



Introduction

Phosphorus is one of essential nutritional elements for plants. Plants absorb phosphorus in the form of anions H_2PO_4^- or HPO_4^{2-} , from the orthophosphoric acid, as well as from some other phosphorus acids, after hydrolysis. After assimilation, phosphorus connects to different compounds of organic acids. Phosphorus demand is essential during all vegetation stages. Therefore, nutrition has to be well balanced.

Figure 1.

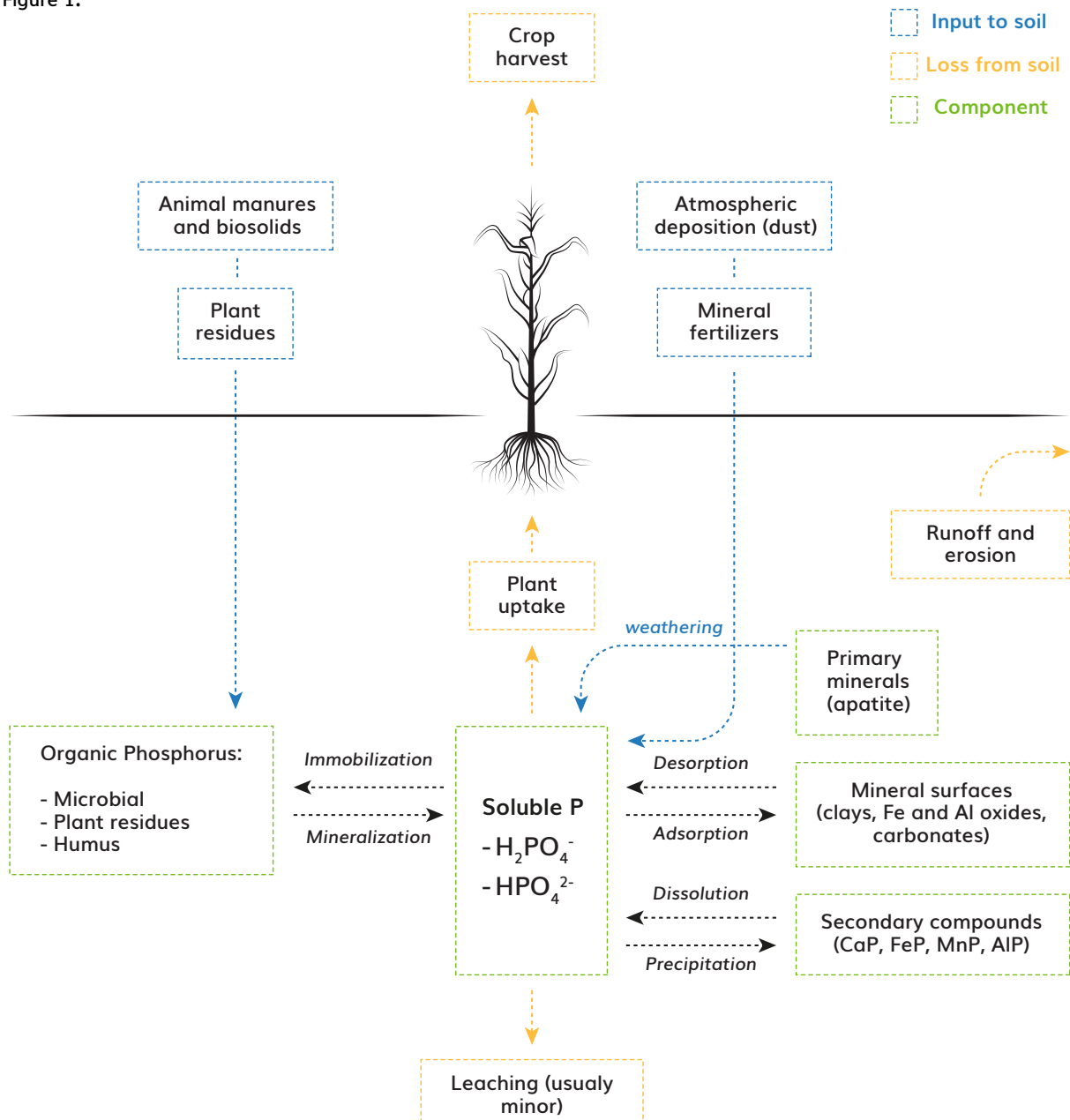
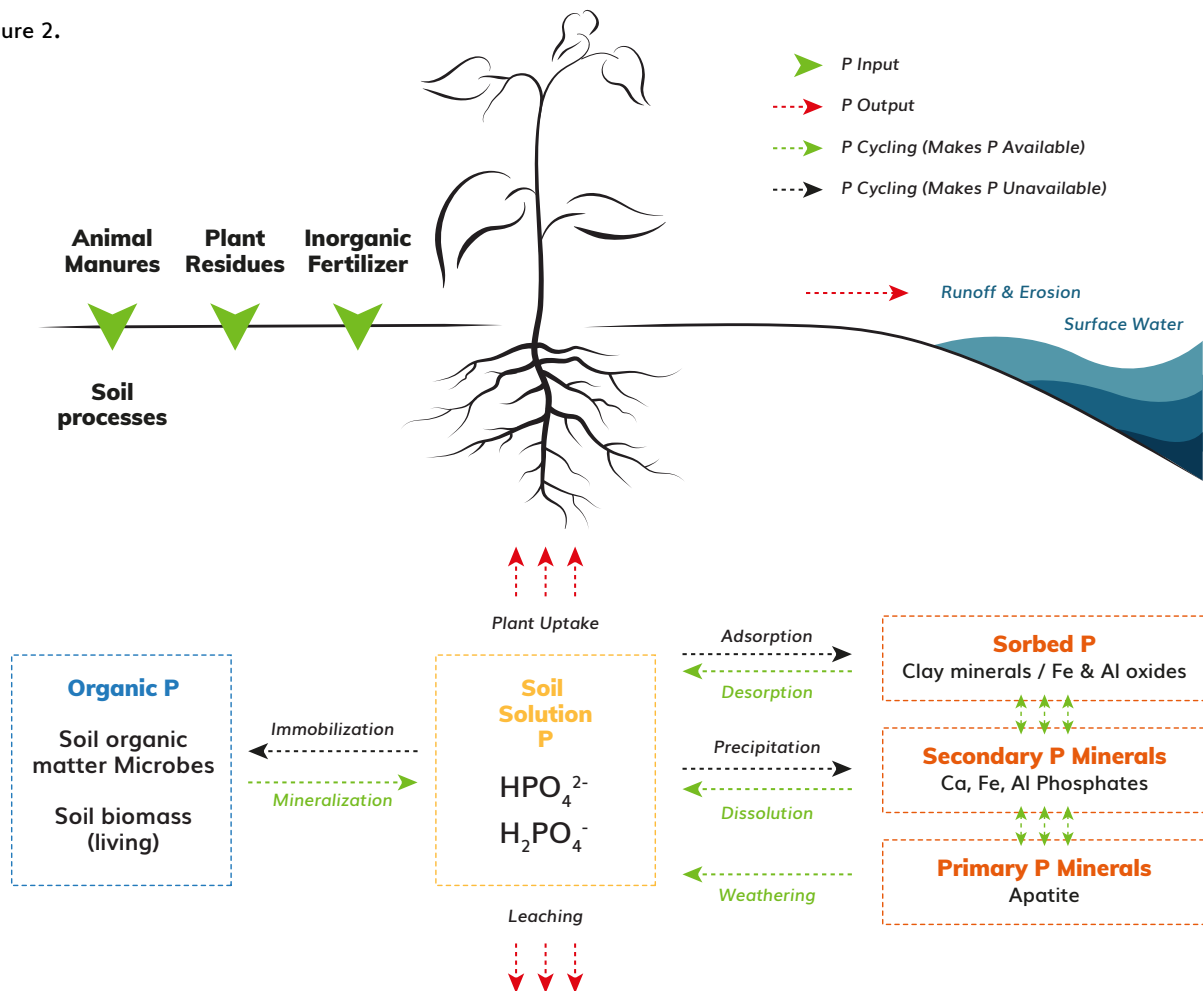
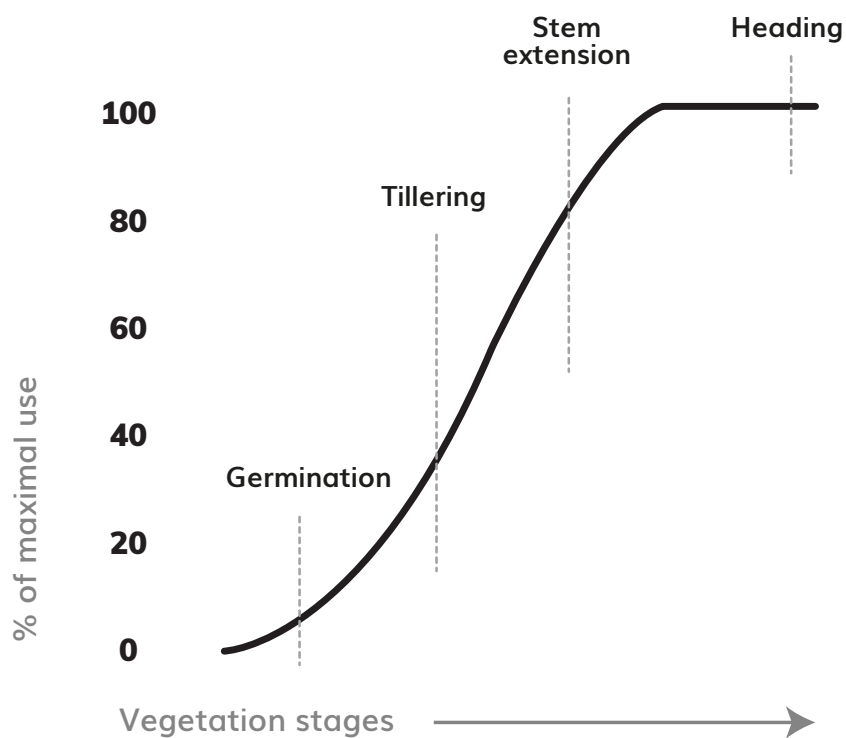


