GreenTile®
FOR A BRIGHTER TOMORROW

Crystals of magnesium ammonium phosphate hexahydrate - $MgNH_4PO_4.6H_2O$

Micro-granulate 0.5-1.0 mm and 2-4 mm sg 0.95 - Slow release fertilizer

5-28-0 (NPK) + 15MgO

5% N ammoniacal nitrogen (NH_4-N)
28% P_2O_5 phosphoric anhydride soluble in citric acid 2% wagner reagent, of which 1/3 soluble in neutral ammonium citrate.
15% MgO magnesium oxide

Highlights

- Environmentally conscious fertilization with a 100% yield guarantee
- Recovered phosphate from potato process water by dosing $MgCl_2$ = Circular Nutrient Economy
- Mitigating climate change = Carbon footprint is 0.21 kg CO_2 equivalent/kg (four X less than mineral fertilizer)
- Precision farming = Efficient and controlled uptake of Bio-Stru by crops with reduced nutrient loss
- Low water solubility allows minimal dosage per hectare and avoid run-off to surface water or from contaminating ground water.
- Suitable for shallow rooting crops such as maize, potatoes, onions and grass.

Application of Bio-Stru in the sowing line (no combustion) in maize, potatoes and other crops gives faster and better rooting. The phase release of the phosphorus in the seed line is partly due to the secretion of organic acids by the plants, the plant uptakes only when necessary and thus nutrients are not lost to the environment.

The struvite effect

The low solubility of struvite acts as a positive property (no burning in the seed line). The solubility of Bio-Stru in light acids (organic acids secreted by the plants) gives Bio-Stru the unique property of slow release and thus the phased release of phosphate close to the plant. The phased release of the phosphorus in the seed line ensures the following:

a) A more strongly developed root system over a long period of time, with all its advantages.
b) A spread uptake, by the plants, of the nutritional elements present from the chemical composition of bio-stru N ,P and MgO, or NPK, originating from the organic manure or from artificial fertiliser.
c) Higher dry matter yields, better quality, faster growth start, less drought stress, more intense colours.
d) Fewer losses of nutritional elements through leaching, the phosphorus does not get the chance to fix itself (retrogradation) with lime through the formation of tri-calcium phosphate at high pH values, or with iron (flanders) or aluminum (kempen) to insoluble compounds at low ph values.
e) Positive for the environment: phosphorus, made from recovered phosphate, contributes to the circular nutrient economy.
f) The effect of struvite is quite comparable to other fertilizers such as ammonium phosphate and kieserite, but also has the unique property: a booster of root development. Stowa report.
g) Applying Bio-Stru in full fields is possible in slightly acidic soils (pH below 6).

In alkaline soils, it can be used in full fields on lawn and grassland.

h) Salt index:

DAP 18-46	MAP 12-52	Struvite
29	27	8

Closing the loop

The phosphate present in the processing water of food industries e.g. potato industry is captured in the form of a crystal i.e. Bio-Stru by dosing $MgCl_2$ in the processed water. The recapturing of this phosphate which was lost to waste streams is a precious tool to close the gaps in the phosphate cycle. The use of Bio-Stru would not only help to close the local nutrient cycle but it contributes immensely to create a green and sustainable phosphate cycle.

Carbon footprint

Phosphate is one of the 20 critical materials on the EU list and EU is totally dependent on imports for phosphate. EU imported 1.8 million tonnes of P_2O_5 in 2020[1] which contributed to 68% share in the imported products' for EU nutrients consumption (includes products for agricultural and industrial use). Not only Bio-Stru will diminish the import but also replaces the mineral fertilizer directly or indirectly via the use as a secondary raw material for fertilizer production. Compared with the production of DAP, Bio-Stru saves 90% emjoules[2] thus a lower energy and carbon footprint per kg of product. Bio-stru has four times less greenhouse gas (GHG) emissions than from the production of mineral fertilizer. With the decrease in GHG emissions, Bio-stru helps to mitigate the effect of climate change.

Employability

Bio-Stru can be used for all crops provided that:

Respecting the manure law, regarding the dose of phosphorus. BIO-STRU as a starting fertilizer in the sowing line in maize, onion and potato cultivation. Dosage 25kg/ha (7E P2O5/ha) for maize, onions, 35 kg/ha (10E P2O5/ha) for potatoes. In this way, Bio-stru fits in well with the mindset of: less use of fertilizers with more efficient use.

In addition to an adapted supplementary fertilization with potassium and nitrogen according to the cultivation needs, Bio-Stru can be used in all arable crops and vegetable crops, in slightly acidic soils.

For sports fields and golf courses, Bio-Stru provides a thicker dark green turf with an additional potassium fertiliser, as a booster 10 kg/are every year. Bio-Stru is also very suitable for floriculture.

Bio-Stru can be mixed well with other fertilizers such as Kali lawn, they have the same granulometry.

Bio-Stru is pure, and contains no heavy metals or other harmful elements, no salts and does not cause burning of the plants. Due to its low cadmium content (nil), it is an alternative to rock phosphate, raw material for organic fertilizers. An application for use in organic farming has been submitted.

New crop, struvite fits seamlessly into the circular economy. In the Netherlands, the government permits the use of struvite on derogation farms. Dairy farmers with a derogation are not allowed to use phosphate fertilizers. But because struvite is made from recovered phosphate, the government doesn't consider the fertilizer as fertilizer.

Packaging can be in bulk, as big bags of 1000 kg and as plastic box of 3-10 or 20 kg.

References

1. Fertilizers Europe/Eurostat - 2020
2. World Fertilizer Magazine - March 2021
3. STOWA, Het kenniscentrum voor de waterschappen - 2015
4. Kali struvite academy

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