PRODUCTION OF NITROGEN FERTILIZERS IN INDUSTRY

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Abstract: *nowadays it is very common to apply fertilizers. Each fertilizer has its own husk. In this article, you can find out about nitrogen fertilizers and about their application, types and preparations.*

Keywords: *ammonia synthesis, atmospheric nitrogen, ammonium salts, nitric acid, calcium nitrate, amide, liquid ammonia fertilizers, ammonium cations, nitrate anion*

Ammonia synthesis. The production of nitrogen fertilizers in industry is based on the synthesis of ammonia from molecular nitrogen and hydrogen.

Ammonia synthesis is a very important way to bind atmospheric nitrogen. In the process of synthesis, nitrogen is obtained by pumping air into the combustion Coke generator, while the hydrogen source is obtained from natural gas rich in methane, or from gases leaving partially coke ovens.

In the production of synthetic ammonia, a mixture of 3 volumes of hydrogen and 1 Ham nitrogen is absorbed by compressors and compressed to the required pressure.

The hydrogen is then passed through an oil separator and a filter filled with heated coal for the purpose of cleaning the nitrogen mixture.

The purified mixture is sent to the catalystalicontact apparatus. Here, at a temperature of 400-500 C, under high pressure and in the presence of catalysts, nitrogen reacts with hydrogen to form gaseous ammonia. the resulting gaseous ammonia is converted to liquid ammonia by cooling:

The resulting ammonia is oxidized with oxygen and used to obtain ammonium salts and nitric acid:

The resulting nitric acid is used for the production of fertilizers with sodium and ammonia-nitrate.

Synthetic ammonia and nitric acids are the main raw materials used for the production of nitrogen-containing mineral fertilizers.

TYPES OF NITROGEN FERTILIZERS

Currently, the following nitrogen fertilizers are produced

1) nitrogen fertilizers with nitrate-sodium nitrate, calcium nitrate

2) nitrogen fertilizers with ammonium and ammonia - ammonium sulfate, ammonium chloride, a solution of ammonia in water.

3) ammonia nitrate-ammonium nitrate, lime - ammonium nitrate, liquid ammonia.

4) amide nitrogen fertilizers - mochevina calcium seonide.

Nitrogen fertilizers with sodium. They mainly include antrium nitrate and calcium nitrate salts.

For a long time, the only representative of this group was the Chilean saltpeter, which was mined naturally.

In connection with the discovery of the method of binding atmospheric nitrogen, synthetic saltpeter is currently being produced.

Sodium saltpeter-its nitrogen content is 15-16%, which is 26% sodium.

Calcium saltpeter-contains 13-15% nitrogen. This saltpeter is obtained by neutralizing 40-48% nitric acid with mel orisolate lime.

Sodium nitrate and calcium nitrate salts dissolve rapidly in soil solution, and these celitrates react interchangeably with the soil absorption complex.

Sodium and calcium cations are absorbed by the soil. The nitric acid anion squeezed by calcium and hydrogen cations from the soil absorption complex produces calcium nitrate and nitric acid.

Sodium and calcium selitrates are used for ildizmevali crops.

These fertilizers work well on chymed podzol soils. This fertilizer is applied in rows and feeding, along with planting, before planting autumn crops and chop-demanding crops.

Sodium saltpeter works especially when Soling together with sowing seeds of sugar beets.

Chymed podzol is the precursor in the use and effectiveness of calcium nitrate in soils.

When calcium-containing saltpeter is left in this soil, TSK is enriched with calcium. Calcium bicarbonate is formed in the soil solution and consequently netralises soil acidity. Sodium saltpeter is not recommended for saline and saltpeter soils.

2. Nitrogen fertilizers containing ammonium and ammonia include aamonium sulfate. The nitrogen content is 20.5-21%. Ammonium sulfate accounts for 25% of nitrogen fertilizers produced in the world. Ammonium sulfate is well soluble in water. Does not solidify when diluted. Hygroscopicity is minor. Salt in the form of a good crystal, the color is white, the moisture content should not exceed 0.2-0.3%.

Nitrogen in ammonium sodium sulfate is not less than 16%. The color is yellow. Sodium sulfate, 20-25%, sodium oxide is 9%.

The nitrogen content of ammonium chloride is 24-25%, and chlorine is 66.6%. It is well soluble in water, has little hygroscopicity, does not solidify when stored.

Ammonium carbonate - containing nitrogen 21-24%, in the open air ammonia is released and quickly converted to ammonium bicarbonate. Ammonium bicarbonate-contains about 17% nitrogen. Ammonium sulfate deposited in the soil quickly dissolves and enters into an exchange reaction with cations in the solid phase of the soil. In soil composition, the ammonium cation of dissolved fertilizer passes to the soil absorption complex, and in solution, an equivalent amount of another cation remains. The absorbed

ammonium cation is well absorbed by plants. The ammonium ion, absorbed into the soil absorption complex, remains less mobile. This prevents the nitrogen in ammonium sulphate from being washed away.

As a result of the nitrification process, the nitrogen of ammonium sulfate passes into the nitrate form. Nitrogen in the form of nitrate is not absorbed into soil, colloidal particles. Does not form insoluble salts. The soil remains in the solution.

This allows the plants to quickly take over from the root. it is not recommended to apply these fertilizers on soils with an acidic environment.

