of oxygen and water.



 $6CO_2 + 12H_2O + Light energy \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$ 



# WHY99

 A counterbalance to respiration by taking in the CO2 produced by all breathing organisms and reintroducing oxygen to the atmosphere.



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## INTRODUCTION

IT'S SAID THAT "AN OUNCE OF PREVENTION IS WORTH A POUND OF GURE," DISEASES AND MALNUTRITION ARE AMONG THE MOST COMMON THREATS TO A FARM'S OVERALL STABILITY; THUS, MOST FARMERS LOOK TO USING THEIR LIVESTOCK FEED AS THE FIRST LINE OF DEFENSE AGAINST COMMON HEALTH PROBLEMS FOR THEIR LIVESTOCK, LIVESTOCK FEED ADDITIVES ARE POPULAR BEGAUSE THEY ALLOW AGRICULTURAL OPERATIONS TO QUICKLY AND CHEAPLY BOLSTER THE NUTRITION AND OVERALL HEALTH OF THEIR HERDS AND FLOCKS. ANIMAL SUPPLEMENTS ARE USED FOR ALMOST EVERY TYPE OF LIVESTOCK, INCLUDING COWS. POULTRY, AQUACULTURE, SWINE, EQUINES, DEER, AND EVEN COMMON DOMESTIC HOUSEHOLD PETS. SOME OF THE MOST COMMON ANIMALANIMAL SUPPLEMENTS CAN SERVE DIFFERENT PURPOSES, DEPENDING ON THEIR INTENDED REGIPIENTS, AS WELL AS THE NEEDS OF THE OPERATION. MOST ANIMAL SUPPLEMENTS ARE USED TO ADDRESS CERTAIN NUTRITIONAL DEFICIENCIES THAT CAN OCCUR IN PARTICULAR CLIMATES, OR ARE COMMON IN SPECIFIC BREEDS OF ANIMALS.

I.Receive raw ingredients.Feed mills receive raw ingredients from suppliers. Upon arrival, the ingredients are weighed, tested and analyzed for various nutrients and to ensure their quality and safety.

Create a formula. Nutritionists work side-by-side with scientists to formulate nutritionally sound and balanced diets for livestock, poultry, aquaculture and pets. This is a complex process, as every species has different nutritional requirements.

3.Mix ingredients.Once the formula is determined, the mill mixes the ingredients to create a finished product.

4. Package and lobel. Manufacturers determine the best way to ship the product. If it is prepared for retail, it will be "bagged and tagged," or placed into a bug with a label that includes the product's purpose, ingredients and instructions. If the product is prepared for commercial use, it will be shipped in bulk.

# WHAT

To replace synthetic hormone

# WHY

Supplements are most frequently used to address nutritional deficiencies. These deficiencies can arise due to a number of reasons, including:

1.Lack of food due to competition, overpopulation, or seasonal changes

2.Poor nutritional value of available food

3.Medical conditions affecting the digestive tract of animals

# Fascilitator

· MADAM NOR AZIRA IRMA MUHAMMAD

# Teams member

- . NUR HANNAH BT SULAIMAN
- · NUR ANIS NAJ MOHAMAD
- NUR AINUE MARDHIAN BT MOND ZANF
- · NUR FARANT WANT BT MAT SAPARI



# Chemical Compound of Insecticide



# Projects Marrier WWASTER, 19627 V SCHTTBURNES



# Introduction

Certain insect carry disease, while others prey upon crop plants. The use of observiced insectioides helps keep these harmful insects under controls. Chemicals are producing new insectioides, siways looking for one that will be safe, specific and even more effective. It is also possible to create plants with built-in insect resistance, using genetic modification.

## WHAT INSECTICIDE USE FOR?

Street Annie I son well alle and the second of the second

## HOWY

the position with the phone proterior a space or the back The position. From parties the track in the parties of the parties the better parties. The strategic and by the back, and to send the matter that probability and substances the track plate proposals authorized the parties of the parties of authorized the parties of the parties of the substances that with another parties and the parties of the parties and

## WHY?

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# References

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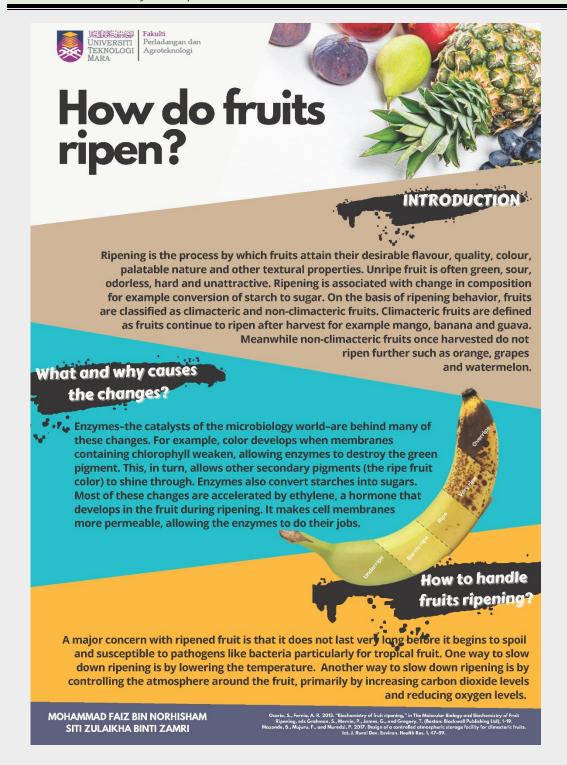
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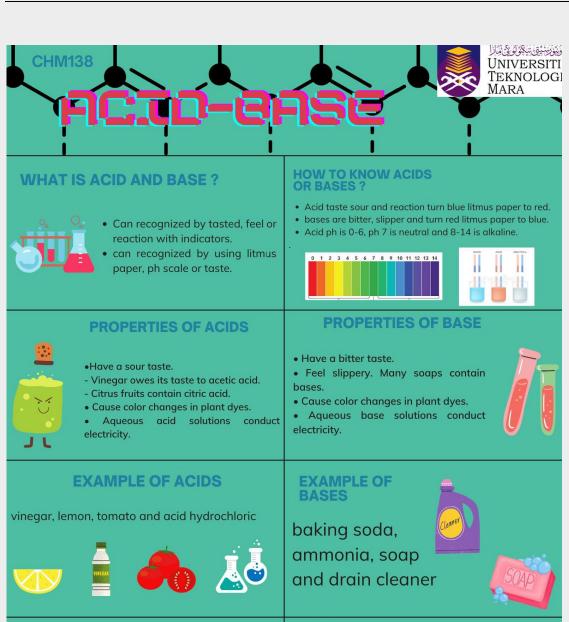
# LECTURER

