

A large, stylized graphic of a water splash in shades of blue, forming a semi-circle that frames the central text. The splash has various droplets and ripples, giving it a dynamic, liquid appearance.

APALIQUA®

AMMONIUM POLYPHOSPHATE NP 11-37

Practical experience
and recommendations for use

The logo for Phosagro, featuring a stylized green plant with three leaves and a cluster of blue dots above it, resembling a flower or a seed head.

PHOSAGRO®

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#1

PhosAgro

Pure minerals
for healthy lives

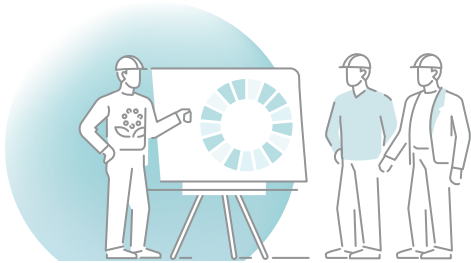
Eco-efficient PhosAgro fertilizers

Product range and advantages

Role of nutrients

Eco-efficient PhosAgro fertilizers

PhosAgro is one of the world's largest producers of high-quality phosphate fertilizers with a low content of potentially harmful substances.



We recognise the need for radical transformation in the way that we think and behave, with the Global 2030 Agenda and the UN Sustainable Development Goals (SDGs) serving as a basis for such transformation. Ensuring product excellence, safety and environmental protection as required by the UN SDGs is the top priority for us, our consumers and partners.



Hazards of heavy metal contamination

Agricultural production grown on soils contaminated with harmful impurities can result in the accumulation of heavy metals in the human body causing serious diseases

Cd

Low-quality fertilizers are one of the main sources of soil contamination with heavy metals, including cadmium

European standards

In order to distinguish which product is the safest in terms of the cadmium content, the EU introduces voluntary labeling for producers of eco-efficient fertilizers

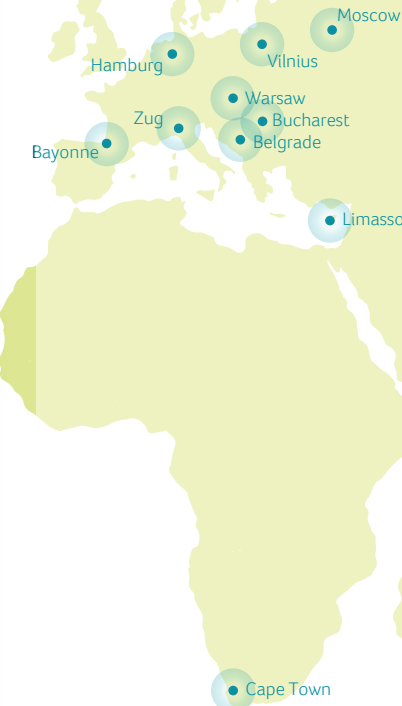
The cadmium content should not exceed 20 mg/kg P_2O_5

PhosAgro Green Label

In accordance with the EU rules, we have developed our own Green Label, certifying the environmental safety of PhosAgro fertilizers

The cadmium content in PhosAgro mineral fertilizers does not exceed 5 mg/kg P_2O_5

To get closer to the customers in our priority foreign markets, we have opened trading offices in these regions. The expansion of our activities abroad has made our interaction with consumers closer and our understanding of their needs better



PhosAgro mineral fertilizers meet the latest European requirements

PhosAgro mineral fertilizers are used to grow the crops, which are essential for the food production in more than 100 countries of the world

Product range

Product brands

Multiple-nutrient fertilizers



They are used in almost all nutrition systems that take into account the properties of the soil and climate

When choosing a fertilizer brand, we recommend that you draw on the soil fertility status.

When the soil supply of all nutrients is known, it is very easy to select the right brand of compound fertilizer.



APAVIVA®

Nitrogen-phosphorus and complex fertilizers

Apaviva® complex fertilizers contain two (nitrogen and phosphorus) or three (nitrogen, phosphorus and potassium) macronutrients, as well as important mesonutrients (sulphur, magnesium). Actually all of our complex fertilizers contain sulphur in varying amounts. Sulphur improves the productivity of all crops: cereals, industrial crops and fodder crops.



APAVIVA®+

Nitrogen-phosphorus and complex fertilizers with micronutrients

This category of fertilizers, in addition to the macronutrients (nitrogen, phosphorus and potassium) and mesonutrients (sulphur, magnesium), also contains calcium and micronutrients (boron and zinc). Almost all crops need micronutrients: some are more sensitive to boron deficiency, others to zinc deficiency, yet others to magnesium deficiency or multiple nutrient deficiencies.



APALIQUEA®

Liquid complex fertilizer

APP NP 11–37 is a unique liquid nitrogen-phosphorus fertilizer. It exhibits the highest phosphorus availability and uptake by plants compared to traditional solid phosphorus fertilizers, especially on calcareous soils. It ensures a good yield increase in different crops with foliar dressing.



NITRIVA®

Nitrogen fertilizers

Nitrogen fertilizers are traditional sources of readily available nitrogen for plants. They are efficiently applied on all soil types and for all cultivated crops. Nitrogen is one of the most important elements: amino acids, proteins, chlorophyll, nucleic acids and B vitamins contain N. The nutritional value of food, thus, depends on the nitrogen supply of the plant. This element is required for most cultivated plants in higher quantities than other nutrients.



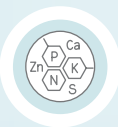
APAFEED®

Feed additives

Monocalcium phosphate and urea are the additives to animal feedstuff. The inclusion of urea in the diet leads to an increase in muscle mass for livestock and poultry as well as milk yield. Monocalcium phosphate strengthens the skeletal, immune and reproductive systems of livestock and poultry.

Product advantages

The right choice of modern fertilizer grades from our wide range ensures balanced mineral nutrition of crops under various soil and climatic conditions. This is a guarantee of stable high yield and crop quality with maximum economic effect.



