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UREA BLUE

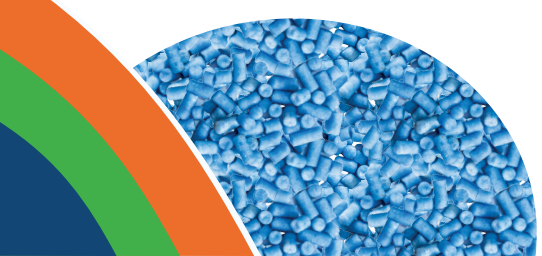
A granular, highly nitrogen concentrated fertilizer, contains nitrogen exclusively.
For application in plantations, field crops and vegetables, by broadcasting on to the soil surface and mechanical mixed into the soil or by fertigation.

Characteristics

A solid fertilizer	Highly concentrated, comprised of fully-soluble Nitrogen, exclusively, immediately available to plants roots.
Nutritional composition	Actual nitrogen at 45% (w/w), hence, 2.18kg product carry 1 kg of actual N.
Chemical composition	Urea + a nitrogen stabilizer additive
Chemical formula	$CO(NH_2)_2$. All the nitrogen is present in an amide form (NH_2^-).
Volumetric weight	0.75 g/ml (= 750 g/L = 750 kg/m^3)
Physical description	Bluish pellets, mean particle size: 4 x 2 mm.

Urea Blue - unique mode of action

Urea Blue is specialty urea, that differs from commodity urea, thanks to its other component a nitrogen stabilizer additive. Once applied in the field, the urea is rapidly turned into ammonium cations (NH4+), by enzyme urease that is commonly found in the soil. After this stage does the nitrogen stabilizer additive start functioning. It protects the ammonium cations for an extended period, that depends on soil temperature. During Summertime this protection can last for 2–3 weeks, while in Wintertime it can last for more than double this period, i.e., 4–8 weeks. During these extended periods, the ammonium cations are firmly adsorbed to the soil's clay minerals, that are commonly found in medium-, and heavy-textured soils. This adsorption takes place because the ammonium cations are positively charged, while the surface of the clay minerals are negatively charged. The ammonium cations in soil solution are balanced with exchangeable adsorbed ammonium, they are available to the plant's roots, most of the crops prefer consumption of ammonium. If ammonium cations are not accompanied by such stabilizer additive, cations are quickly attacked by nitrification bacteria, commonly found in the soil, which rapidly oxidize the ammonium cations to nitrate anions (NO3–). Now, these nitrate anions cannot be adsorbed to the soil clay minerals, because are negatively charged. Hence, these nitrate anions are prone to leached down by rain or irrigation water and to percolation to the groundwater of the soil. This process has two serious consequences. firstly, this nitrogen is no longer available to the plant's roots, and secondly, this nitrate nitrogen is leached to groundwater and can contaminate drinking water.



South plant
Haplatina 28 Kiryat Gat, Israel
Tel: +972-8-6811050
Fax: +972-8-6811252