Figure 2.



Role of phosphorus during different growth stages

Figure 3.



Challenges

Phosphorus is relatively immobile in the soil and the phosphorus cycle is very slow. Crops cannot absorb phosphorus from unavailable forms. In alkaline conditions, calcium and magnesium ions dominate, which forms calcium, magnesium phosphates (salts). Those forms of phosphorus are unavailable for plants. In acidic conditions, iron and aluminium compounds prevail, thus iron or aluminium phosphates are formed, they are not available for the plants neither.



Solution

Fosfix Plus – microbial biostimulant for plants, for optimal uptake of phosphorus.

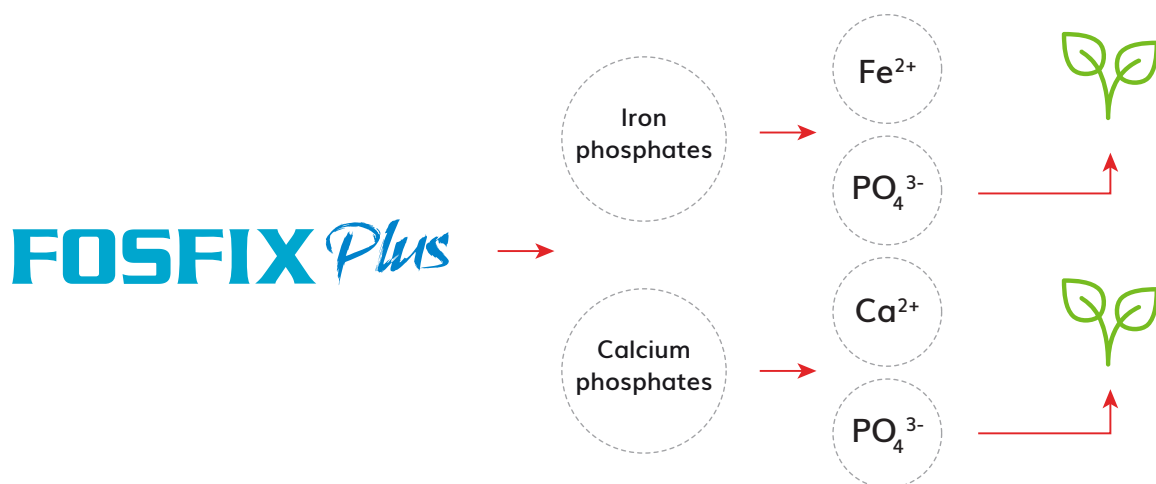
Registration information and certificates

Suitable for: cereals, rapeseed, corn, sunflower, sugar beet, vegetables, fruit trees, fruit bushes, berries.