Up to 8 nutrients in a fertilizer granule

The use of such fertilizers contributes to an excellent high quality crop and high profitability



Sulphur for high quality yields

All our complex fertilizers contain sulphur in a sulphate form, thus ensuring high quality yields in terms of protein and oil content



Ammonium nitrogen NH_4^+

The ammonium form of nitrogen, in contrast to the nitrate, is energy-efficient in the process of conversion to plant protein and contributes to better absorption of phosphorus



Environmentally safe feedstock

The phosphate ore that we mine in the Khibiny deposits has the world's lowest content of harmful impurities



Uniform distribution of fertilizer

Each granule of our complex fertilizers that enters the soil contains the right proportions of nutrients



Water-soluble and plant-available

PhosAgro fertilizer grades are characterized by a high content of water-soluble phosphorus, which makes it more available for plant roots in the soil



Wide range

The line of innovative grades of macro and complex fertilizers containing macro and microelements is suitable for any soil and climatic conditions



Easy product selection

We offer crop feeding systems and product brand categories to simplify the choice of the desired fertilizer grade



Increased caking resistance

Our fertilizers do not cake during transportation and storage

Perfectly balanced formula

Macroelements

Nitrogen

N

It stimulates the vegetative growth, increases crop yield and protein content. Nitrogen is constituent. Ammonium nitrogen is not leached from the soil, in contrast to nitrate nitrogen. It contributes to better phosphorus uptake and is absorbed directly by plant roots.

Phosphorus

P

Phosphorus is used in photosynthesis, energy conversion, cell division and growth, and transfer of genetic information. It contributes to strong root system growth, improves water use efficiency of plants. Phosphorus enhances resistance to disease and drought, accelerates maturity, improves grain quality.

Potassium

K

It ensures the photosynthesis, intensifies synthesis and transport of carbohydrates from plant leaves to storage organs. Potassium provides enhances drought resistance of grain, tuber, and root crops, increases starch and sugar content.

Mesoelements

Sulphur

S

It is required for many metabolic processes. It is included in three essential amino acids, necessary for protein synthesis. It improves phosphorus absorption by plant roots on calcareous soils. Sulfur regulates redox metabolism, positively affects, photosynthesis and plant growth.

Calcium

Ca

It plays a key role in soil fertility, and eliminates the excessive soil acidity. In plants, calcium maintains the structure of cell walls and the integrity of cell membranes. It improves the availability of molybdenum to plants.

Magnesium

Mg

It is a key element for the synthesis of chlorophyll in plants, involved in photosynthesis and protein synthesis. Magnesium is essential for vegetative growth. It is contained in small amounts in most of our complex fertilizers.

Microelements

Zinc

Zn

It is necessary for functioning of enzyme systems and protein synthesis. It controls the formation of essential growth regulators by plants. Zinc regulates phosphorus uptake by the plant. Zinc application most effective on sandy soils.

Boron

B

It is necessary for plants to develop new cells in growing organs and tissues. Essential for flowering and formation of fruits and seeds. It is especially effective on soils having lower or higher pH.

#2

Characteristics and applications of Apaliqua APP NP 11-37

Phosphorus is a key plant nutrient

Characteristics, advantages
and recommendations for use,
transportation, storage

Preparation of liquid / tank mixtures
and calculation of fertilizer
application rates

Phosphorus is a key plant nutrient

It accelerates the development and maturity of crops (cereals by 5–6 days)



It accelerates seed germination



It stimulates tillering and intensive development of the root system



It improves the number of grains per ear and increases the and percentage of filled grain

Plants absorb phosphorus: from the soil

Soil phosphorus content

Most of the phosphorus in the soil is contained in a form unavailable to plants, and its phosphorus reserves in the ecosystem are not replenished from natural sources

Insoluble phosphorus
97–99%

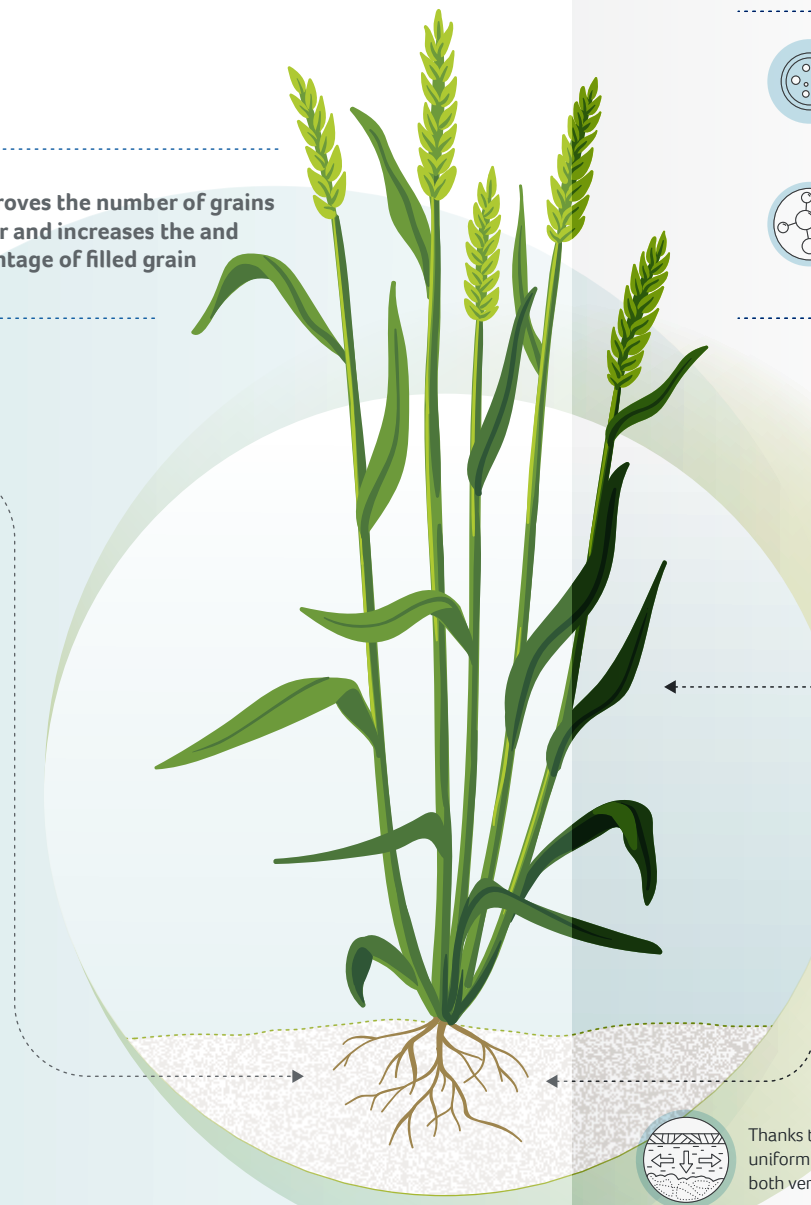
Potentially available for plant nutrition