MADAM NURUL IZZATI AFIFA BINTI ISMAIL









## WHY ACIDS MUST BE PLACE SUITABLE PLACE?

To reduce the risk of acids and bases mixing, it is a good practice to store acids and bases in separate safety cabinets, If they cannot be stored in separate safety cabinets, acids and bases must be store in separate compartments within the cabinet.







## HOW TO FOUND ACIDS AND BASES IN LIFE?

To determine whether a substance is an acid or a base, count the hydrogens on each substance before and after the reaction. If the number of hydrogens has decreased that substance is the acid (donates hydrogenions). If the number of hydrogens has increased that substance is the base(accepts hydrogen ions)



AHWAO UWATZ STAWU OAWIAW WAKUM SAUM OAWIMINIAM

MUHAMIMAD DANTAL HAHTMT

**DIPLOMA POSTER (BRONZE)** 











Masturah binti Haris Fatillah Aleez Syahrina binti Mohd Khairi Mohd Zuli bin Jaafar

#### TITLE: CHEMICAL REACTION IN PLANT PHOTOSYNSTHESIS

1

#### INTRODUCTION

 Photosynthesis is the process used by plants, algae and certain bacteria to run sunlight, carbon dioxide and water into food and oxygen.



## 7

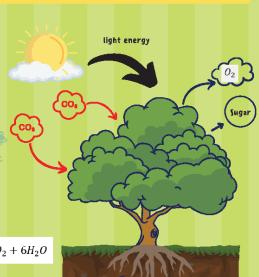
#### PROCESS OF PHOTOSYNTHESIS

- Light energy transfers electrons from water (H2O) taken up by plant roots to CO2 to produce carbohydrates.
- In this transfer, the CO2 is "reduced," or receives electrons, and the water is "oxidized," or loses electrons. Oxygen is produced along with carbohydrates.

3

#### **EQUATION OF REACTION**

 Six molecules of carbon dioxide (CO2) combine with 12 molecules of water (H2O) using light energy. The end result is the formation of a single carbohydrate molecule (C6H12O6, or glucose) along with six molecules each of oxygen and water.



 $6CO_2 + 12H_2O + Light\ energy\ \rightarrow\ C_6H_{12}O_6 + 6O_2 + 6H_2O$ 

4

#### WHY??

 A counterbalance to respiration by taking in the CO2 produced by all breathing organisms and reintroducing oxygen to the atmosphere.



#### references:

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https://www.livescience.com/51120-photosynthesis.html#section-types-of-photosynthesis. Retrieve at 24 May 2022.

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https://www.dreamstime.com/diagram-showing-process-photosynthesis-plant-cells-illustration-image176969946. Retrieve at 24 May 2022.

#### NITRIFICATION PROCESS: REACTION OF FERTILIZER

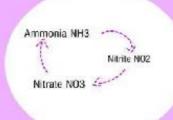
#### GROUP MEMBERS

1. Hakimi Hafiz Bin Hasbullah 2. Mohd Iqbal Irfan Bin Rahmat 3. Hariz Hilman Bin Fabim Azam

#### **FACILITATOR**

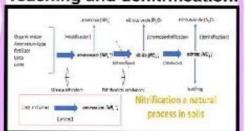
To Dr Mohd Khairy Bin Yahari Sir Abdul Muha min Bin Mohd Shafie

#### NITRIFICATION IS CONVERTING AMMONIA TO NITRITE AND THEN TO NITRATE



#### NITRIFICATION PROCESS

Nitrification, inhibitors interfere with activity of Nitrosomonas bacteria, slowing the nitrification process. This leaves more N in ammoniacal form, thus reducing the chance of Teaching and denitrification.

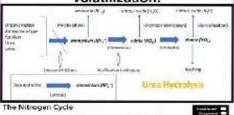


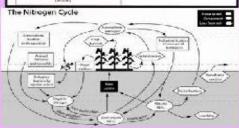
#### NITROGEN FERTILIZER

Anhydrous ammnia NH3 B2% Ammonium Nitrate NH4NO3 34% UREA (NH2) 2CO 46% UAN solution 20-32% Ammonium Sulfate (NH4)2SO4 21%

#### **UREA HYDROLYSIS**

Urease inhibitors interfere with the process of urea hydrolysis. The slowing of conversion of urea to ammoniacal N can significantly reduce the potential for NH3 volatilization.





#### THE REACTION

Commercial fertilizers are chemicals. They are going through physical reaction. They are involved in chemical reactions. Some reactions are biologically mediated We can manage the nutrients better by knowing their behavior.

#### PLANT MORPHOLOGY & ANATOMY

MORPHOLOGY IS THE BRANCH OF BIOLOGY CONCERNED WITH THE FORM OF LIVING ENTITIES. PLANT MORPHOLOGY, ALSO KNOWN AS PHYTOMORPHOLOGY, IS THE STUDY OF A PLANT'S PHYSICAL FORM AND VISIBLE STRUCTURE PLANT ANATOMY IS THE STUDY OF A PLANT'S INTERIOR STRUCTURE, TYPICALLY AT THE CELLULAR/MICROSCOPIC LEVEL.