Mode of action

Bacteria exudate enzymes, which modify phosphorus compounds and phosphates (calcium, magnesium, iron, aluminium) that are complex and difficult to absorb into forms available for plants. Bacteria also synthesize: thiamine, pyridoxin, biotin, pantothenic and nicotinic acids.

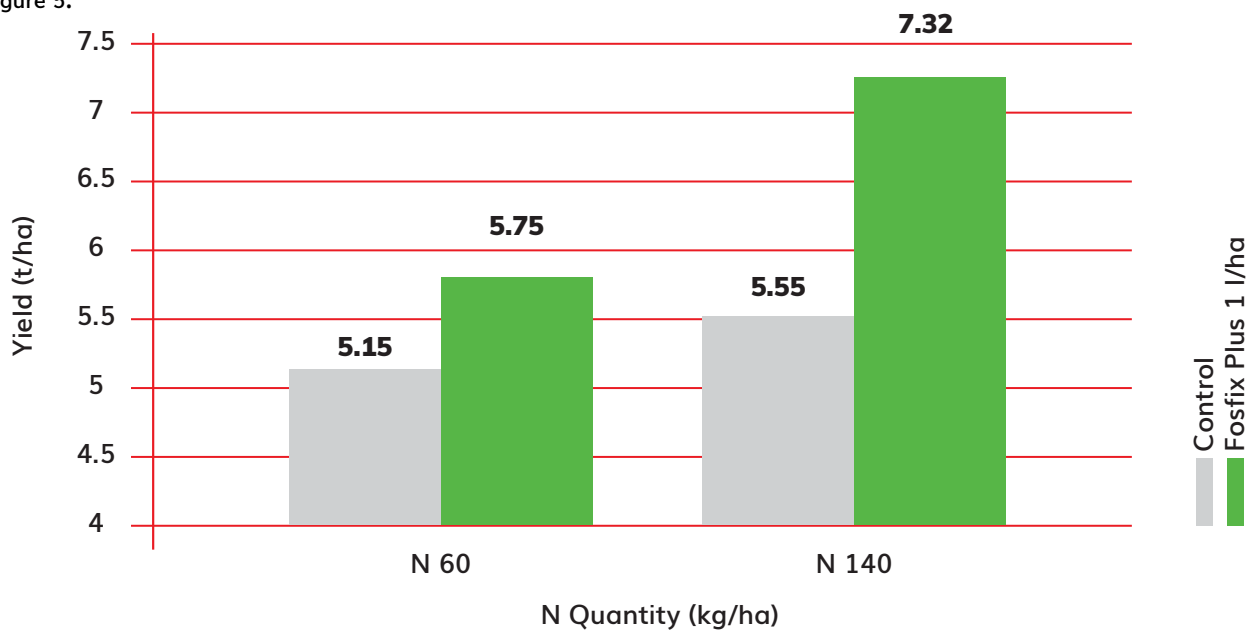
Figure 4.



Benefits and Results

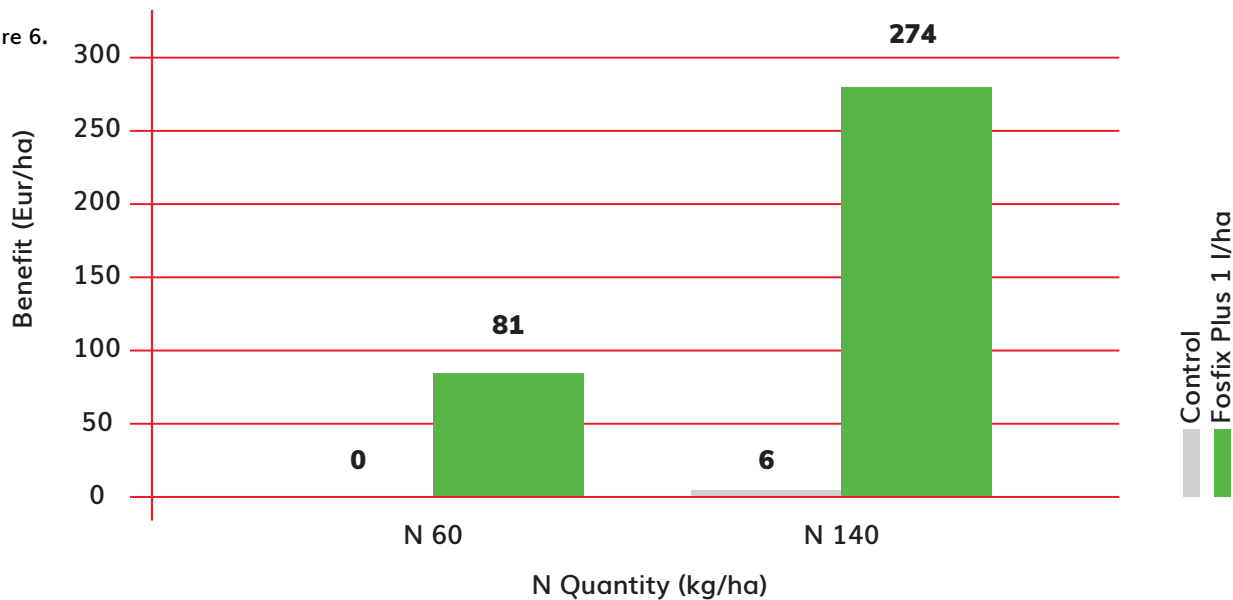
- Increases amounts of available phosphorus in the soil by up to 40 kg/ha;
- Stimulates development and growth of plant root system;
- Enhances efficient assimilation of nutritive elements;
- Promotes biological activity of soils;
- Increases productivity of plants and quality of yields.