In an easily soluble form
1–3%

Directly available for plant nutrition

Organic matter, organic residues and minerals

Soil solution



Phosphorus improves plant metabolism and the composition of fruits



Increases the buffering capacity of cell juice and support the cell turgor



Improves the winter hardiness of plants



Improves the water regime of plants, thus optimizing the water use



Increases the sugar and protein content of grains



It is involved in nitrogen metabolism



Activates the processes of protein synthesis and the transition outflow of assimilates to the reproductive organs

from APALIQUA® as orthophosphates

Phosphorus content in APP NP 11–37

It is important to control the level of available phosphorus with right fertilizers. APP NP 11–37 saturates the soil with phosphorus and ensures its longer availability to plants, thanks to **prolongation effect**

Slowly undergoing hydrolysis: the phosphorus contained in APP in the form of polyphosphates is converted into orthophosphates — thus ensuring prolonged **phosphorus nutrition**. In acidic soils, this effect is enhanced with liming

In the form of orthophosphates

13%

They provide nutrition from the moment of application

In the form of polyphosphates

24%

They convert to orthophosphates in one to two weeks

37% P₂O₅

Thanks to APP NP 11–37, phosphorus is distributed uniformly in the soil volume and moves both vertically and horizontally






Basic physical and chemical characteristics of APP NP 11–37

Parameters, units of measurement	Values
Mass fraction of ammonium nitrogen (N), min %	11
Mass fraction of total phosphates (P ₂ O ₅), min %	37
Conversion percentage*, %	> 65
I.e: orthophosphates, %	13
polyphosphates, %	24
pH	6–7
Density, kg/L	1,41–1,47
Viscosity at 20 °C, cP	61.2
Crystallisation temperature, °C, max	– 20

Density, kg/L	1.41	1.47
Weight of 100L of the fertilizer, kg	141	147
Content of nutrients in 100L of the fertilizer, kg		
N (nitrogen)	15.5	16.2
P ₂ O ₅ (phosphorus)	52.2	54.4

* The conversion percentage characterizes the content of polyphosphates in APP in % of the total content of P₂O₅.

Comparative characteristics of APP NP 11–37 and mineral granulated fertilizer

Assessment criteria	Nitrogen-phosphorus liquid fertilizer NP 11-37	Nitrogen-phosphorus granulated fertilizer (NP)
 Immediate availability of nutrients to plants, plants become more resistant to stress factors	✓	✗
 Nutrient uptake through the leaves (foliar feeding)	✓	✗
 No risk of nitrogen loss during surface application	✓	✗
 Can be applied in tank mixtures with pesticides/biostimulants* and agrochemicals**	✓	✗
 An increased utilisation rate of micronutrients from the soil	✓	✗
 Safe — non-flammable, non-explosive, non-toxic	✓	✗***

Seasonal application



In autumn, before moldboard and subsoil ploughing



In autumn and spring, before and during sowing/planting



In spring and summer, for side dressing during the growing season of plants

* With a prerequisite, preliminary test for compatibility
** Including with urea, UAN, potash and micronutrient fertilizers
*** In the presence of ammonium nitrate in fertiliser mixtures

Distinct advantages of Apaliqua APP NP 11–37



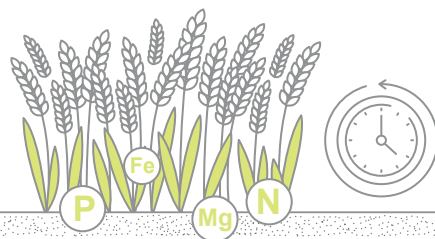
APP NP 11–37 convenient handling and use



Fertiliser can be applied using sprayers available from farms



They do not contain free ammonia, which prevents nitrogen loss during transport and application



Nutrients are absorbed more quickly and fully



Phosphorus in APP NP 11–37 is in the form of ammonium ortho- and polyphosphates, the molecules of which are not bound by the soil-absorbing complex for up to 5 weeks

This increases the **phosphorus use efficiency** on calcareous soils or on acid soils after liming

Granulated fertilizers

30%

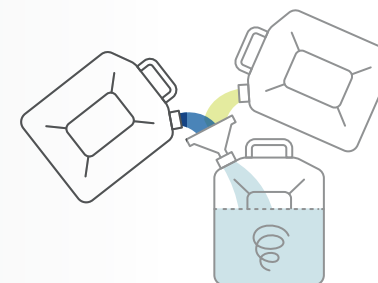
Liquid P fertilizer

49%



For use in **No-Till system**: surface application APP NP 11–37 without incorporation into the soil can ensure phosphorus penetration to a depth of **13 cm after 5 months or more***

* Dr. John Kovar / Fall Surface-Applied Fluid P Movement Into Soil Limits Potential Loss to Erosion / Fluid Journal 2006.