#### WHAT IMPORTANCE IN AGRICULTURE

MORPHOLOGY- IN AGRICULTURE, RESEARCHERS
HAVE FOCUSED ON PLANT SHAPE AND
ACHITECTURE, AS WELL AS THE
TRANSCRIPTIONAL NETWORKS THAT DRIVE
PLANT DEVELOPMENT. MODIFYING ROOT
GROWTH BY CHANGING CELL EXPANSION AND
LEAF AND STEM ACHITECTURE BY WORKING ON
GIBBERELLIN AND BRASSINOSTERIOD SIGNALLING
PATHWAYS ARE TWO EXAMPLES
1) ANATOMY- CAN HELP TO UNDERSTAND

- 1) ANATOMY- CAN HELP TO UNDERSTAND VARIOUS BIOLOGICAL PROCESSES OF THE PLANTS SUCH AS PHOTOSYNTHESIS, RESPIRATION, TRANSLOCATION, NUTRIENT UPTAKE.
- 2) HORMONE- MEDIATED PLANT GROWTH REGULATION, AND OTHER ACTIVITIES THAT HAVE A SIGNIFICANT IMPACT ON CROP PRODUCTIVITY.

MORPHOLOGY-PLANT MORPHOLOGY ALSO DISCUSSES HOW PLANTS TAKE ON THEIR PHYSICAL STRUCTURE. PLANT MORPHOLOGY IS EXTREMELY **BENEFICIAL FOR VISUALLY IDENTIFYING PLANTS. IT IS THE STUDY** OF PLANTS STRUCTURE. **DEVELOPMENT AND FORM. THIS FIELD** HAS FOUR MAJOR AREAS OF INQUIRY, **EACH OF WHICH OVERLAPS WITH** OTHER BIOLOGICAL SCIENCES. **ANATOMY-PLANT ANATOMY ALLOWS** STUDENTS TO CONCEPTUALISE THE **RELATIONSHIP BETWEEN ORGANISMAL** STRUCTURE AND FUNCTION. IT ALSO AIDS IN THE DISCOVERY OF **CONNECTIONS BETWEEN** STRUCTURES, FUNCTION, TAXONOMY, **ECOLOGY AND DEVELOPMENT** GENETICS.

#### **EQUATIONS**

- 1. PHOTOSYNTHESIS-6CO2 + 6H2O C6H12O6 + 6O2
- 2. TRANSPIRATION- 6CO2
- + 6H2O + energy C6H12O6 + 6O2.
- 3. ASSIMILATION -HNO, + 8H --. NH, + 3HzO.



#### HOW IT IS USE IN AGRICULTURE

Understanding which characteristics and structures belong to each type is an important part of understanding plant evolution. The evolutionary biologist relies on the plant morphologist to interpret structures, and in turn provides phylogenies of plant relationships that may lead to new morphological insights.



## **ACID AND BASE**

## INTRODUCTION

• The term acid is derived from the Latin word acid which means sour. Early chemists had a list of properties that were common to the substances that they considered to be acids or bases [eg acids had a sour taste, turned litmus red, reacted with some metals to produce a flammable gas (hydrogen) ..etc...]. They would assess a new substance as an acid or as a base (or as neither) by comparing the properties of the new substance against the list of properties.

## **EXAMPLE FOR ACID**

 hydrochloric acid, sulfuric acid, citric acid and ethanoic acid (vinegar/acetic acid).

## CONCLUSION

 In conclusion from this topic that I can conclude that where acid and base make and how to know it

#### BASE

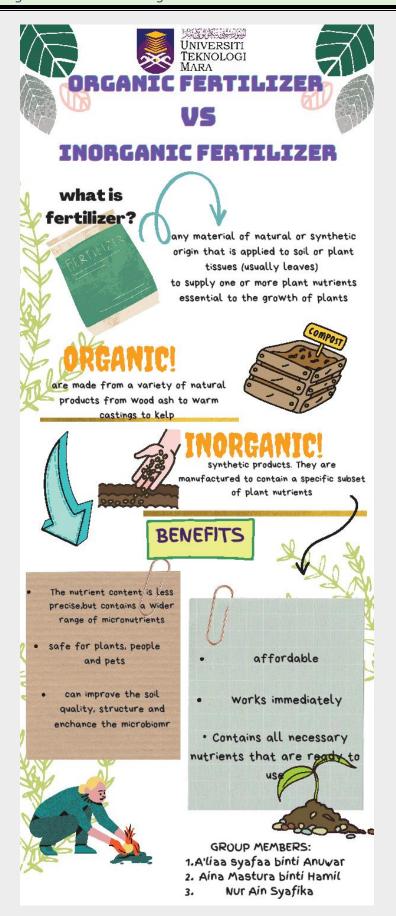
 cases are a group of substances that neutralize acids





#### ACID

 An acid is a molecule or ion capable of either donating a proton (i.e. hydrogen ion, H+), known as a Brønsted-Lowry acid, or forming a covalent bond with an electron pair, known as a Lewis acid.



# ♦ light and dark REACTION OF PHOTOSTNTHESIS

#### introduction

Photosynthesis is the process of conversion of light energy into chemical energy which can then be utilized by living organisms. It is a rather complex process which is carried out through various stages.

#### Photosynthesis comprises two phases:

- -The first phase is the photochemical phase or light-dependent process. This phase is commonly known as the light reaction.
- -The second phase is the biosynthetic phase of the dark reaction of photosynthesis. This phase is the light-independent process.

#### chemistry application:

-The light reaction is the initial stage of photosynthesis which traps light energy to produce ATP and NADPH, whereas dark reaction is the second step of photosynthesis which utilizes the energy from ATP and NADPH to produce glucose.

#### When it is use in agriculture:

#### a)LIGHT:

The light reaction takes place in the thylakoid membranes. In the light reaction, the light is absorbed and energy is used to drive electrons from water to generate NADPH and to drive protons across the membrane.

