www.cich.ro

CICh®

for a good growth

Research | Development | Innovation

NUTRI-TOP

Technology

NĂVODARI CHEMICAL FERTILIZERS PLANT

The fertilizers, in the agrochemical sense, are simple or compound mineral or organic substances, natural or obtained by synthesis, which are applied in solid and / or liquid form by incorporation into the soil, on its surface or on the leaves of the plant, to supplement the need for nutritional ions in order to improve the general state of soil fertility, to intensify the microbiological activity and facilitate the decomposition of plant debris, in order to improve the natural conditions of growth and development of plants and to maximize the vegetative production quantitatively and qualitatively, with minimal or no negative impact on the environment.

The role of nutrients (fertilizers)

(agro-chemistry / various authors)

CATEGORY	ELEMENT	ROLE
Main macro-elements	N	Essential element with a structural role, necessary for vegetative growth and development. Essential constituent of amino acids, proteins, chlorophyll. It ensures the stability and plasticity of plant tissues. Determining factor of quantity and quality of production.
	P	Energetic contribution to the metabolism of the plant. It balances metabolic functions and stimulates nitrogen uptake, in combination with N / NP and K / NPK, ensures balanced growth and crop stability.
	K	It stimulates and regulates photosynthesis, a key element of carbohydrate synthesis, deposition and accumulation. It controls water transport and contributes to NPK fertilization alternatives to obtaining high yields, and a stable production, superior from a quantitative and qualitative point of view.
Secondary macro-elements	S	It participates in the nitrogen circuit and protein metabolism, increasing its production and quality. NS ratio is specific to the quality of nutrition and plant production.
	Ca	It actively participates in the constitution, structure, permeability of membranes and plant tissues. It ensures the quality of consumption, storage and industrialization of plant products. Protects plant tissues and plants on **ACID SOIL** from the effects of excessive quantities of Al, Mn and Fe and on **ALKALINE SOIL** against excessive quantities of Na and salts.
	Mg	Activator in the process of photosynthesis, is present in the composition of chlorophyll. It activates N metabolism and supports the nutritional involvement of P. It favours K for the synthesis and deposition of spare substances in consumable plant products.
Micro-elements	B	The only microelement with a plastic role, constitutive, present in plasma membranes and cells, provides functional plasticity. It enables the phenomenon of reproduction, provides the pollen with viability and activity in fruiting. Quantitatively and qualitatively involved in vegetable production.
	Fe	Involved in the development and activity of chlorophyll in photosynthesis. It participates in some stages in the N circuit, influences growth processes.
	Mn	Activator of the photosynthesis process, involved in the N circuit, especially in its metabolism. Positive effect on the nutritional involvement of P.
	Cu	Involved in photosynthesis together with Fe, Mn, Zn, Mg, involved in the N circuit, provides elasticity to plant tissues and resistance against pathogens. Together with B, it is involved in pollen viability and flower fertilization, as an activator of reproduction phenomena.
	Zn	Zn metalloenzymes have efficacy in plant metabolism. They activate the growth processes in plants, by stimulating tryptophan and auxin. It is present as an activator of photosynthesis, in the synthesis of carbohydrates, proteins and lipids, is involved in the P circuit.
	Mo	Decisive involvement in the stages of symbiotic fixation of the N. The effect of applying N is dependent on the availability in soil and plants of this microelement, supports the synthesis of proteins, chlorophyll and carbohydrates.

According to the researches carried out by CICh in laboratories accredited in Romania and in the European Union, soils generally have a high amount of total nutrients.
In the case of phosphorus, on alkaline soils with low content of organic matter, even extreme values of **up to 700 times more total phosphorus in soil compared to available phosphorus are registered.**

According to the literature, the results of the research carried out by the CICh show that, **out of the conventional NP / NPK fertilizers applied annually, only a small ratio of 5 - 25% of their phosphorus content is available** to be taken by the plants during the period of vegetation, both on acid reaction and alkaline soils, with values often below the necessary ones, including on neutral reaction soils.