Easily mixed into APP-UAN solutions in various ratio



UAN-APP solution is stable and convenient for application



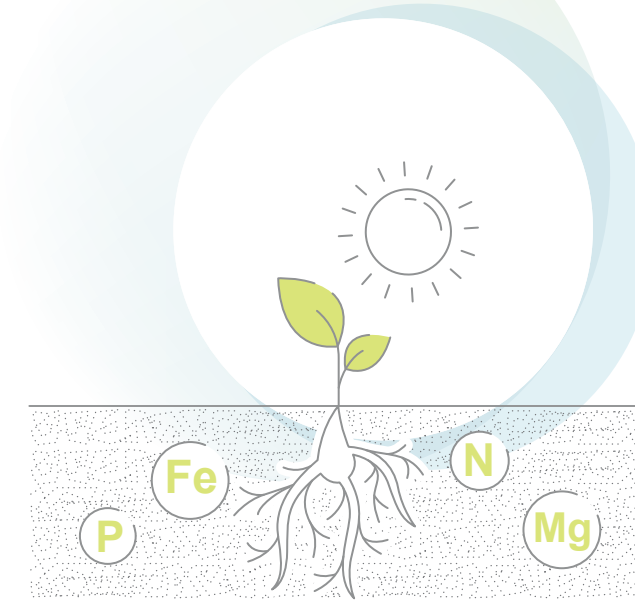
Application on maize

Liquid fertilizer mixture is compatible with herbicides from chloroacetanilide family



Foliar application of APP with herbicides

APP should not be mixed with some of imidazolinone herbicides because of a toxic solution for crops



Both orthophosphates and pyrophosphates are effective in supplying P to plants



Orthophosphates and pyrophosphates that contain two P atoms in a P-O-P linkage are equally available to roots under P-deficient conditions.

Plants get stronger:

Synthesise biomass

Become more resistant to adverse environmental factors

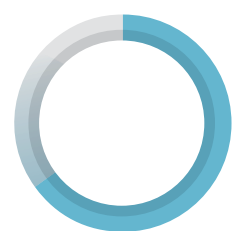
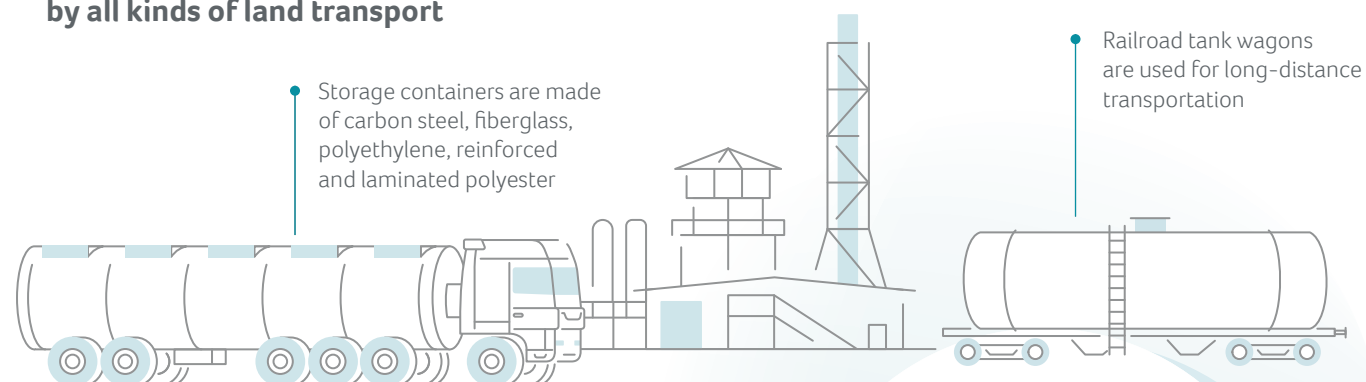
Better absorb micronutrients from soil

When applying APP in fertigation systems, the focus should be on water pH, high level of Ca^{2+} and Mg^{2+} , in water can lead to precipitates

Transportation and storage of APP NP 11–37 and its solutions

How to transport

APP NP 11–37 is transported by all kinds of land transport



> **65%**

Conversion percentage

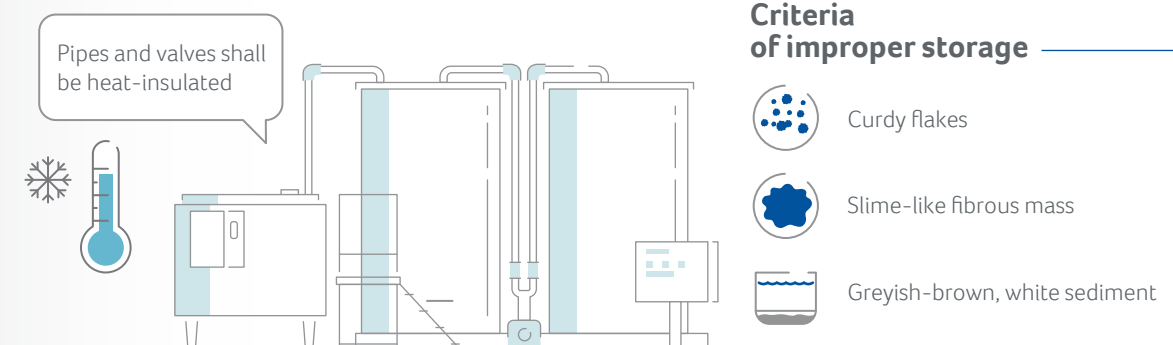
(% of polyphosphates of the total P_2O_5 content in APP NP 11–37)

→ The higher the degree of conversion, the longer APP will be stored



Typical storage time
6 months

How to store



The frozen APP NP 11–37 solution thaws **without changing the physical and chemical properties**. Despite this, we recommend to check the storage temperature regime. The temperature must not be allowed to rise above +25 °C.