Chemical equations: 24H2O⇒24H+ + 24OH

#### b)DARK:

In the dark reaction, plants use carbon dioxide with ATP and NADPH from the light reactions to produce glucose. It takes place in the stroma of the chloroplast.

Chemical equations: 6CO2 + 24H → 6(CH2O)+6H2C

#### why it is important

- THE LIGHT REACTIONS OF PHOTOSYNTHESIS INVOLVE LIGHT-DRIVEN ELECTRON AND PROTON TRANSFERS, WHICH OCCUR IN THE THYLAKOID MEMBRANE, WHEREAS THE DARK REACTIONS INVOLVE THE FIXATION OF CO2 INTO CARBOHYDRATE, WHICH OCCURS IN THE STROMA. THIS KNOWLEDGE CAN HELP FARMERS FROM DOING THINGS THAT PREVENT TREES FROM GETTING SUNLIGHT. FOR EXAMPLE, BUILD TALL BUILDINGS SO THAT LIGHT IS BLOCKED DIRECTLY TO THE TREE. THIS KNOWLEDGE CAN HELP MAINTAIN AND IMPROVE THE QUALITY OF PLANTATIONS IN THE ECONOMY





Cawangan Melaka Kampus Jasin

## THE CHEMICALS INVOLVED IN FRUIT RIPENING

Ethylene is a gas and is known as the 'fruit-ripening hormone

Ethylene can be found in fruits, and is responsible for fruit ripening. Based on how they response, they can classified into two major groups.

Climacteric fruits, such as tomato, avocado, apple and etc, the ripening is accomponied by a burst of ethylene, and also respond to external ethylene to increase their ripening rate.

Non-climacteric fruits, such as strawberry, grapes and citrus fruits, requires external ethylene source, as the ethylene production does not increase during ripening.

Non-climacteric fruits can still ripen, if they are exposed to external ethylene source, such as a ripening climacteric fruit.

For example, a rotten apple can spoil the whole basket. This is because the rotten apple is releasing ethylene, which is accelerating the ripening process, by exposing other apples to external ethylene source.

For some, the fruits are picked right before they are ripe, so that when they are picked and sent to their destination, they can conduct the ripening process in a controlled condition.

AHMAD KHUSYAIRI BIN ANUAR AHMAD AMJAD BIN MOHD NASIR CHE ANIS BINTI MOHD NAZRIE

REFERENCE: https://www.frontiersin.org





#### **GROUP 6**

- -MUHAMMAD LATIFF BIN MOHAD SABRI
- -MUHAMMAD NABIL QAYYUM BIN ZURAIMI
- -MUHAMMAD ASRUL BIN MOHD AZUAR

#### CHEMICAL REACTION IN RESPIRATIONS

#### Basic information

-cellular respiration, the process by which organisms combine oxygen with foodstuff molecules, diverting the chemical energy in these substances into life-sustaining activities and discarding, as waste products, carbon dioxide and water. Organisms that do not depend on oxygen degrade foodstuffs in a process called fermentation. (For longer treatments of various aspects of cellular respiration, tricarboxylic acid and cycle metabolism.)

#### PROCESS(STAGE)

-Biologists differ somewhat with respect to the names, descriptions, and the number of stages of cellular respiration. The overall process, however, can be distilled into three main metabolic stages or steps: glycolysis, the tricarboxylic acid cycle (TCA cycle), and oxidative phosphorylation (respiratory-chain phosphorylation)

#### REFERENCE

https://www.britannica.com/science/cellular-respiration

#### 3 MAIN METABOLIC STAGE

#### Glycolysis

-Clycolysis means lysis or splitting of glucose and is the first stage of cellular respiration and occurs inside the cells. Enzymes cut the glucose into two halves, forming two 3C(C-C-C) containing compounds which are converted by other enzymes into 2 molecules of pyruvate. This releases energy from glucose. Since we are breaking glucose down, gycolysis is a catabolic chemical reaction!

#### Tricarboxylic acid cycle

-The TCA or Kreb's Cycle is a series of chemical reactions that end up where they start (they go round in circle) except that the carbons from the pyruvates are oxidised to carbon dioxide, releasing more energy!

#### Oxidative phosphorylation

-Oxidative phosphorylation: the NADH is used by the mitochondrion to make more ATP, which stores the energy from the NADH. Thus, all the usable energy from the glucose is now in ATP molecules.





## ACID AND BASE

## USE IN AGRICULTURE

## Asid sulfuric (Acid)

- Sulphuric acid is a strong mineral acid made up of sulphur, hydrogen, and oxygen, with the molecular formula (H2SO4-) It has a strong smell and is an extremely corrosive, oily, clear liquid.
   sulphuric acid is used in some way
- sulphuric acid is used in some way during the production of almost all manufacture good. It has a wide range of uses in the agriculture.
- range of uses in the agriculture.

   Sulphuric asid is use specifically in the fertiliser industry.
- specificially used to manufacture phosphate fertilisers such as superphosphate of lime and ammonium sulphate
- nitrogen fertilisers it increases the crop yield

- The most common acids for agricultural use are Sulfuric acid, Phosphoric acid and Nitric acid.
- These acids contribute essential plant nutrients (sulfur, phosphorus and nitrate).

