



Conventional Urea to Nano Urea

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Conventional urea or granular urea: Urea is the most widely used nitrogen fertilizer in the world. It is effective on all crops, including regions with a warm climate. Urea is a synthesized organic molecule that is easily accessible to plants and can be absorbed by all parts of plants, both roots and vegetative mass. As a granular product, urea can be applied directly to the soil using conventional spreading equipment. Urea breaks down in the soil to give ammonium. The ammonium is taken up by the plant. In some soils, the ammonium is oxidized by bacteria to give nitrate, which is also a plant nutrient. The loss of nitrogenous compounds to the atmosphere and runoff is both wasteful and environmentally damaging. For this reason, urea is sometimes pretreated or modified to enhance the efficiency of its agricultural use. One such technology is controlled-release fertilizers, which contain urea encapsulated in an inert sealant. Another technology is the conversion of urea into derivatives, such as with formaldehyde, which degrade into ammonia at a pace matching plants' nutritional requirements.

Nano Urea: Nano Urea Liquid is required to supplant the use of urea granules, perhaps the most broadly utilized manures in farmlands across the world. Nano Urea (Liquid) contains nano scale nitrogen particles which have more surface area (10,000 times over 1 mm Urea prill) and number of particles (55,000 nitrogen particles over 1 mm Urea prill). Further, application of nano urea (liquid) improves yield, biomass, soil health and nutritional quality of the produce. IFFCO Nano Urea is a result of the 21st century and it is the need of great importance to keep the climate soil, air, and water, for people in the future while getting the best atmosphere for all. The new nano urea liquid will build the creation of yields with improved dietary quality.

Less expensive than customary urea, the new item is additionally expected to diminish the natural contamination brought about by the granular structure, by decreasing its inordinate application that compounds soil, water, and air contamination with environmental change issues.

How to use Nano Urea Liquid:

First, wear mask and hand gloves then take Nano urea bottle to make a solution. According to crop age and condition choose a concentration per liter of water. Mix 2 to 4 ml of nano urea in one liter of water and spray on crop leaves at active growth stages. For best results apply 2 foliar sprays. 1st spray at active tillering / branching stage (30-35 Days after Germination or 20-25 Days after Transplanting). 2nd spray 20-25 days after 1st spray or before flowering in the crop.

Points to consider when using nano urea:

- Apply nano urea to the crop in the morning or evening.
- Don't spray when wind at high speed.
- Spray in only straight forward way to avoid overdose.
- Don't spray in a foggy atmosphere.

Why nano urea liquid is better than granular urea:

1. Reduces the requirement of conventional Urea by 50% or more.
2. Required less and produces more: Efficacy of one bottle of Nano Urea (500 mL) is equivalent to one bag of urea.
3. Environment friendly produce improve soil, air & water quality thus, helps in addressing the concerns of Global Warming.
4. Cheaper than conventional urea.
5. Reduce input cost to farmers, leads to increase in farmers' income.
6. Improves crop productivity, so and nutritional quality of produce.
7. Nano urea is developed to replace conventional urea and it can curtail the requirement of the same by at least 50 per cent. It contains 40,000 parts per million (ppm) of Nitrogen in a 500 ml bottle, which is equivalent to the impact to test its efficacy, around 11,000 farmer field trials were undertaken on more than 94 crops across India and results showed an average 8 per cent increase in crop yields.
8. Nano urea has been included in the government's Fertiliser Control Order after the field trials were undertaken under National Agriculture Research System (NARS), 20 ICAR research institutes, State Agriculture Universities and Krishi Vighyana Kendras on 43 crops. The new nano urea liquid will increase the production of crops with improved nutritional quality. Cheaper than conventional urea, the new product is also expected to reduce the environmental pollution caused by the granular form, by reducing its excessive application that exacerbates soil, water and air pollution with climate change problems.
9. The size of one nano urea liquid particle is 30 nano meter and compared to the conventional granular urea it has about 10,000 times more surface area to volume size. Due to the ultra-small size and surface properties, the nano urea liquid gets absorbed by plants more effectively when sprayed on their leaves.

IFFCO NANO UREA FERTILIZER



50KG

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500ML



Reduces Input Cost



Increases Farmers' Income



Environment-friendly



Enhances Crop Productivity



Improves Nutritional Value



Cheaper than Conventional Urea



ECO FRIENDLY LIQUID FERTILIZER

Case Study: Influence of Urea and Nano-Nitrogen Fertilizers on the Growth and Yield of Rice (*Oryza sativa* L.)

This experiment was laid out five treatments T1 - No fertilizer (Control), T2 - 100% of usual fertilizer, T3 - 75% Urea + 25% Nano-N fertilizer, T4 - 50% Urea + 50% of Nano-N fertilizer, T5 - 100% Nano-N fertilizer for determine influence on plant height, tiller per plant, dry plant weight and yield in rice, 2018.

Conclusions of case study and review

Application of 100% of Nano fertilizer has given the highest growth performance compared to the other treatments. Nitrogen losses occur through denitrification, volatilization and leaching which may cause air and water pollutions. Based on the present findings it could be concluded that replacing urea with nano nitrogen fertilizer has increases the growth and yield of rice. The application of Nano-N fertilizer can reduce harmful effects of nitrogen to the environment by reducing harmful nitrogen inputs.

Reference

1. Baboo, P. (2021) Nano Urea the Philosophy of Future. Researchgate. DOI: 10.13140/RG.2.2.15790.43845.
2. Rathnayaka R. M. N. N., Mahendran S., Iqbal Y. B and Rifnas L. M. (2018). Influence of Urea and Nano-Nitrogen Fertilizers on the Growth and Yield of Rice (*Oryza sativa* L.). *International Journal of Research Publication*, Volume 5 – Issue. 2 May 2018.