General recommendations for use



For the recommended concentration for a particular crop, [see pages 29–43](#)

Application period

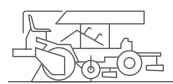
Placement into the soil before sowing together with the seeder or seeding machine side-banded

During the initial crop growth

In irrigation conditions for basal application and top-dressing

In order to avoid leaf burn during foliar application, the weather conditions and the growth and development phases of the plants must be taken into account

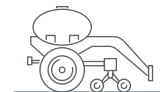
Required machinery



Planting machinery



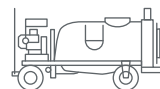
Sprayers, followed by ploughs, cultivators, harrows and various tillers



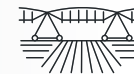
Liquid fertilizer applicators, cultivators — plant feeders



Multi-injectors, liquilisers



Sprayers



Sprinkler machines

Prerequisites for application



Evening or night hours

With morning dew monodisperse sprayers should be used. Early morning sprays are effective



Calm and cool weather

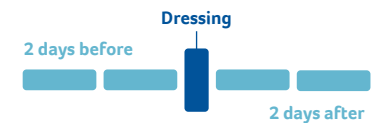
At high air temperatures, moisture from the solution evaporates more intensively → the plant has no time to take up the solution and gets burned



The foliar dressing with APP NP 11–37 does not replace the basal application of phosphorus to the soil



For two days before and two days after dressing with the ammonium polyphosphate, the plants should not be stressed



It is advisable to avoid the following:

- frosts
- strong winds
- dust storms
- high temperatures
- harsh pesticide treatments

Recommendations for foliar application

To achieve the best results from the use of such mixtures on the surface of vegetative plants, certain requirements shall be observed.



Use the dilution ratio of 1:4

For foliar dressing, the APP NP 11–37 basis solution shall be diluted with water at a ratio of at least 1:4 before application



Monitor the plant health

Foliar dressing should only be applied to physiologically healthy plants that are not under water stress



Monitor the weather conditions

The mixture can be sprayed: in calm weather in the evening, at night or in the early morning, in the afternoon in cloudy weather at air temperatures up to 23 °C



The solution is sprayed in small droplets to cover a larger area and increase efficiency of foliar fertilization. With too small droplets, however, a drift may occur

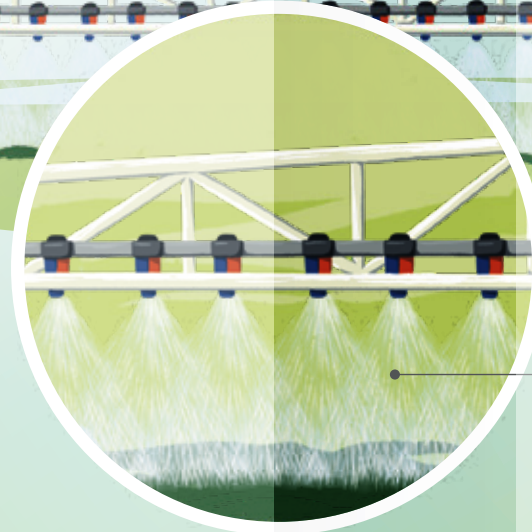


Adjust the sprayer piping pressure accordingly

Large-droplet sprays before sowing

Large-droplets may be sprayed when APP NP 11–37 is applied onto the soil surface before sowing

Application of APP NP 11–37 with a sprayer allows achieving a uniform distribution of nutrients over the surface, which is especially important for close-growing crops



The boom heights are adjusted so that the spray patterns intersect midway between the boom and the sprayed surface



When used on wide-row crops, use sprayers with extension hoses to reduce ineffective spraying of the solution onto the crop-free soil

Preparation of tank/liquid mixtures

APP NP 11–37 can be used as a basis solution

General recommendations



Conduct compatibility test

Before mixing, always test the ingredients for compatibility and see if the combination is practically applicable. It is not advisable to prepare large quantities without this preliminary procedure



Test using the target crop

If there are no visual signs of incompatibility (sediment, discoloration, suspension), test the mixture on the target crop. Conduct the test in a small area using a rucksack or hand-held sprayer



Fast mixing

Add all components to the sprayer tank (with the agitators on)



Add before use

Tank mixture should be applied immediately after preparation



Use the mixture on the day of preparation

At the moment, tank mixtures with APP NP 11–37 and mixtures based on them are tested under storage conditions. The best recommendation for today is to use the mixture on the day of preparation

Mixing procedure



- 1 The tank is filled with water to 1/3–1/4 of the volume



- 2 In descending order, add other substances previously dissolved in small volumes of water:
 - nitrogen and potash fertilizers
 - micronutrients
 - growth promoters
 - pesticides



- 3 Mix thoroughly



- 4 Add water to the necessary volume in the sprayer tank

With nitrogen fertilizers

When preparing the tank mixtures with nitrogen fertilizers, keep in mind that the presence of ammonium nitrate makes the solution less stable. The higher the ratio of UAN in the tank mixture, **the more unstable the system**



Try to mix selected components in small volume to make sure component compatibility



Prepare solutions in a room with a temperature above 5 °C

The obtained mixture* contains, kg:

Nutrient compound, %	APP NP 11–37	Urea	KCl (MOP, White)**	Water
NPK 8:8:8	216	120	133	530
NPK 5:10:10	270	43	167	520
NPK 17:17:0	460	256		284

* In 1000 kg of tank mixture

** TSP can be an alternative potassium source

Possible preparation sequence:

- 1 Add urea and potassium chloride, wait until complete dissolution.
Note: preparing of urea solutions needs heating
- 2 While stirring continuously, pour the dissolved components into the APP NP 11–37 basis solution and add the required volume of water

With pesticides



APP is incompatible with imidazolinones

When mixing with pesticides, observe the following sequence of adding of preparative forms to the sprayer tank:

- 1 Water
- 2 Water-soluble granules
- 3 Wettable powders
- 4 Water-dispersible granules
- 5 Suspension concentrates
- 6 Aqueous solutions
- 7 Emulsion concentrate
- 8 APP
- 9 Surfactants

With micronutrients

Components based on chelating agents are recommended as sources of micronutrients



When using sulfate salts and oxides of micronutrients, take into account the maximum concentration of the solution

Recommended maximum concentration in ready-made working solutions

Zn	Mn	Cu	Mo	B
0.5%	0.5%	0.4%	0.1%	0.2%

Calculation of the fertilizer application rate

The application rate of APP NP 11–37 is calculated for phosphorus, while nitrogen is taken into account separately. When calculating the application rate of APP NP 11–37, always take the solution density into account

P Conversion factor for phosphorus

0.37

1 kg of APP NP 11–37 contains 0.37 kg of phosphorus

N Conversion factor for nitrogen

0.11

1 kg of APP NP 11–37 contains 0.11 kg of nitrogen

N Solution density in the certificate of conformity (given at intervals)

1.41–1.47 kg/L

Use a hydrometer to check the density of the solution. If a hydrometer is not available, the solution density can be determined by weighing.