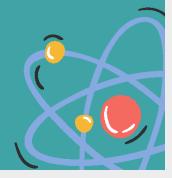


## Calsium hydroxide (base)

- It is used to neutralize the acidity in soils
- it is a component of the bordeaux mixture used for protecting agricultural crops from pest
- Calsium hydroxide is an inorganic compound with the chemical formula Ca(OH)2

 The most common base that can be use in agriculture is ammonium hydroxide and calsium hydroxide







## UITM CAWANGAN MELAKA KAMPUS JASIN

## SOIL PH PREFERENCE FOR PALM OIL PLANTATION

#### PREPARED BY:

MUHAMMAD HARIZUDDIN BIN AZHAR, MUHAMAD AFIQ IRFAN BIN SAIFUL RIZAL, MUHAMAD MUHSIN MUBARAK BIN RAZALI AND MOHAMMAD SAIFUL BIN MOHD SAZALI

#### INTRODUCTION

Almost all oil palms are planted on acidic, low-fertility soil, according to estimates. The pH range of 4.3 to 6.5 is ideal for oil palm growth. Oil palm trees on the other hand and have a high tolerance for acidity, allowing them to flourish even at pH levels as low as 3.9-4.2

Soil pH	Plant Growth		
> 8.3	Too alkaline for most plants		
7.5	Iron availability becomes a problem on alkaline soils		
7.2	6.8 to 7.2 — near neutral 6.0 to 7.5 — acceptable for most plants		
7.0			
6.8			
6.0			
5.5	Reduced soil microbial activity		
< 4.6	Too acid for most plants		
(Source: Color	ado State University – CMG Garden Notes #222)		



#### THE IMPORTANCE OF SOIL PH

- nutrient availability (plant nutriens are generally found in plants in pH range of 5.5-6.5.it allows oil palm plants to produce better quality fruit)
- we know how to take care of it and prevent discase in the soil and ensure the soil and plantsand organisms living there can all live a long healthy life
- it is also important, it may not seem like it but plant life is importance, it may not seem like it but plants have every detrimental effect and job in the world. They help all living things by absorbing carbondioxide which humans and other animals need to breathe





## Aerobic and Anaerobic Respiration



Aerobic respiration is a set of metabolic reactions that take place in the presence of oxygen, occurring in a cell to convert chemical energy into ATPs. Anaerobic respiration is a process of cellular respiration where the high energy electron acceptor is neither oxygen nor pyruvate derivatives.

# Glucose -- Pynuvic acid Chemical energy Chemical energy

#### AEROBIC RESPIRATION

Overall Equation:C6H12O6 + 6O2 → 6CO2 +
6H2O + energy
Location:- Aerobic
respiration, after glycolysis,
occurs in the mitochondria
of eukaryotes and cytoplasm
of prokaryotes.
End Product:- carbon

dioxide, water, and energy.

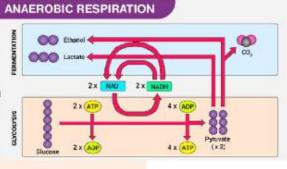
## ANAEROBIC RESPIRATION

2 ATP

Overall Equation:-C6H12O6 → C2H5OH + CO2 + energy

Location:- Anaerobic respiration occurs only in the cytoplasm of a cell.

End Product: - acids, alcohols, gases, and energy.



## ACID AND BASES

#### INTRODUCTION

AN ACID IS ANY HYDROGEN
CONTAINING SUBSTANCE THAT
IS CAPABLE OF DONATING A
PROTON (HYDROGEN ION) TO
ANOTHER SUBSTANCE A BASE
IS A MOLECULE OR ION ABLE TO
ACCEPT A HYDROGEN ION FROM
AN ACID

#### WHY

SOIL ACIDITY AND SOIL LIMING IS AN IMPORTANT FACTOR IN THE ASPECT OF SOIL FERTILITY ESPECIALLY FOR THE GROWTH OF FOOD CROPS.

#### REFERENCES

https://www.sciencedirect.com/science/article/abs/pii/S0016706104000564

http://animhosnan.blogspot.com/2013/05/tanah-keasidan-tanah-part-1.html?m=1

#### WHAT

Available alkalinity was about half the potential alkalinity. Cations associated with organic anions. An acidity budget equated neutralized soil acidity with residue alkalinity and base or acid produced by transformation.

## HOW

THE ACIDITY VALUE OF THIS SOIL IS MEANSURED WITH A PH SCALE WHICH IS A SCALE USED TO MEASURE IN THE RANGE 1-14 WHERE THE READING OF SCALE 7 IS CALLED NEUTERAL.

