

# TYPES OF MINERAL FERTILIZERS USED IN COTTON AND APPLICATION RATES

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## Abstract

From an agricultural point of view, fertilizer should be applied in such a way that it allows to increase the cotton yield, and the resulting additional crop covers all the costs associated with the application of fertilizers. The rate of potassium fertilization with phosphorus is determined depending on the amount of mobile phosphorus in the soil and the amount of exchangeable potassium. This ratio of phosphorus and potassium increases by 10% in marginal soils and decreases by 10% in fertile soils.

The above calculations for fertilizers are not yet perfect. However, other methods of calculating the fertilizer rate cannot fully satisfy the basic requirements for maximum additional crop production if less fertilizer is used per unit of crop. But the important thing is that every kilogram of nitrogen given to cotton yields at least 14-15 kg of cotton.

**Keywords:** Cotton growing, cotton crop, additional crop, fertilization, mobile phosphorus in the soil, fertilizer rate, ammonium nitrate, nitrogen fertilizers, ammonia water, diluted ammonia, ammoniated superphosphate.

## Introduction

At present, to determine the amount of fertilizer application required for agriculture, including cotton growing, the results of field experiments from geographical networks of research institutions located in different zones are taken as a basis. From an agricultural point of view, fertilizer should be applied in such a way that it allows to increase the cotton yield, and the resulting additional crop covers all the costs associated with the application of fertilizers. The rate of potassium fertilization with phosphorus is determined depending on the amount of mobile phosphorus in the soil and the amount of exchangeable potassium.

This rate of phosphorus and potassium increases by 10% in marginal soils and decreases by 10% in fertile soils. The above calculations for fertilizers are not yet perfect. However, other methods of calculating the fertilizer rate cannot fully satisfy the basic requirements for maximum additional crop production, even if less fertilizer is used per unit crop. But the important thing is that every kilogram of nitrogen given to cotton yields at least 14-15 kg of cotton. The above norm of nitrogen fertilizers is developed for cotton fields cultivated in old plows. The nitrogen rate should be 100-150 kg in the first year and 150-200 kg in the second year and subsequent years after plowing alfalfa.



**Nitrogen fertilizers.** The comparative benefit of nitrogen fertilizers is determined by their application during the period of cotton growth. Only calcium sulfate is less effective due to poor physical properties. When applying these fertilizers before sowing, completely different indicators are obtained. All types of nitrogen fertilizers, except for the ammonium nitrate used at that time, provide high yields of cotton. Depending on the type of nitrogen fertilizers, cotton productivity increases by 15-20%, or 2-3 centners of yield increase is obtained per hectare. When choosing types of nitrogen fertilizers, their physical and chemical properties, as well as the rate of their dispersion in the soil, are taken into account.

In recent years, liquid types of nitrogen fertilizers have been used in agriculture - ammonia water and diluted ammonia. Liquid ammonia contains 82-83% nitrogen and is considered the most aggressive fertilizer. For storage, transportation and disposal of liquefied ammonia, large containers with special thick walls are required. Ammonia water contains 21% nitrogen. Ordinary tin containers are also suitable for its storage, transportation and disposal. Both types of nitrogen fertilizers can be applied before sowing seeds and during cotton growth. An important condition for their use is a deeper penetration than with moist soil and solid fertilizers. If it digs into the soil surface or falls on dry soil, it will be ineffective and wasted.

In the soils of our region, any type of nitrogen fertilizers, when applied during the growth period of cotton, quickly turns into nitrate nitrogen. Nitrate nitrogen combines with the soil and moves freely along with the water flow. In hot summers, when water evaporates quickly, nitrate nitrogen accumulates in the surface layer of the soil, and the plant cannot use it. When it rains in autumn, it is washed away by water and falls to the bottom layer of the soil, joins the seeping waters and disappears in vain. Therefore, ammonium nitrate, where half of the nitrogen is in the form of nitrate, cannot be applied during autumn plowing. The most convenient for application before sowing are ammonia and amide types of nitrogen fertilizers.

**Phosphorus fertilizers.** Powdered granular ammonium superphosphates contain few nutrients. The content of easily digestible phosphoric acid in them usually does not exceed 14-16%. Superphosphate obtained from apatite contains 18-20% of assimilable phosphorus. In order to increase the amount of phosphorus absorbed and facilitate transportation, double superphosphate is produced containing more than 30% phosphorus. Superphosphate is granulated or ammoniated to improve its physical properties. Granulated and ammoniated superphosphate is neutral, while regular superphosphate is acidic. When we compared the effectiveness of different superphosphates, ammonium superphosphate granules proved to be more effective than regular superphosphate. When ammonizing superphosphate with anhydrous ammonia, the fertilizer is not only neutralized, but also converted from a simple calcium salt to a double calcium salt. In this case, ammonia and phosphorus combine to form ammophos.

The double calcium salt of phosphoric acid is part of a fertilizer called precipitate. Precipitate with ammophos is considered a highly concentrated phosphorus fertilizer. The digestible phosphorus in the precipitate is considered a fertilizer. The amount of absorbable phosphorus in the precipitate is 25-38%. This percentage varies depending on the quality of the processed raw materials and the fertilizer production technology. Ammophos, which is considered a complex fertilizer, contains nitrogen and phosphorus, and the amount of absorbed phosphorus is much higher. The content of pure ammophos, obtained by adding part of the ammonia to phosphoric acid, reaches 61% R<sub>2</sub>O<sub>5</sub>,



the powder applied to the soil contains 48-60%, depending on the quality of the raw material, and nitrogen, on average, 11%. Ammophos obtained from Karatag phosphate contains 46% phosphorus and 11% nitrogen.

In order to maintain the effectiveness of ammophos, precipitate and simple powdered superphosphate, field experiments have shown that fertilizers with a high concentration are more useful than fertilizers with a low amount of phosphorus. As mentioned above, the coefficient of absorption of phosphorus from the composition of the fertilizer is significantly lower than the coefficient of nitrogen assimilation. Therefore, the additional cotton yield obtained from phosphorus fertilizers is much less, and this factor also depends on soil conditions, the additional yield obtained through the use of phosphorus fertilizers is 3-5 centners on meadow soils. With an increase in the content of phosphorus in the soil, the effectiveness of phosphorus fertilizers decreases sharply, the difference in the effectiveness of types of fertilizers is almost not noticeable.

**Potassium fertilizers.** Potash fertilizers produced at the Solikamsk mine are mainly produced in the form of chloride salt. Highly concentrated potassium salt and potassium chloride are brought to Central Asia. Potash fertilizers consist of acidic potassium sulfate and nitrogen salts, in addition to the chloride salt. Salts of potassium chloride and sulfate, despite the low content of nutrients, are considered ballast, and potassium nitrate is considered without ballast fertilizer. Due to the fact that these salts contain nitrogen and potassium, they are included in the list of complex fertilizers. It contains 13% nitrogen. According to the results of research institutions, when cotton was given potash fertilizers with and without ballast, the advantage without ballast was known.

In the experiments of UzPITI, when testing potassium chloride and sulfate potassium, sulfate fertilizer turned out to be effective. According to special tests, cotton seedlings do not like high concentration potash fertilizers, instead they tend to use sulphate-group potash fertilizers at this time. This property of cotton must be taken into account when applying potash fertilizers to saline soils, otherwise chlorine salts can have a negative effect on seedlings.

Compliance with fertilizer application rates and timely application of fertilizers, taking into account the above recommendations, ensures a high cotton yield.

### References

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