Sample no. / Specification	P 1	P 4	P 5	P 6	P 7	P 9	P 10	P 11	P 13	P 16	P 17
pH	7,5	**8,3**	8,2	8,2	**6,7**	6,8	6,4	**5,9**	6,0	6,2	6,1
Available phosphorus (ppm)	7	**4**	6	6	**17**	28	19	**16**	30	10	18
Total phosphorus (ppm)	328	**2896**	240	357	**990**	570	487	**489**	439	339	421
Magnesium (ppm)	263	205	108	154	207	186	371	355	222	323	347
Calcium (ppm)	4711	3732	2984	4201	3827	3752	3507	3134	1961	2816	3113
Iron (ppm)	188	37	35	57	203	296	356	367	479	315	323
Organic matter (%)	2,2	1,3	0,8	2,6	2,8	2,5	3,2	3,9	2,0	2,2	2,7

To make efficient the use of soil nutrient resources and maximize yields, we recommend performing complex soil analyzes within small control surfaces, predetermined and identified by GPS and / or agrochemical and pedological mapping when tracking variable rate fertilization, with recommended areas for the average sampling of 1-2 ha.

The fertilization plan of a crop (determining the quantities of fertilizers) must take into consideration:

- **Specific consumption in kilograms of active** substance per nutrient per tonne of product and for each particular species (for the calculation of the pre-harvest export and / or of the planned production).
- **Degree of soil supply** with nutrients resulting from analyzes (total amount of nutrients existing in soil vs. mobile / available / plant assimilable quantity).
- **The ability to assimilate nutrients** depending on the root system and soil reaction (pH value).
- **Recommended fertilizer type / method of application / time of application**

Crop nutrient requirement per ton of product *

CROP	Primary and secondary macro-elements (kilograms s.a.)						Microelements (grams)				
	N	P_2O_5	K_2O	CaO	MgO	SO_3	B	Mo	Zn	Cu	Mn
Rapeseed	60	25,5	65	45	12,5	50	115	7	70	8	90
Wheat	29	10,5	25	9	3	12	25	0,75	90	30	120
Corn	21	8,7	24,5	5	3	10	7,5	0,55	45	9	55
Sunflower	46	15	29	60	12	11	125	1	40	15	100
Potatoes	5	2,3	9,5	1,5	0,5	1	3,5	0,15	2	2,5	10
Beet	3,75	2,5	9,5	4,5	0,8	1,2	210	7	280	92	260

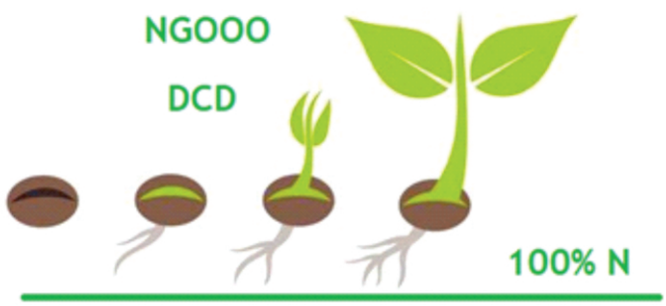
*** indicative values - the consumption can be different depending on the variety / hybrid and the local pedoclimate conditions**

What is the NUTRI-TOP TECHNOLOGY?

Developed by CICh by carrying out specific research, development and innovation activities, the NUTRI - TOP TECHNOLOGY includes:

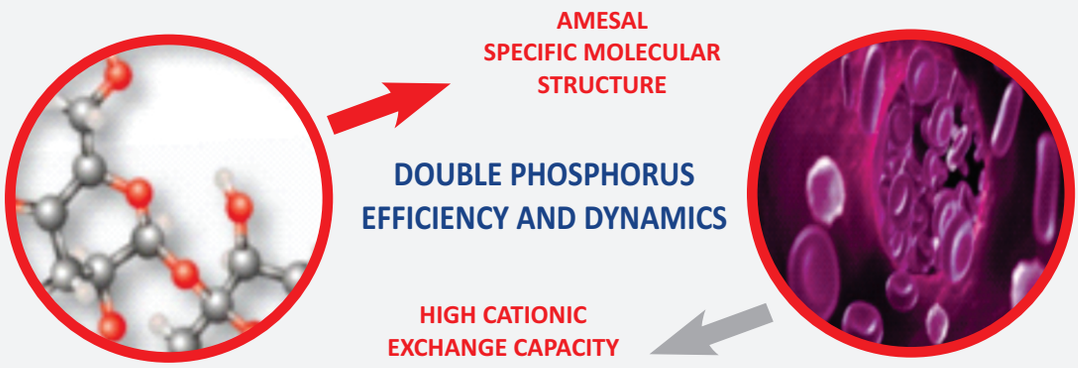
NGOOO TECHNOLOGY

- based on the DCD nitrification inhibitor for the stabilization, complete assimilation and optimization of nitrogen availability in the initial stages of vegetation, for a period of up to 40 - 50 days, without losses and negative impact on the environment.