Liquid ammonia fertilizers.

1. Anhydrous ammonia is the fertilizer with the highest concentration, with nitrogen content of 82.3%. Gas is obtained by liquefying Holi ammonia. It is impossible to store in an open container.

2. Ammonia water or a solution of ammonia in water. Produced in two different varieties. Nitrogen in the 1st variety is 20.5%, and nitrogen in the 2nd variety is 16.4%.

3. Nitrogen fertilizers with ammonia - nitrate include ammonium nitrate. Both ammonium and nitrate nitrogen in the composition are 34.6%. 56-60% nitric acid is obtained by neutralization with gas holidai ammonia.

To extract ammonium nitrate, the solution is polished to 95-98%. It is recrystallized and dried.

The result is a substance that contains 98-99% ammonium nitrate in a rational use colored crystal.

The hygroscopicity of ammonium nitrate is very high, in the open air, moisture pulls and hardens very quickly.

To reduce its hardening, a small amount of visionary phosphorite flour, gypsum, kaolinite is added.

The added additives give the saltpeter a unique color.

4. Fertilizers with nitrogen in the form of amide. Such fertilizers include mochevina, the nitrogen contained in it is not less than 46%. Mochevina is obtained as a result of the interaction of carbon dioxide gas with ammonia with the participation of high pressure and temperature.

Mochevina is a white crystalline substance, currently being made granulated. It dissolves very well in water. Hygroscopicity is not as large as 20%, but as a result of rising temperatures, this characteristic of it becomes stronger.

Donador mochevina does not solidify. The consistency is well maintained during the preservation period. The top layer of granules is covered with a thin layer of fat. In order to granulate mochevina, under the influence of high temperatures, the substance biuret is formed.

The amount of biuret in mochevina does not exceed 3% olzim. When Biuret increases by more than 3% because it is a toxic substance, it ’ignites ' the plant.

Currently, the amount of biuret in mochevina, which is produced in industry, does not exceed 1%.

This does not harm plants.

Calcium cyanamide contains 20-22% nitrogen. as a technical product, its composition includes 58-60% cationic cyanide 20-28% calcium oxide, 9-12% coal and a small amount of silicic acid, iron oxide, aluminium oxide and calcium carbide. The exterior of calcium cyanide is a light fine black or dark grey poroshock.

When working with it, it is necessary to work as an honor. Because it burns if it gets on the skin and eyes. Calcium cyanide undergoes hydrolysis after being deposited in the soil and interacts with TSK. The cyanide formed is poisonous to plants. But he quickly turns into mochevina. Calcium cyanamide is an alkaline reaction fertilizer because it contains mixtures of calcium oxide. Systematic use of this fertilizer on chymed-podzol soils greatly improves its physical properties. In order to mitigate the harmful effects of calcium cyanamide on plants, it should be applied in BA'or 7-10 days before planting in the ground or driven under in the fall. Calcium cyanamide cannot be used in plant feeding.

INTERACTION OF AMMONIUM NITRATE WITH SOIL

Ammonium nitrate dissolves completely quickly in the moisture of the soil. D.N.In experiments carried out in the laboratory of Pryanishnikov, it was found that the plant receives the ammonium cation from ammonium nitrate relatively quickly and abundantly compared to the nitrate anion. Therefore, ammonium nitrate belongs to the physiological acidic fertilizers. But its acidity property is much lower than that of other ammonium fertilizers. Ammonium nitrate deposited in the soil reacts with TSK.

As a result, the ammonium cation binds to soil Colloids, and the nitrate anion remaining in solution forms calcium or magnesium salts. In black and gray soils saturated with bases, acidity in the soil environment does not occur even when constantly using ammonium nitrate in high doses.

When the soil lacks calcium, an acidity environment occurs in the soil solution.

Such acidity has a temporary character, which disappears after the absorption of nitrates by plants.

But long-term use of ammonium nitrate can increase the acidity property in chimmed podzol soils with low buffering with mild mechanical content. Therefore, when placed on crops that are resistant to acidic environments, its effectiveness decreases.

In ammonium nitrate, half the nitrogen is in the form of ammonia, which, after being placed in the soil, the soil is absorbed into colloids. Half is in the form of a nitrate anion, a volatile motility that remains in the soil solution.

In addition, ammonium and nitrate nitrogen of ammonium nitrate deposited in the soil is also undesirable by microorganisms in addition to plants. As a result, some of it switches to the appearance of complex organic compounds absorbed in plants. With the passage of certain times, microorganisms have become ’flammable, and after rotting, the nitrogen contained in them is mineralized and used again as nutrients for plants. a number

of them, on the other hand, are stored for a long time without being absorbed into plants, being converted into humus substances as a result of the breakdown of microbial proteins.

The use of ammonium nitrate.

Ammonium nitrate is the 1st most effective nitrogen fertilizer. It can be used for various crops on all soils. In order to be used on chymed podzol soils with little acidity bufferol, they must first be limed. The potential acidity of ammonium nitrate should be neutralized with lime or dolomite.

This fertilizer cannot be driven under autumn on light soils with a mechanical composition in extremely humid climates. The non-washable climate can be found in dry areas, though it is laid down in the fall.

In our conditions, it is mainly not laid out in the fall, it is used in the feeding of gravelly crops in BA'or. One part is given when planting, and the rest is given when feeding.

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