

## Nano Urea: Application and Significance

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### INTRODUCTION

Nano-sized fertilizers are the new frontier of nanotechnology towards a sustainable agriculture. The nano urea manufacturing method provides a simple way to develop nano scale materials for improved crop production, while significantly reducing agro chemical leaching into the soil. Nano Urea (liquid) contains nano scale nitrogen particles with greater surface area (10,000 times more than 1 mm urea prill) and number of particles (55,000 nitrogen particles on 1 mm urea prill). In addition, the application of Nano Urea (Liquid)

### APPLICATIONS

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.

**Note** – Don't cut nitrogen applied through DAP or complex fertilizer at the basal stage. Reduce only top dressed Urea applied in 2-3 splits; Number of sprays of Nano Urea can be increased depending upon crop and its nitrogen requirement)

### COST

IFFCO has priced Nano Urea at Rs 240 per 500 ml bottle for the farmers, which is 10% cheaper than the cost of a bag of conventional urea.



## HOW DOES NANO UREA WORK?

Liquid Nano urea as foliar sprayed on leaves Nano Urea easily enters through stomata and other openings and is assimilated by the plant cells. It is easily distributed through phloem from source to sink inside the plant as per its need. Unutilized nitrogen is stored in the plant vacuole and is slowly released for proper growth and development of plant. Nano Urea nutritional quality of the produce. Nano Urea (liquid) is completely safe for human, animals, birds, rhizosphere organisms and environment at the recommended levels of application.

## APPLICATION INSTRUCTIONS

- ✿ Shake well the bottle before use.
- ✿ Use flat fan or cut nozzles for spraying on the leaves.
- ✿ Spray during morning or evening hours avoiding dew.
- ✿ If rain occurs within 12 hours of the spray of Nano urea, it is advised to repeat the spray.
- ✿ Nano Urea can easily be mixed with biostimulants, 100 % water-soluble fertilizers and agrochemicals. It is always advised to go for a jar test before mixing and spraying for compatibility.
- ✿ For better result Nano urea should be used within 2 years from the date of its.

## BENEFITS OF NANO UREA NANO UREA (LIQUID) HAS MANIFOLD BENEFITS:

- ✿ Reduces the requirement of conventional urea by 50% or more.
- ✿ Less requirement and more production: The efficacy of one bottle of Nano Urea (500 ml) is equivalent to one bag of urea.
- ✿ Eco-friendly production Improves soil, air Heir leaves. Upon penetration, these nanoparticles reach the parts of the plant where nitrogen is required and release the nutrients in a controlled manner.
- ✿ Nano urea has been developed to replace conventional urea and can reduce its requirement by at least 50 percent.
- ✿ It contains 40,000 parts per million (ppm) of nitrogen in a 500ml bottle, which is

equivalent to the effect of. To test its efficacy, nearly 11,000 farmer field trials were conducted across India on more than 94 crops and the results showed an average increase of 8 percent in crop yield.

- ✿ 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.
- ✿ 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.

## CONCLUSION

In India, IFFCO developed nanotechnology based Nano Urea (Liquid) fertilizer to address the imbalanced and excessive use of conventional Urea. According to the problem of environmental pollution and hunger dilemma of the growing population of the world, it seems that the use of nano-urea can not only reduce environmental pollution, eutrophication, pollution of groundwater and diseases caused by overusing of conventional urea prills/granular, but also due to smaller particle diameters, with more penetration into the roots and leaves of plants can improve the physiological traits and yield of crops. Therefore, it is recommended to replace nano-urea with conventional fertilizers, especially in sandy soils due to the possibility of more leaching of conventional urea fertilizer and groundwater pollution. The biotic and abiotic constraints which limits the agricultural productivity furthermore has an effect on human health and use of exclusive nano fertilizers to improving crop production in agriculture.

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