CHAPTER 3 : Mineral fertilizers (simple and compound fertilizers)

Definition and classification of different fertilizers

Fertilizers are substances, natural or synthetic, added to soil to supply essential plant nutrients (like N, P, K) for growth, classified primarily as **organic** (manure, compost) or **inorganic** (urea, ammonium sulfate). They're also categorized by nutrient content (straight for one nutrient, complex for multiple) and physical form (solid, liquid).

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Classification of Fertilizers

1. By Origin/Composition

1. Organic fertilizers

Definition: Derived from the decomposition of plant and animal matter.

Advantages: Improves soil structure and microbial life, has a slow but lasting effect.

Examples: Compost, manure, slurry, green manure.

2. Mineral fertilizers

Definition: Produced by the chemical industry from minerals or other sources.

Advantages: Fast-acting because the nutrients are directly assimilable by plants.

Classification by nutrient:

Nitrogenous: Derived from nitrogen in the air and hydrogen (e.g., ammonium nitrate, urea).

Phosphorous: Derived from phosphate rock (e.g., superphosphate, ammonium phosphate).

Potassium: Derived from potash deposits.

Others: Can be simple (a single primary nutrient) or compound (two or three primary elements).

3. Organo-mineral fertilizers

Definition: A mixture of mineral and organic fertilizers.

Advantages: They act quickly thanks to the mineral elements and more gently and sustainably thanks to the organic elements.

3.2.1. Nitrogen and nitrogen fertilizers

- Role: Nitrogen is an essential nutrient for foliage growth.
- Forms: It is found in ammoniacal and nitric forms in nitrogen fertilizers.
- Examples: Urea is an example of a simple nitrogen fertilizer.

3.2.2. Phosphorus and phosphate fertilizers

- Role: Phosphorus is crucial for root development.
- Origin: It comes mainly from sedimentary rocks.
- Examples: Superphosphate is a simple phosphate fertilizer.

3.2.3. Potassium and potash fertilizers

- Role: Potassium contributes to flowering, fruiting, and overall plant resistance.
- Examples: There are organic potash fertilizers such as nettle manure, guano, and fish meal.

NPK fertilizers (behavior)

• Although they are simple fertilizers, phosphorus and potassium are often found in combination with nitrogen in NPK fertilizers.

Biofertilizers: Contain living microorganisms that enhance nutrient availability for plants (e.g., nitrogen-fixing bacteria).

2. By Nutrient Content (Primary Macronutrients: N, P, K)

Straight Fertilizers: Supply only one primary nutrient (N, P, or K).

N: Urea, Ammonium Sulfate.

P: Single Superphosphate (SSP).*K:* Potassium Chloride (MOP).

Complex/Compound Fertilizers: Contain two or three primary nutrients chemically combined.

Examples: Diammonium Phosphate (DAP), NPK blends.

- **Mixed Fertilizers:** Physical mixtures of straight fertilizers, blended to provide specific nutrient ratios.

3. By Physical Form/Release Rate

- **Solid Fertilizers:** Powders, granules, crystals, prills (e.g., Urea prills, SSP powder).
- **Liquid Fertilizers:** Solutions applied via sprays or irrigation (e.g., Foliar feeds, liquid ammonia).
- **Slow-Release Fertilizers:** Coated or encapsulated to release nutrients gradually over time.

4. By Other Properties

- **Micronutrient Fertilizers:** Supply essential trace elements like zinc, iron, manganese, boron.
- **Acid/Base/Neutral Fertilizers:** Classified by their effect on soil pH.

The main compound fertilizers available in Algeria

Algeria offers various compound fertilizers, primarily NPK blends like 10-52-10, 12-12-36, and 20-20-20 for balanced nutrition, alongside specialized water-soluble types (e.g., Potassium Nitrate, MAP, MKP), bio-NPK formulations, and nutrient-rich options with micronutrients (Magnesium, Sulphur, Calcium, Boron, Zinc), meeting demands for both traditional and modern/sustainable agriculture.

Key suppliers provide these products, addressing needs for intensive crop production, hydroponics, and soil health.

Common Types of Compound Fertilizers in Algeria

- **Standard NPK Blends:**

10-52-10 (FERTIGROW): High Phosphorus for root development.

12-12-36 (FERTIGROW): Balanced NPK, often for flowering/fruiting.

20-20-20 (FERTIGROW): General purpose, balanced growth.

NPK Water Soluble: (e.g., grow CIO 11-40-11, grow LIBRATUM 20-20-20) for irrigation systems.

- **Specialized & Water-Soluble Options:**

Potassium Nitrate (KNO_3): Multi-K, Potassium Sulphate (SOP) for high-K needs, often with Sulphur.

MAP (Monoammonium Phosphate): (e.g., MAPINN 12-61) high P & N.

MKP (Monopotassium Phosphate): (e.g., PHOSPHITE 0-52-34) high P & K, good for early growth/stress.

Calcium Nitrate: (e.g., CALINN XL, Haifa Cal) for calcium, cell strength.

Magnesium Sulphate: (e.g., PerforMag) for Magnesium & Sulphur.

Bio-Fertilizers & Biostimulants:

Natural liquid compounds, humic/fulvic acids, kelp extracts, and amino acids to improve soil vitality and plant resilience.

Trace Element (TE) Enriched Fertilizers:

NPK fertilizers fortified with essential micronutrients like Boron (B), Zinc (Zn), Iron (Fe), Manganese (Mn), Copper (Cu) for comprehensive nutrition.

Key Providers & Focus:

Major Suppliers: Agrimatco Algeria, Bafagro, Haifa Group, SARL AGRIA INDUSTRIE ALGERIE.

Trends: Growing demand for bio-NPK and sustainable solutions driven by .