Calculation of application rate

To convert the nutrient (P_2O_5) to physical weight of fertilizer: ① divide the **required nutrient rate** by ② the **conversion factor**. Next, convert into liters: divide the **physical weight** by ③ the **liquid fertilizer density**.

Example: add 30 kg P_2O_5 /ha (P30) in APP NP 11–37

$$\begin{array}{c} \text{① Required nutrient rate (P30)} \\ 30 \end{array} \div \begin{array}{c} \text{② Conversion factor} \\ 0.37 \end{array} = \boxed{81 \text{ kg/ha}} \div \begin{array}{c} \text{③ Density of APP NP 11–37 according to certificate} \\ 1.45 \end{array} = 55.9 \text{ L/ha}$$

Determination of amount of the nutrient in the liquid fertilizer

① Multiply the **number of liters** by ② the **nutrient conversion factor** and by ③ the **liquid fertilizer density**

Example: calculate phosphorus application rate

Find out the phosphorus content in 80 litres of APP NP 11–37

$$\begin{array}{c} \text{① Volume of APP NP 11–37} \\ 80 \end{array} \times \begin{array}{c} \text{② Conversion factor} \\ 0.37 \end{array} \times \begin{array}{c} \text{③ APP NP 11–37 density (kg/L)} \\ 1.41 \end{array} = 41.7 \text{ kg } P_2O_5 \text{ /ha}$$

Example: calculate nitrogen application rate

Find out the nitrogen content in 80 litres of APP NP 11–37

$$\begin{array}{c} \text{① Volume of APP NP 11–37} \\ 80 \end{array} \times \begin{array}{c} \text{② Conversion factor} \\ 0.11 \end{array} \times \begin{array}{c} \text{③ APP NP 11–37 density (kg/L)} \\ 1.41 \end{array} = 12.4 \text{ kg N /ha}$$

#3

Experimental data and recommended power supply systems



Winter wheat

Maize

Winter wheat

APP NP 11–37 is applied on the basis of the foliar diagnosis of nutrient deficiencies or as a standard element of cropping technology

APP NP 11–37 nutrition system
can include the following steps:

- 1 Basal application
- 2 Pre-sowing application
- 3 Foliar dressing



In the first half of the growing season, plants may experience phosphorus deficiency. During this the application of granular fertilizers is not very efficient due to the frequently insufficient soil moisture

APP NP 11–37 enables rapid phosphorus supply during the critical phases of plant growth and development

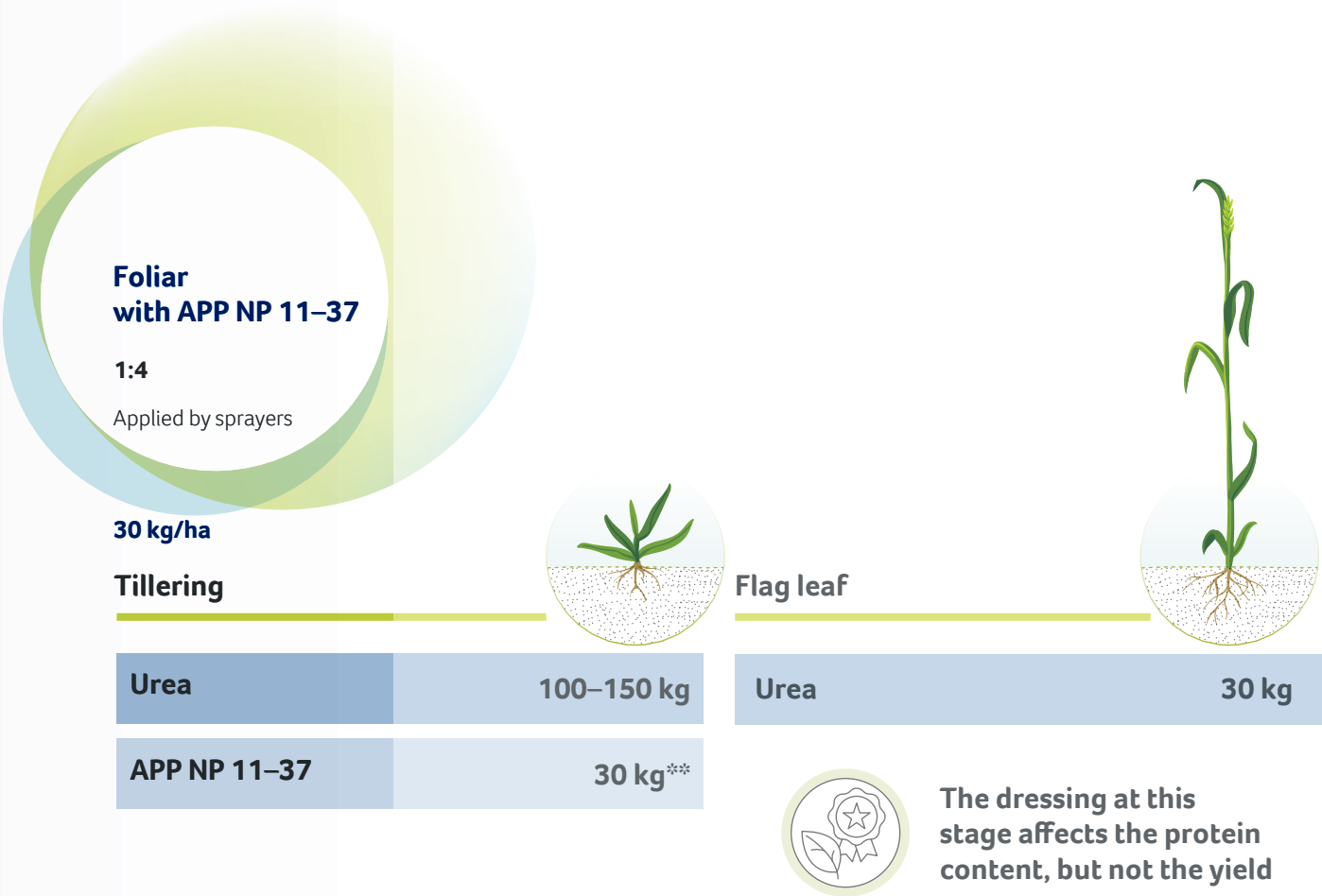
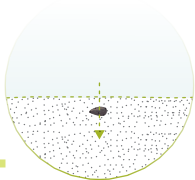
up to 60%

the share of mineral fertilizers
in the cost of agro-technical
operations with intensive
cropping technology