Figure 5.



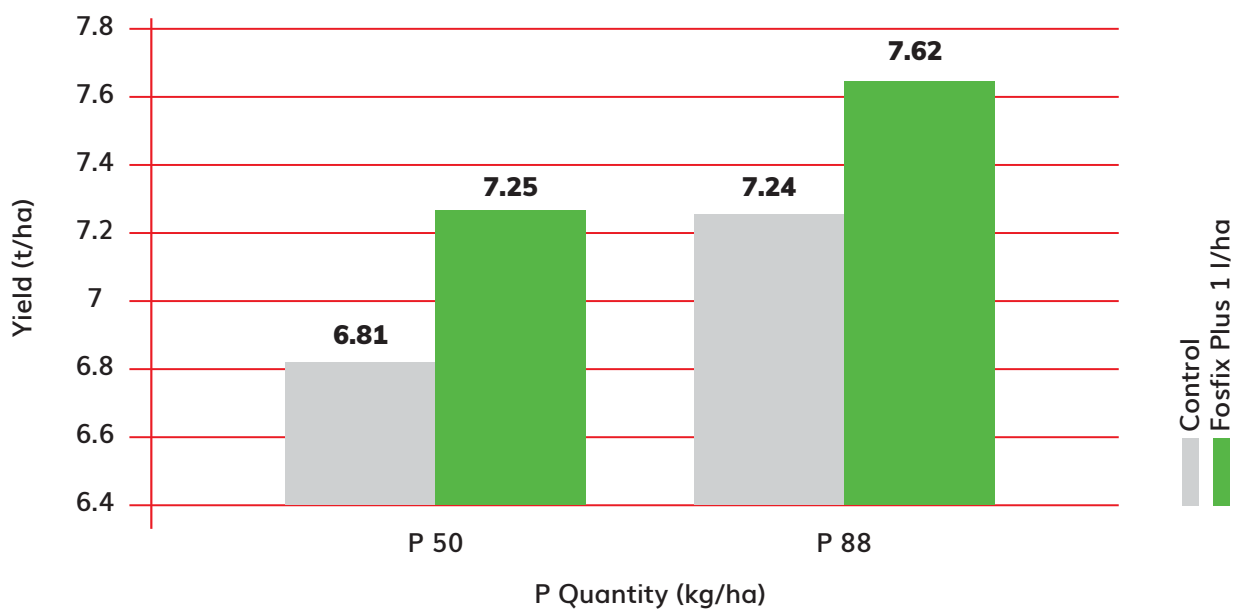
ASU Experiment Centre, W. Wheat, 2019

Figure 6.