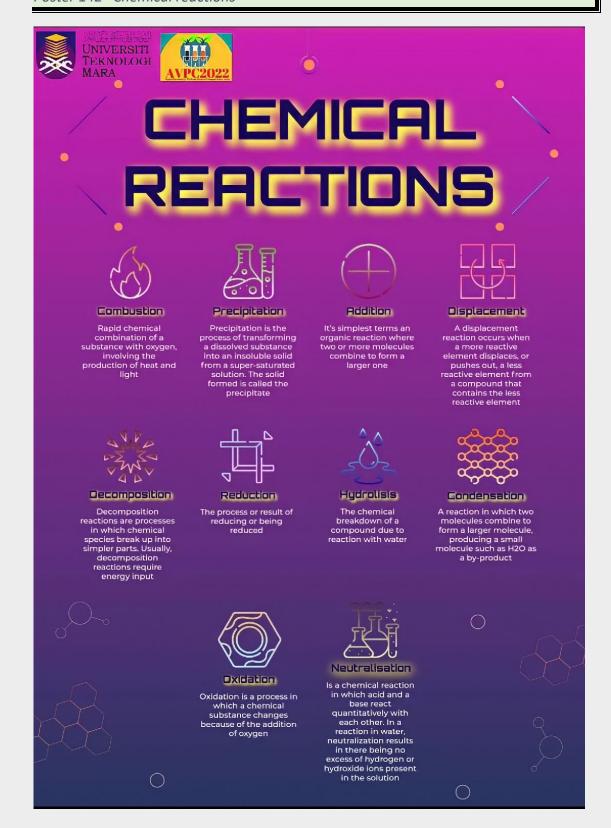
#### NAME OF THE AUTHOR

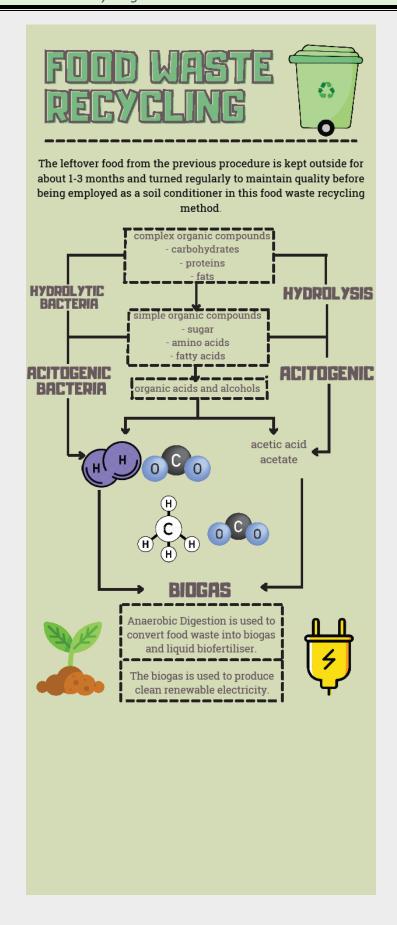
- 1. NORSYAFIZA BINTI IBRAHIM
- 2. NUR AINIS NAFISYA BT ABU BAKAR
- 3. NUR ADLINA BINTI MARZUKI
- 4. NORHIDAYU NATASYA BINTI SHARIZAN

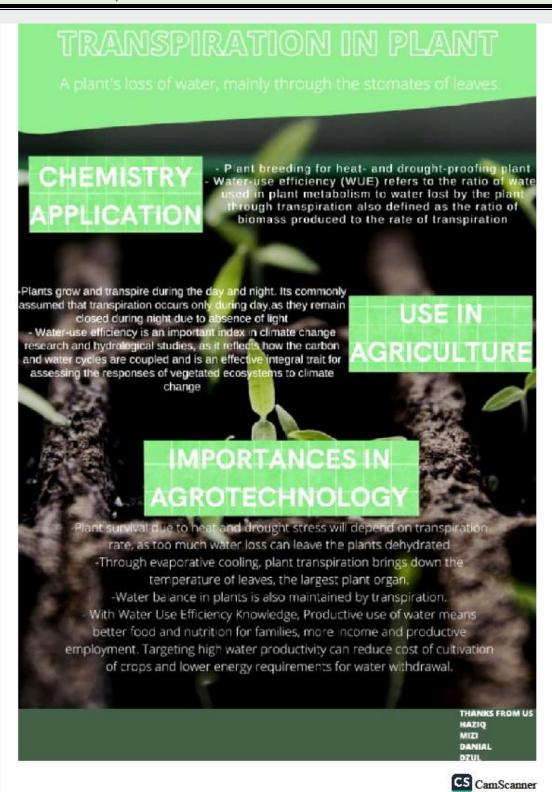


 $\Box$ 









## THE CHEMISTRY BEHIND OF INSECTICIDES

BY NURULANIS FARHANA BINTI IKMAL MANSANG, NUR AINA NAJEHA BINTI OSMAN, PUTERI AYUNABILLA BINTI HAMDAN

#### HOW DOES THE INSECTICIDES CREATED?

#### 1. Selecting raw materials

Carbosulfan 25%, High Golden Thiophene Ketone 2%, methyl naphathalene 22%, ethylene glycol 20%, sucrose 8% phosphoric acid 2%. Excess water will be supplied as well.

#### 2. Mixing and dissolving

After choosing the raw material, it will be added in a dissolving tank in in proportion.

#### 3. Preparing an emulsifier

Phenethyl, phenol, polyxyethyl, sulphur calcium sulphate are mix by 1:2 mass ratio, which will obtained emulsifier.

#### 4. Emulsifying

The mixed raw material will be added with emulsifier.

The acidity will be control in the range between 4 or 5.

This must be stir for 3 hours.

#### 5. Taste removal

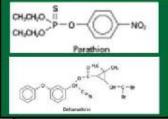
The mixed liquid will add some essence.

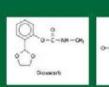
#### 6. Shearing

Water added into the tank. It will breakdown the particles which controlled the diameter in between 0.1 or 0.2 µm. Control the particle for 30 minutes.

#### THE CHEMICAL STRUCTURES IN INSECTICIDES

- Organochlorine
   Organophosphorous compounds
  - Methylcarbamates
  - Synthetic pyrethroids







#### WHAT TYPE OF CHEMICAL REACTION IN INSECTICIDES?

commonly, the reaction in insecticide is hydrolosis, which is a process that breakdown the chemical and reacts with water.

#### **HOW INSECTICIDES WORK**

Pesticides interfere with the transmission of nerve impulses. They attack synapse, the tiny gap between one nerve fiber and the next. Nerve impulses jump such gaps with the aid of chemicals called neurotransmitters. Enzymes normally destroy these chemicals immediately after the nerve impulse crosses the gap.

FASILATOR MADAM NURUL WAHIDA BINTI HANI & MADAM NORAIDA BINTI MOHD RADZ

# AgroChemistry Virtual Poster Competition 2022 acid and bases INFORMATION OF

AGID AND BASES

**ACID** 

- PASTE SOUR

-REACT WITH SOME METALS TO GIVES OF HYDROGEN GAS

- CONDUCT ELECTRICITY IN SOLUTIONS

- TASTE BITTER - FEEL SLIPERY -DISSOLVE FAT AND OIL **BASES** 



7 MEANWHILE FOR BASES IT WAS REFER TO AS ALKALI (HAVING GREATER

- BOTH RELEASE IONS IN WATER
- CHANGE THE COLOR OF LITMUS PAPER
- FORM SALT AND WATER WHEN
COMBINED

ACID AND BASES SIMILIARITY PRE DIPLOMA POSTER (GOLD)