North plant
P.O.B 174 Afula, Israel
Tel: +972-4-6407640
Fax: +972-8-6407879

info@gatfertilizers.com · www.gatfertilizers.com

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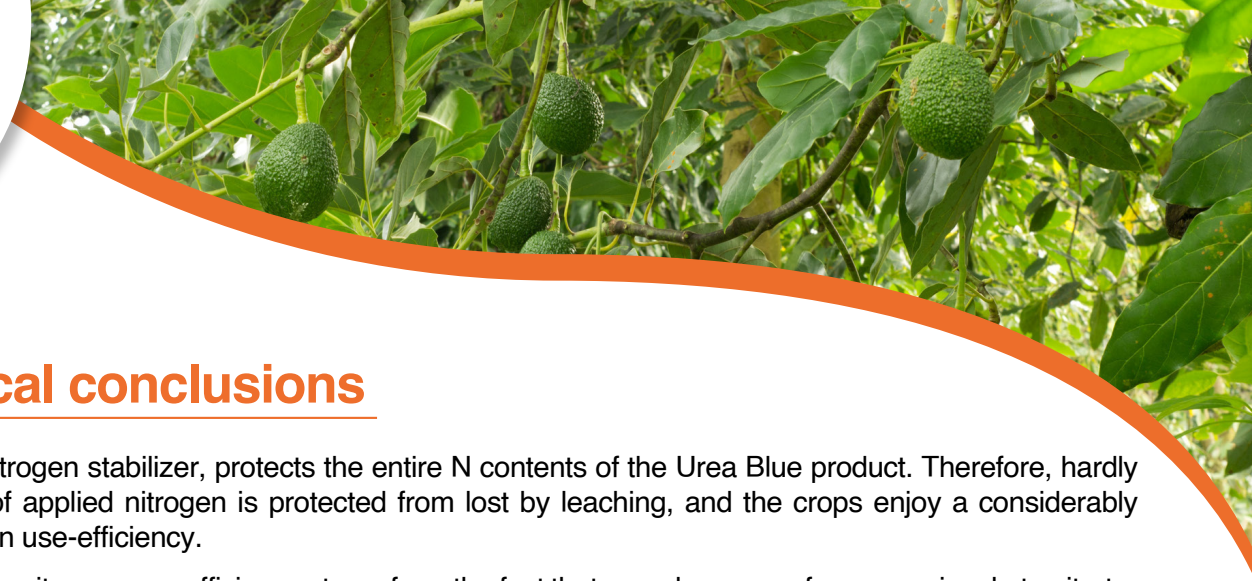


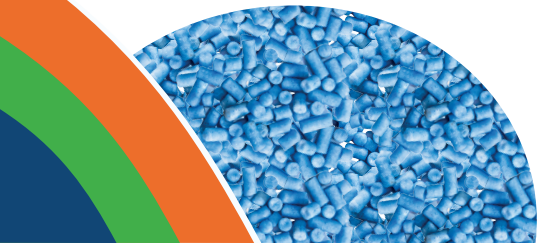
Practical conclusions

- The unique nitrogen stabilizer, protects the entire N contents of the Urea Blue product. Therefore, hardly any amount of applied nitrogen is protected from lost by leaching, and the crops enjoy a considerably higher nitrogen use-efficiency.
- An even higher nitrogen use-efficiency stems from the fact that cereal crops prefer ammoniacal-, to nitrate-nitrogen.
- If Urea Blue is applied by base-dressing to cereals, a rather large portion of it will be kept in te upper layers of the soil, in the form of adsorbed ammonium cations. This amount can continue feeding the plants with their necessary nitrogen, and can, generally, replace the commonly additional nitrogen top dressing application. This features considerable saving for the grower, in terms of fertilizers and mechanical application
- Risky nitrate contamination of groundwater is avoided.
- Urea Blue is a highly concentrated nitrogen carrier, which makes it very efficient logistically, because less fertilizer volumes should be transported, to satisfy the N requirements of a given field.
- Urea Blue is highly water-soluble, which makes it an optimal source for nitrogen, applied by fertigation, especially for medium-, to heavy- textured soils. Urea Blue will be quickly incorporated into the soil, even by light rain rate. It will, thus, be quickly taken up by the plants, and rapidly satisfy their N requirements.

Recommended application methods

- Granular fertilizer field-spreader. If this method is implemented, the product should be quickly incorporated into the soil by mechanical means, or by extensive irrigation /rain showers.
- Airplane spreading, in Winter time.
- Fertigation systems.

	Commodity Urea	Urea Blue
Time: Zero Product applied to soil as base-dressing	$CO(NH_2)_2$	$CO(NH_2)_2$ + N stabilizer
Time: Zero+ ~2 days	$(NH_4)^+$	$(NH_4)^+$ + N stabilizer
Time: Zero+ ~4 days	$(NH_4)^+ + (NO_3)^-$	(NH4)+ adsorbed to soil clays + N stabilizer. Plant feed normally on the (NH4)+
Time: Zero+ ~14 days	0 $(NH_4)^+ + (NO_3)^-$ Percolation to groundwater	As above
Time: Zero+ ~42 days	0 N in the soil solution. A second N application must be top-dressed. Groundwater polluted with $(NO_3)^-$	Most $(NH_4)^+$; some $(NO_3)^-$ Percolation to groundwater



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Innovation In Plant Nutrition