Classic phosphorus (P) fertilizers do not reach their target, given the high reactivity of phosphate ions to the many components in the soil - following the application of conventional fertilizers, low and insufficient phosphorus (P) concentrations are available versus the optimal needs of each crop.

In acidic soils, phosphorus (P) forms insoluble complexes with iron (Fe) and aluminum (Al) hydroxides (Fe and Al phosphates) and in basic soils, rich in limestone, it reacts with calcium (Ca) transforming (by retrogradation) in dicalcium phosphate or tricalcium phosphate, thus becoming unavailable for crops.



THE AMESAL TECHNOLOGY it is based on a polymer of the latest generation, with a specific molecular structure that determines a high cation exchange capacity. AMESAL preferentially binds to metal cations such as aluminum, iron and calcium on acid and alkaline soils, including on neutral reaction soils. This mechanism protects the phosphorus released into the soil from known bonding phenomena, in dicalcium and tricalcium phosphorus. Therefore, the phosphorus (P) present in the CICh fertilizer granules treated with AMESAL, will be available to crops during critical and maximum consumption periods, with a performance that tends to double the yield and soil dynamics of the applied units.

HUMIC EXTRACTS - with a decisive role in increasing water retention capacity, soil structure and physical-chemical properties such as soil exchange and buffering capacity - properties of particular importance not only in controlling nutrient uptake by plants and their retention in soil, but also in minimizing the harmful effect of soil acidity and / or salinity.

There is conclusive evidence in the specialized studies that, when incorporated into fertilizers, some of the organic substances derived from humic extracts such as humic and fulvic acids, vitamins and amino acids, have a positive effect on the bioavailability of nutrients, growth and balanced development of plants and implicitly on maximizing agricultural production.

Considering their specific colloidal activity, humic acids increase the storage capacity of nutrients and water (the ability of humic acids to retain water in the root zone is about seven times higher than clay particles) and buffer the soil reaction in the area of granules providing nutrients that are " blocked "from from soil. Also, the insolubility of toxic aluminium compounds (Al) which will no longer be absorbed in plant structures is additionally ensured, and compounds with metals such as Fe, Cu, Zn, Mg, Mn become more accessible to plants and are used as and microelements.

Fulvic acids improve the permeability of membranes and optimize the use of nutrients by "chelating" them in organic forms much easier to absorb by the root system - through the synergistic effect, humic and fulvic acids stimulate and support germination, seed viability and even the uniform crop emergence.

The CICh NPK NUTRI-TOP range supports the rapid development of the root mass and the sustained growth of the roots especially in length, optimizing the consumption of nutrients from the fertilizers applied throughout the vegetation period - thus preventing loss of nutrients in the deep soil by levigation.

Comparing the impact of humic substances on root system growth, it was concluded in the specialized studies that root systems that benefited from humic substances applications or found a rich soil in them were 20-50% more developed.

The CICh NPK NUTRI-TOP range is a source of nutrients, amino acids, vitamins and organic carbon for plants and an energy source for soil organisms (algae, bacteria, mycorrhizae, and so on) that support important functions such as improving natural fertility and the physical-mechanical properties of the soil (structure, colour, texture, drainage and aeration, etc.), balanced growth and development of plants and induction of their resistance against different pathogens. Last but not least, the improved microbial activity of the soil leads to a faster and better decomposition of plant residues.

CICh®

for a good growth

All complex fertilizer formulas produced at CICh Romania include the Amesal technology so that the P from granules is protected from bonding due to the innovative P potentiation technology. P is no longer blocked in soil, regardless of the soil reaction.

With Amesal technology, P remains mobile and accessible for plants throughout the crop vegetation period.

NUTRI-TOP Technology

P_2O_5

NUTRI-TOP SSP

CHEMICAL COMPOSITION

P_2O_5 21%, 33% SO_3 + 28% CaO

MAIN MACRO-ELEMENTS	SECONDARY MACRO-ELEMENTS	MICRO-ELEMENTS
21% P_2O_5	33% SO_3, 28% CaO	

TECHNOLOGY

AMESAL, Humic extracts (organic carbon, humic and fulvic acids, amino acids).