# ENVIPLUS PESTICIDE

AVPC-PRA\_02

#### Introduction

Organic insecticide is a type of pesticide that is made from natural ingredients. These pesticides effectively control a wide variety of pests, and safe for humans and the environment. Azadirachta Indica (neem) tree known locally as "semambu" has many benefits. Semambu oil is a natural by-product of the semambu tree that is derived from the leaves and seeds. For centuries now, it has been used as a natural pesticide. Biopesticides (organic pesticides) are a good alternative to synthetic pesticides. Both leaves and fruit of the semambu plant are known to have a bitter taste have fungicidal, insecticidal, and nematicidal properties. Azadirachtin, chemically a tetranorterpenoid component of neem acts on the mitotic cells and blocks the microtubule polymerization [1]. While, garlic is a food crop with documented therapeutic and pesticide effects [2]. It has been long-recognized as a bactericide due to the effects of a variety of sulfur-containing compounds with strong biological activity. These same compounds also inhibit fungal growth. Garlic is used as an insecticide with both repellent and biocidal properties. The sulfurcontaining constituents diallyl disulfide and diallyl trisulfide are the predominant constituents of the garlic oil, with diallyl disulfide comprising up to 60% of the oil by weight and therefore, have the potential for pest control [3]. Therefore, ENVIPLUS is the new findings with the formulation of both plant oils combined with emulsifier was found to be potential as biopesticide as well as biofertilizer in reduction of pest populations and growth. Example of neem leaves and fruits, chemical structure of tetranorterpenoid and chemical constituent of garlic as shown in Fig. 1.

diallyl sulfide diallyl disulfide diallyl trisulfide

Fig 1: a) neem leaves & fruits b) tetranorterpenoid c) chemical constituent of garlic

#### Why should use ENViPLUS?

- When used in soil, it works as a systematic insecticide. This means that the oil will be used in the soil while still getting absorbed into the plant, acting as a fertilizer and boosting the plant's immunity against pest attacks.
- It eradicates harmful orgasms leaving the beneficial ones intact.
  - There are no adverse effects observed when ENViPLUS is ingested.

It gets rid of root rot. When sprayed or mixed in the soil, plants that experience rot in the root system effectively prevents the disease from spreading.

#### How to prepare ENViPLUS

- edients
- 1 Litre ENVIPLUS 15 mL semambu oil
  - 15 mL garlic oil
  - 2.5 mL liquid dish soap
  - 1 L warm water

Add liquid dish soap to the spray bottle. Gently stir to mix the soap.

stir to mix the soap.

Add semambu oil and garlic oil to the mixture.

the mixture until oil is well mixed with the soap mixture.



Spray the mixture on the top and bottom of the leaves, shake the bottle before used.

#### Conclusion

The production of ENVIPLUS from the extraction of neem oil and garlic oil has been successfully produced.

Fill a spray bottle

with warm water.

- The innovation from the traditional application of the neem tree and garlic into the biopesticide as well as bio fertilizer, free from hazardous chemicals gives the consumers the best alternative for pest and plant growth problems.
- This innovation develops a new organic pesticide that does not naturally treat the plant's problems, but it is also an excellent organic fertilizer that causes no harm when sprayed on both the plants and soil.
- ENVIPLUS is a fantastic choice of both organic pesticide & fertilizer.

#### References

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#### Acknowledgement

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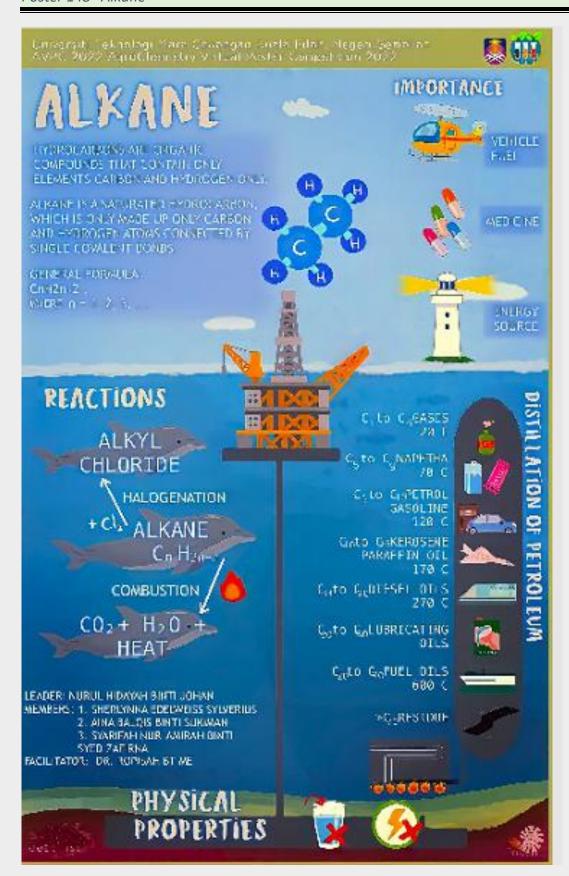
#### Contact us



Mazni Musa, Nurul' Ain Jamion, Nurhaliza Isa, Ramadzan Shaiful Amran & Izzat Haqkimi Ruzain.



PRE-DIPLOMA POSTER (SILVER)



## Chemical used for agricultural purposes

Agricultural chemical :Any substance involved in the growth or utilization of any plant or animal of economic importance to humans.