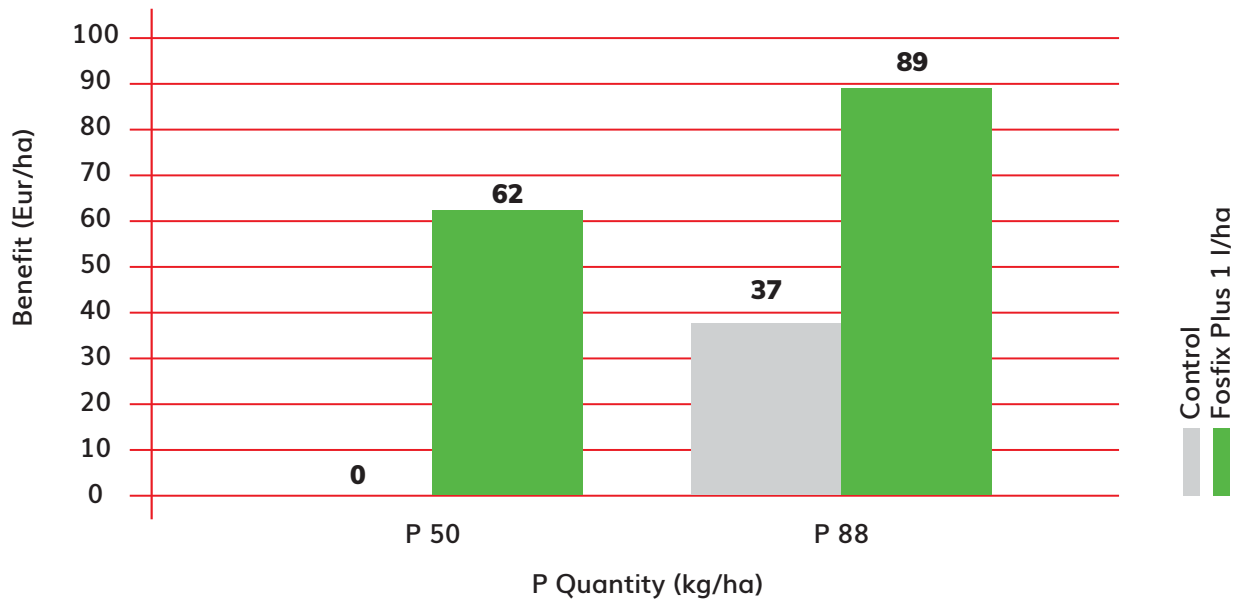
October, 2019. W. Wheat Market Price 160 Eur/t

Figure 7.



ASU Experiment Centre, W. Wheat, 2020

Figure 8.



October, 2020. W. Wheat Market Price 175 Eur/t

Application rate, technology

Application rate: cereals 1-3 l/ha – BBCH 01-30; rapeseed: 1-3 l/ha – BBCH 01-30; corn, sunflower: 1-5 l/ha – BBCH 01-16; sugarbeet: 1-3 l/ha – BBCH 01-16; vegetables: 1-5 l/ha – BBCH 01-40; fruit trees, fruit bushes: 1-4 l/ha – BBCH 01-59, on the soil before planting or until flowering; berries: 1-3 l/ha – BBCH 01-59, on the soil before planting or until flowering.

Application requirements: the sprayer pressure must be 1-10 bar or 15-145 psi; nozzle size is at least 50 µm.

Safety and storage: product can be mixed with all kinds of fertilizers and pesticides unless the manufacturer of fertilizer or pesticide states otherwise. May contain natural sediments. Storage at high temperature above 30 °C must be avoided. Use Fosfix Plus as soon as possible after opening or store in the refrigerator (4 °C) once it is opened and use it within 72 h. Contamination of the product may occur at any time after opening and the manufacturer takes no responsibility for opened and unused product.

Product is non-toxic and has no irritating compounds. There is no risk to humans, animals and the environment. After contact with the skin or eyes, wash with running water. Microorganisms may have the potential to provoke sensitising reactions.

Specifications

Composition: *Bacillus aryabhatai* MVY-004 (1.2×10^{12} CFU/l); K-1506 mg/l; Na-738 mg/l; S-608 mg/l; Ca-137 mg/l; P-100 mg/l; Mg-0.5 mg/l.

Packaging: 20 l; 10 l; 5 l; 1 l.

- **Biological activity:** phosphorus release, by changing phosphorus into forms available for plants; free-living microorganism;
- **Physical state:** liquid biological product;
- **Viability, shelf life:** 12 months. The manufacturer does not recommend storing the product above 30 °C.
- **Working conditions:** 5-42 °C soil temperature; 4 to 10 pH;
- **Chemical parameters:** dry matter 1.7%; pH 6.2; organic matter 66.1%;
- **Physical parameters:** colour from dark brown to black; dynamic viscosity 0.7 mPas; density 1.01 g/cm³.

Manufacturer: "Bioenergy LT", Staniunu str. 83/1, LT 36151 Panevezys, Lithuania.

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