P_2O_5

NUTRI-TOP CEREALFOS

CHEMICAL COMPOSITION

P_2O_5 40% + 10% SO_3 + 22% CaO + Mn 0,5% + Fe 0,3% + Zn 0,03%

MAIN MACRO-ELEMENTS	SECONDARY MACRO-ELEMENTS	MICRO-ELEMENTS
40% P_2O_5	10% SO_3, 22% CaO	0,5% Mn, 0,3% Fe, 0,03% Zn

TECHNOLOGY

AMESAL, Humic extracts (organic carbon, humic and fulvic acids, amino acids).

PK

NUTRI-TOP PK 15.30

CHEMICAL COMPOSITION

P_2O_5 15% + K_2O 30% + SO_3 5% + CaO 9,5% + Fe 0,5% + B 0,01% + Mn 0,01% + Zn 0,01% + Cu 0,001%

MAIN MACRO-ELEMENTS	SECONDARY MACRO-ELEMENTS	MICRO-ELEMENTS
15% P_2O_5, 30% K_2O	5% SO_3, 9,5% CaO	0,5% Fe, 0,01% B, 0,01% Mn, 0,01%, Zn, 0,001% Cu

TECHNOLOGY

NGOOO, AMESAL, Humic extracts (organic carbon, humic and fulvic acids, amino acids).

NUTRI-TOP & SOP Technology

NPK

NUTRI-TOP NPK 5.10.15 SOP

CHEMICAL COMPOSITION

N 5% + P_2O_5 10 % + K_2O 15% + SO_3 37% + CaO 10% + MgO 1,3%+ Fe 0,5% + Mn 0,01% + Zn 0,01%

MAIN MACRO-ELEMENTS	SECONDARY MACRO-ELEMENTS	MICRO-ELEMENTS
5% N, 10% P_2O_5, 15% K_2O	37% SO_3, 10% CaO, 1,3% MgO	0,5% Fe, 0,01% Mn, 0,01% Zn

TECHNOLOGY

DMPP, AMESAL, Humic extracts (organic carbon, humic and fulvic acids, amino acids).

K2O

import

K Sulfate

CHEMICAL COMPOSITION

K_2O 50% + SO_3 45%

MAIN MACRO-ELEMENTS	SECONDARY MACRO-ELEMENTS	MICRO-ELEMENTS
50% K_2O	45% SO_3	

NUTRI-TOP Technology

NP

NUTRI-TOP NP 5.30

CHEMICAL COMPOSITION

N 5% + P_2O_5 30% + SO_3 15% + CaO 6% + MgO 0,65% + Fe 1,65% + B 0,05% + Mn 0,04% + Zn 0,01%

MAIN MACRO-ELEMENTS	SECONDARY MACRO-ELEMENTS	MICRO-ELEMENTS
5% N, 30% P_2O_5	15% SO_3, 6% CaO, 0,65% MgO	1,65% Fe, 0,05% B, 0,04% Mn, 0,01% Zn

TECHNOLOGY

NGOOO, AMESAL, Humic extracts (organic carbon, humic and fulvic acids, amino acids).

NPK

NUTRI-TOP NPK 4.12.24

CHEMICAL COMPOSITION

N 4% + P_2O_5 12% + K_2O 24% + SO_3 12% + CaO 7,6% + MgO 0,34% + Fe 0,5% + B 0,01% + Mn 0,01% + Zn 0,01%

MAIN MACRO-ELEMENTS	SECONDARY MACRO-ELEMENTS	MICRO-ELEMENTS
4% N, 12% P_2O_5, 24% K_2O	12% SO_3, 7,6% CaO, 0,34% MgO	0,5% Fe, 0,01% B, 0,01% Mn, 0,01% Zn

TECHNOLOGY

NGOOO, AMESAL, Humic extracts (organic carbon, humic and fulvic acids, amino acids).

NUTRI-TOP NPK 4.20.10

CHEMICAL COMPOSITION

N 4% + P_2O5 20% + K_2O 10% + SO_3 12% + CaO 12% + MgO 1% + Fe 0,1% + B 0,07% + Mn 0,07% + Zn 0,05% + Cu 0,02%

MAIN MACRO-ELEMENTS	SECONDARY MACRO-ELEMENTS	MICRO-ELEMENTS
4% N, 20% P_2O_5, 10% K_2O	12% SO_3, 12% CaO, 1% MgO	0,1% Fe, 0,07% B, 0,07% Mn, 0,05% Zn, 0,02% Cu

TECHNOLOGY

NGOOO, AMESAL, Humic extracts (organic carbon, humic and fulvic acids, amino acids).