Types of chemicals use in agricultural:

herbicides(to kill weeds)

insecticides(to kill bugs)
fungicides(to get rid of disease)

soil fumigants, desiccants, harvest aids, and plant growth regulators

#### THE BENEFITS OF CHEMICALS IN AGRICULTURE



kill pests



accelerate plant growth



the productive more satifactory



fertilize the soil

#### DISADVANTAGES OF CHEMICAL IN AGRICULTURE



food poisoning



water polution



acid rain



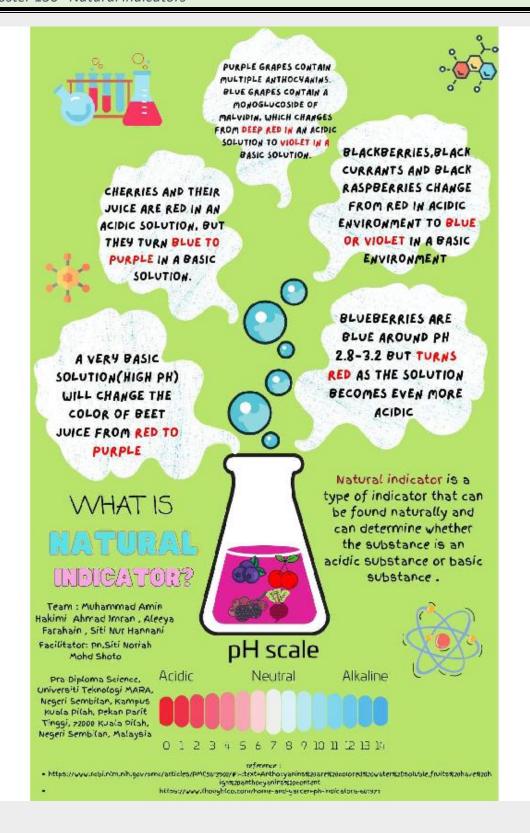
acidic soil

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**REFERENCES:** 



#### A New Nano-Dual -Herbicide for Agriculture purposes.

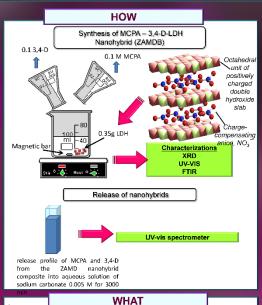
Sheikh Ahmad Izaddin Sheikh Mohd Ghazali<sup>11</sup>, Siti Noriah Mohd Shotor<sup>1</sup>, Tuan Nor Idayu Tuan Abg Ghani<sup>1</sup>, Effa Ainisyammi Mohd Zaki<sup>1</sup> and Rosnita a/p Rosli<sup>1</sup>

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#### INTRODUCTION

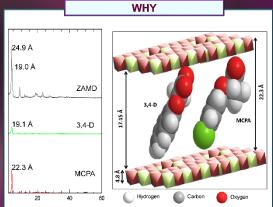
Nanomaterial such as two-dimensional (2D) nanosheets have recently gained much attention due to their unique physical and chemical properties [1]. Layered double hydroxide(LDH) or so called hydroxiacite-like compound with a general formula [M<sub>x</sub>-<sup>2</sup>M<sub>y</sub>-<sup>3</sup>(OH)<sub>2</sub>] \*<sup>3</sup>A<sub>xn</sub><sup>n</sup>-yH<sub>2</sub>O, where M<sup>2+</sup> are divalent cations, M<sup>3+</sup> are trivalent cations, A<sup>n</sup> is the interlayer anion and x is the molar ratio of M<sup>3+</sup>/ (M<sup>2+</sup> + M<sup>3+</sup>) having the typical value of 0.25. Structurally the are formed by brucite-like (Mg (OH)<sub>2</sub>) sheets where isomorphorm substitution of Mg<sup>2+</sup> by a trivalent cation like Al<sup>3+</sup> occurs. The positive charge of the layer is compensated by anions, which occupy the interlayer space along with water molecules [2]. Many active agents such as drugs [3], herbicide and plant growth regulator [4] have been successfully intercalated into the layered double hydroxide. This paper deals with the work on the formation of phase-pure, well-ordered LDH-intercalated anonhybrids by the intercalation of 2 bricides namely 2-methyl-4- chlorophenoxy acetate (MCPA) and 3,4-dichlorophenoxy acetate (3,4D) simultaneously into the LDH interlayer using an anion exchange method.



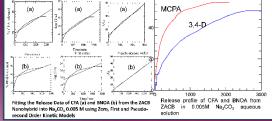
→ From PXRD pattern of the dual nanohybrid (ZAMD), basal spacing of the nanohybrid was determined to be 19.0 Å.

- $\Rightarrow$  Taking into account that the layer thickness is 4.8 A the expected gallery height is 17.1 A. ZAMD anion have to orient themselves in a monolayer arrangement by turning the functional group on the opposite side and opposing the fields of aromatic ring mutually by  $\pi$ - $\pi$  interactions to fit into gallery height available to be occupied.
- →ZAMD nanohybrid is composed of 3,4-D and MCPA with loading percentage of 30.2 and 27.7% (w/w),respectively.
- → The maximum accumulated release of 3,4-D was found to be 50.5 which is higher than MCPA at 45.7%.
- $\Rightarrow$  Correlation Coefficient, r² value obtained from the fitting of the data of anion exchange process of CFA and BNOA in the LDH interlayer into aqueous solution containing Na $_2$ CO $_3$  0.005 M

Anion	Zeroth order	First order	Pseudo- second order
BNOA	r <sup>2</sup> =0.6994	r <sup>2</sup> =0.775	r <sup>2</sup> =0.999
CFA	r <sup>2</sup> =0.879	r <sup>2</sup> =0. 932	r²=0. 999



PXRD pattern of of ZAC, ZAB and ZACB Proposed spatial orientation of ZACB in zinc aluminum layer double hydroxide interlayer.



#### CONCLUSIONS

- Simultaneous intercalation of 2-methyl-4-chlorophenoxy acetate and 3,4dicholorophenoxy acetate into zinc-aluminium-layered double hydroxide was successfully incomplish via anion-exchange method for the formation of a biphasic organic-inorganic nanohybrid composite..
- 3,4-D has slightly higher released (0.5%) compared to MCPA because of the anionic size as well as the host-guest and/or guest-guest interactions.
- The r<sup>2</sup> values for pseudo-second order is close to 1 suggested that the release process of MCPA and 3,4-D into carbonate aqueous solution follows pseudo-second order kinetic model.

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