Average recommendations on nutrient management systems

	Basal application APP NP 11-37	At sowing application APP NP 11-37
Dilution*	1:1	1:2 (minimum)
Application method	Surface placement with sprayer using large-droplets and subsequent tillage	With seed drills equipped with a liquid fertilizer system
Rates kg/ha, physical weight	Phosphorus calculation 75% of the recommended rates below	25%
	Tillage	Sowing
	AS	200-300 kg
	APP NP 11-37	110-160 kg
	NPK(S) 10-26-26(2)	180-230 kg
	NPK 9-22-29	220-270 kg
	NPK(S) 15-15-15(10)	300-400 kg
	NPK 12-32-16	130-190 kg
	NP(S) 16-20(12)	230-300 kg
	NP(S) 14-40(7)	100-150 kg



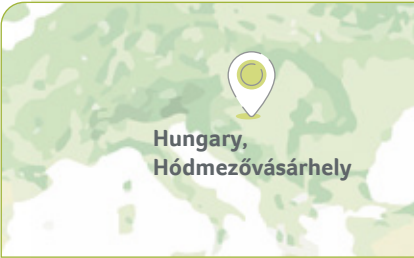
Including of APP NP 11-37 in foliar dressing helps to optimize mineral nutrition and reduce costs per ton of grain

* Ratio for dilution with water
** Can be done in case of phosphorus deficiency based on leaf diagnosis

Winter wheat, MV Nador

We support our customers with most recent information regarding fertilizer efficacy, best nutrition systems adopted to local conditions

Geography



Soil

Meadow chernozem



More details on our YouTube channel Pro Agro

Latest trials with APP-based nutrition schemes conducted in dry 2020

Nutrition schemes

Nutrients

Rates: kg/ha

Physical weight

Physical weight

Physical weight

Untreated Control

N₁₁₃P₇₀

APP NP 11-37 140 kg

N₁₇₀P₄₀

APP NP 11-37 110 kg

N₁₇₆P₅₀

APP NP 11-37 140 kg

BBCH26

Urea (100 kg) + APP NP 11-37 (50 kg)

Urea 200 kg

Urea 200 kg

BBCH32

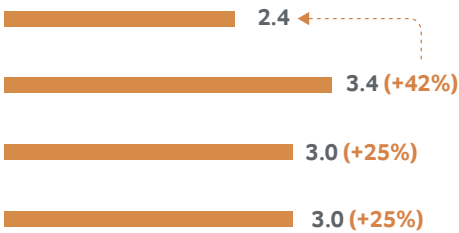
Urea 100 kg

Urea 140 kg

Urea 150 kg

Yield, t/ha

Randomized Complete Block Design, 6 replicates, LSD=0.53



Timeline

2019 crop: sorghum

2019 2020

Oct

Nov

Dec

Jan

Feb

March

April

May

Jun

Jul

Date

19.11

23.11

Snowy period

26.03

02.04

17.04

04.05

21.05

04.06

01.07

Type of operation

Spreading

Sowing

Spreading

Herbicide, Fungicide

Spreading

Insecticide Fungicide

Fungicide

Harvesting

Name of machinery, variety, agro-chemical

—

Sämaschine, MV Nador

—

Huszár Aktív, Falcon Pro

—

Biscaya

Falcon Pro

Falcon Pro

Agriunion Au201-a

Depth, type of application

Surface broadcast

4 cm

Topdressing, foliar application

Spraying

Topdressing

Spraying

Spraying

Spraying

Rate / scheme / stage

Before sowing

0.455 MM/ha

BBCH26

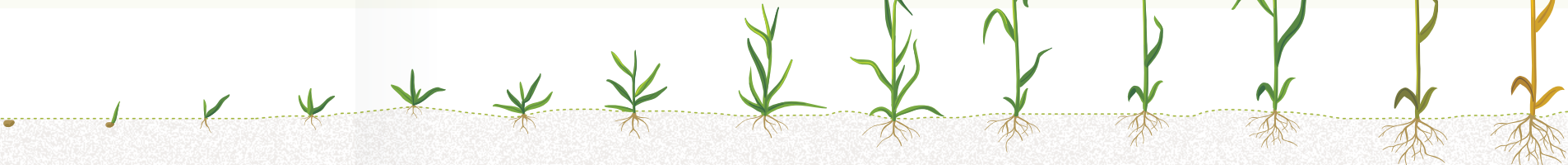
1.0 l/ha

BBCH32

0.3 ml/ha

1.0 l/ha

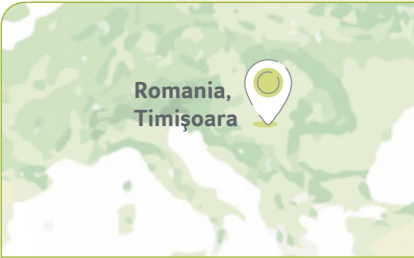
1.0 l/ha



Winter wheat, Exotica

We support our customers with most recent information regarding fertilizer efficacy, best nutrition systems adopted to local conditions

