(2023)

Write down application of potash fertilizers

- Regulation of osmotic potential of plants
- Play a important role for the activation of enzyme that are required for the synthesis of protein and starch
- Involve in the process of photosynthesis and respiration.

What are raw material for ammonia synthesis

Any material (organic or inorganic) which is required for production of specific compound are called raw material.

Most important raw material

- Wood
- lignite
- Coal
- Hydrogen
- coke
- natural gas
- LP gas
- refinery gas
- naphtha
- fuel oil
- Bunker C
- Crude oil

All raw material described above are used to manufacture NH_3 and are obtained from various sources.

Give two examples of micro and macro nutrient for soil?

Macro nutrients

Macronutrients are the nutrients required in large amounts.

example :- protein, fats, fiber, water and carbohydrates

Micronutrient

Micronutrients are the nutrients required in small amounts.

example:- phytochemicals and antioxidants, vitamins and certain minerals are examples of nutrients.

What are natural organic fertilizers, give examples.

Organic fertilizers are fertilizers that are naturally produced. These are the materials that can be added to soil or plants, in order to provide nutrient and sustain growth.

example

compost
composted animal manure
sewage sludge

What is the difference between Artifically prepared mixture of $Ca(H_2PO_4)_2$ monocalcium super phosphate

Normal Superphosphate fertilizers

Triple superphosphate fertilizers

(•) Simple superphosphate is produced from phosphate rock and sulfuric acid

(•) used with most crops and is applied during planting season

(•) While triple super phosphate is produced from phosphate rock & phosphoric acid

(•) added to soil to promote development, improve yield, Used before planting

(•) **Chemical reaction**

$Ca_3(PO_4)_2 + 2H_2SO_4 \longrightarrow Ca(H_2PO_4)_2 + 2CaSO_4$

rock phosphat — monocalcium — gypsum

$Ca_3(PO_4)_2 + 3H_2SO_4 \longrightarrow 3CaSO_4 + 2H_3PO_4$

$Ca_3(PO_4)_2 + 4H_3PO_4 \longrightarrow 3Ca(H_2PO_4)_2$

Long Question

1) Write raw materials, chemical reactions in production of urea and its apsimilation in soil
2) Describe different types of calcium fertilizers, write important raw materials used for their manufacturing.

(2021)

Different between macro and micro nutrients

Repeat 2023

Name few natural organic fertilizers

Repeat 2023

What are raw materials for normal superphosphate fertilizers? The main raw material for normal superphosphate are:

(•) Rock Phosphate

It remove impurities and concentrate the phosphate content

(•) Sulfuric acid

A significant raw material in the production of phosphate fertilizers. H_2SO_4 combines with phosphate rock to produce phosphoric acid and phosphogypsum

$$Ca_3(PO_4)_2 + 2H_2SO_4 \longrightarrow 2CaSO_4 + H_2(PO_4)_2Ca$$

Give two example of phosphate fertilizer

⟹ These fertilizers provide phosphorous to soil.

examples

superphosphate of lime
triple superphosphate
phosphate slag

☆ Write down the action of calcium cyanide as fertilizers?

Calcium cyanide is primarily used in agriculture as a pesticide rather than a fertilizer. Its action as a pesticide is due to its ability to release cyanide ions, when it comes into contact with moisture.

Calcium cyanide acts maidy as a pesticide with toxic properties and poses significant risk to human health and the environment

Long

1- Descibe manufacturing of ammonia by Haber's process
2- What are triple superphosphates, write down their properties and application.

2020

What is the significance of potash fertilizers?

Potash fertilizers are important for plant growth and crop yields because they contain potassium (K) which is vital for many plant physiological process.

Significance

- (•) Improve Quality of crop by enhancing their size
- (•) enhance soil structure and fertility
- (•) enhance stress resistance
- (•) promote balance nutrient

Write down the temperature and catalyst conditions for Haber's process.

Most of the ammonia is now prepared by fixing atmospheric nitrogen. When nitrogen and hydrogen are passed over iron catalyst at 400°C under pressure about 200 atm ammonia is formed:

$$N_2 + 3H_2 \longrightarrow 2NH_3 \qquad \Delta H = -46.232\ KJ/mol$$

Write down the action of ammonium sulphate as fertilizers?

Ammonium sulphate act as an effective nitrogen fertilizer, providing essential nutrients, adjusting soil pH, promoting quick availabity of Nitrogen, enhancing growth and being compatible with other fertilizers.

How prilling is carried out during urea manufacturing?

Prilling is a process in which solid particles are produced. The concentration solution is changed into globules by spraying from to of prilling tower and heated by hot air. In this way drying of pills is not needed.

Long Question

→ Briefly explain fertilizers Classification (book) pg# 205 (Haq Nawaz Bhatti)

→ Describe urea manufacturing process, also mentioning its application.

Provide to the soil

1. Nitrogen fertilizers
   - Ammonium phosphate
   - $Ca(NH_4NO_3)$
   - $H_2N-\overset{O}{\overset{\|}{C}}-NH_2$
2. Phosphatic
   - phosphate slag
   - phosphate lime
   - Triple superphosphate
3. Potash
   - KCl
   - KNO_3
   - K_2SO_4
4. NP
   - $NH_4H_2PO_4$
   - $Ca(H_2PO_4)_2$
   - $2Ca(NO_3)$
5. Complete (mixed NPK)

available for plants

Direct

- ability to be directly utilize by plants
- Nutrient present in the form of compound

Indirect

- (•) added to soils to make progress in its properties
- (•) increase acidity of soil dolomite or limestone added
- high salt concen. of soil gypsum is added
- (•) increase soil alkanity by sulphur

Compound

- (•) combination of several nutrients combine chemically
- (•) beneficial for field
- (•) S, K, Urea, NH_3 used
- (•) provide ease in meeting nutritional requirements for crop

(2019)

Different between micro and macro nutrients

Repeat => (2019, 2021, 2023)

Write down temperature and catalyst conditions for Haber's process?

Repeat (2020)

Briefly explain urea assimilation in soil?

Assimilation of urea is natural phenomenon as it is present in soil. Urea comes in contact with soil either:

artificially made fertilizer

natural coming from animal excretion

$$NH_2CONH_2 \rightleftharpoons NH_3 + CO_2$$

- (•) increase fertility, growth, crop production
- (•) improve nitrogen cycle and maintain