Geography



Soil

Meadow chernozem



More details on our YouTube channel Pro Agro

Latest trials with APP-based nutrition schemes conducted in dry 2020

Nutrition schemes

Nutrients

Rates: kg/ha

Physical weight

Physical weight

Physical weight

Untreated Control

N₁₁₃P₇₀

N₁₇₀P₄₀

N₁₇₆P₅₀

Before sowing

APP NP 11-37	140 kg
APP NP 11-37	110 kg
APP NP 11-37	140 kg

BBCH26

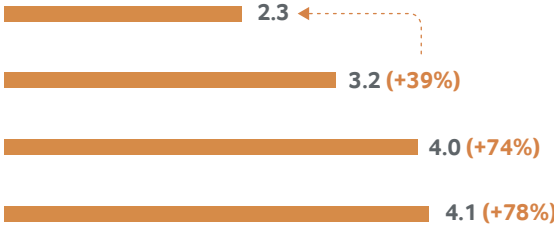
Urea (100 kg) + APP NP 11-37 (50 kg)	
Urea	200 kg
Urea	200 kg

BBCH32

Urea	100 kg
Urea	140 kg
Urea	150 kg

Yield, t/ha

Randomized Complete Block Design, 6 replicates, LSD= 0,11



Timeline

2019 crop: Sunflower

2019 2020

Oct

Nov

Dec

Jan

Feb

March

April

May

Jun

Jul

Date

15.11

16.11

02.04

09.04

20.04

19.05

10.06

10.07

Type of operation

Spreading

Sowing

Spreading

Herbicide, Fungicide

Spreading Fungicide; Insecticide

Fungicide

Harvesting

Name of machinery, variety, agro-chemical

—

Exotica

—

Sekator, Falcon Pro

— Matiz; Fury

Falcon Pro

Agriunion Au201-a

Depth, type of application

Surface broadcast

5 cm

Topdressing, Foliar application

Spraying

Topdressing

Spraying

Spraying

Rate / scheme / stage

Before sowing

280 kg/ha

BBCH26

0.15 l/ha; 0.75 l/ha

BBCH32

1.0 l/ha; 0.2 l/ha

1.0 l/ha



Maize

Foliar phosphorus nutrition system should be tailored to the growing conditions and the crop status

APP NP 11–37 nutrition system can include the following steps:

- 1 At sowing application
- 2 Foliar dressing
- 3 Side dressing



In conditions of cold lingering springs, on light texture soils, the root system of young maize plants may not be able to cope with the absorption of soil phosphates.

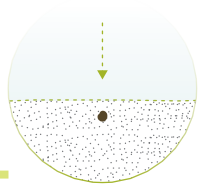
In such conditions, it is recommended to apply APP NP 11–37 as side dressing or foliar dressing of plants to improve phosphorus nutrition

Maize (for grain and silage) responds positively to side dressing with APP NP 11–37



Average recommendations on nutrient management systems

	Basal application APP NP 11-37	At sowing application APP NP 11-37
Dilution*	1:1	1:2 (minimum)
Application method	Surface placement with sprayer using large-droplets and subsequent tillage	With seed drills equipped with a liquid fertilizer system
Rates kg/ha, physical weight	Phosphorus calculation 75% of the recommended rates below	25%
	Tillage	Sowing
	AS **	200-300 kg
	Urea	200-300 kg
	APP NP 11-37	110-160 kg
	NPK(S) 10-26-26(2)	180-230 kg
	NPK 9-22-29	220-270 kg
	NPK(S) 15-15-15(10)	300-400 kg
	NPK 12-32-16	130-190 kg
	NP(S) 16-20(12)	230-300 kg
	NP(S) 14-40(7)	100-150 kg



Side dressing
with APP NP 11-37

1:4

Applied by sprayers

30 kg/ha

5-7 leaves

APP NP 11-37

50-90 kg

Ear formation

Urea

30-70 kg

Side dressing with APP 11-37 does not replace the basal application of phosphate-based fertilizers, but only supplements it

Side application of APP 11-37 is symptomatic and compensates for the temporarily unavailable soil phosphorus for young maize plants under any stressful conditions

* Ratio for dilution with water
** AS is recommended for application to cover nitrogen and sulphur crop demand

Forage Silage Maize

We support our customers with most recent information regarding fertilizer efficacy, best nutrition systems adopted to local conditions

Geography



Soil

Soddy-podzolic light-textured



More details on our YouTube channel Pro Agro

Nutrition schemes

Nutrients

Before sowing

Rates: kg/ha

Physical weight

Physical weight

$N_{140}P_{60}$

MAP NP 12–52

115 kg

Urea

272 kg

$N_{160}P_{90}S_{63}Zn_{1,8}$

NP(S)20–20(14)+0,4Zn

450 kg

Urea

152 kg

$N_{160}P_{90}K_{90}S_7$

NPK(S) 10–26–26(2)

346 kg

Urea

272 kg

$N_{160}P_{90}K_{90}S_{60}$

NPK(S) 15–15–15(10)

600 kg

Urea

152 kg

$N_{163}P_{90}S_{56}Zn_{1,6}$

NP(S)20–20(14)+0,4Zn

400 kg

Urea

174 kg

BBCH10

APP NP 11–37

27 kg

Yield, t/ha

Randomized Complete Block Design, 4 replicates, LSD $P_{0,05}$ =2.40



Timeline

2018 crop: Buckwheat 2018 2019

Nov

Dec

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Date

Snowy period

13.05

13.05

07.06

16.09

Type of operation

Spreading

Sowing

Spraying

Harvesting

Name of machinery, variety

—

Talisman

Agriunion Au201-a

Depth, type of application

Surface broadcast

4 cm

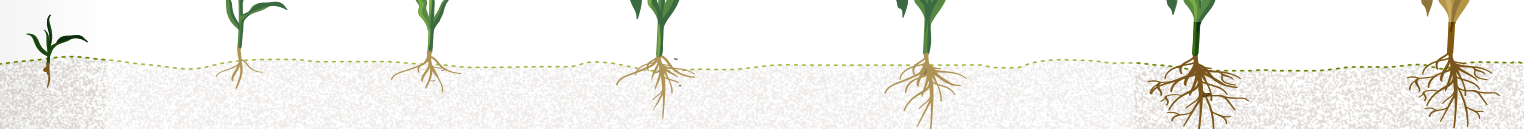
Foliar application

Rate / scheme / stage

Before sowing

70 kg/ha

BBCH10



Contacts



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