NUTRI-TOP NPK 4.20.10 SOP

CHEMICAL COMPOSITION

N 4% + P_2O_5 20% + K_2O 10% + SO_3 24% + CaO 8% + MgO 0,3%

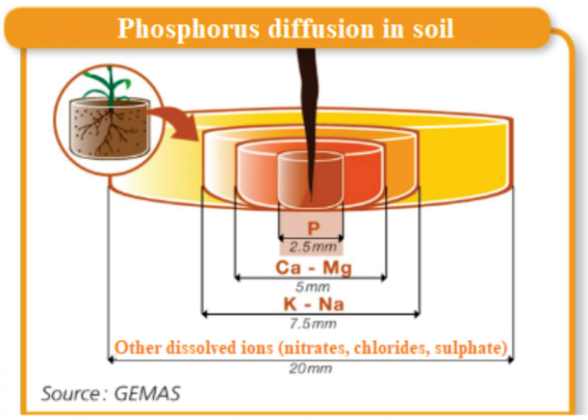
MAIN MACRO-ELEMENTS	SECONDARY MACRO-ELEMENTS	MICRO-ELEMENTS
4% N, 20% P_2O_5, 10% K_2O	24% SO_3, 8% CaO, 0,3% MgO	

TECHNOLOGY

NGOOO, AMESAL, Humic extracts (organic carbon, humic and fulvic acids, amino acids).

AMESAL technology - is the solution for maximizing phosphorus availability

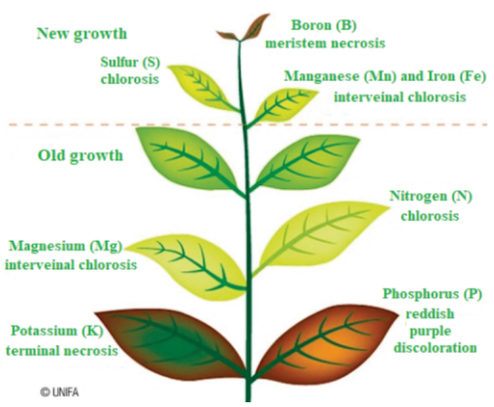
- Maximum availability of phosphorus regardless of soil reaction
- Increased efficiency of phosphorus from applied fertilizers
- Phosphorus favours formation and development of root system and absorbent hairs



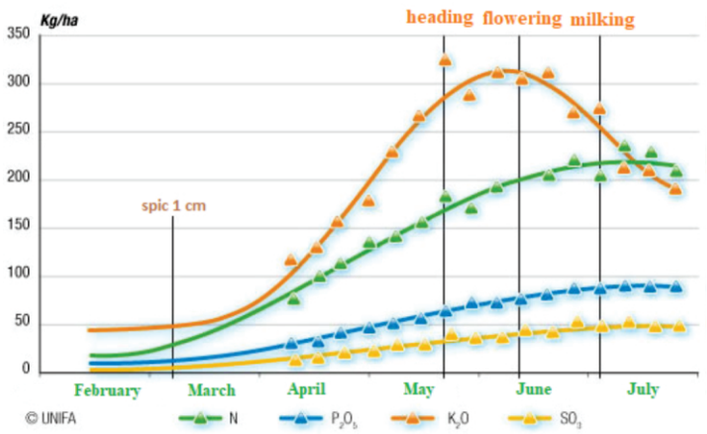
Availability of nutrients depending on soil reaction (pH values)

pH	N	P	K
4,5	30%	23%	33%
5	43%	34%	52%
5,5	77%	48%	77%
6	89%	52%	93%
6,5	93%	93%	100%
7	100%	100%	100%
7,5	98%	68%	74%
8	93%	30%	44%
8,5	77%	20%	28%
9	50%	5%	8%

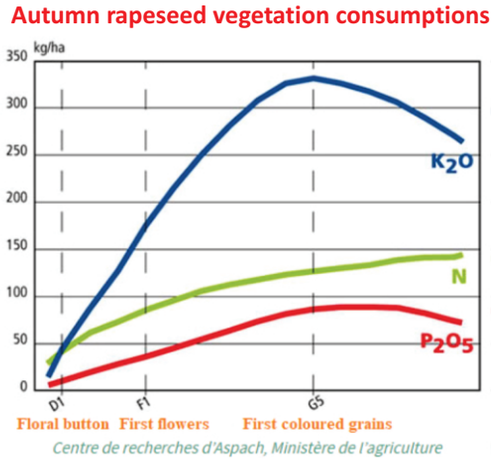
Signs of crop nutrient deficiency



Total autumn wheat consumption

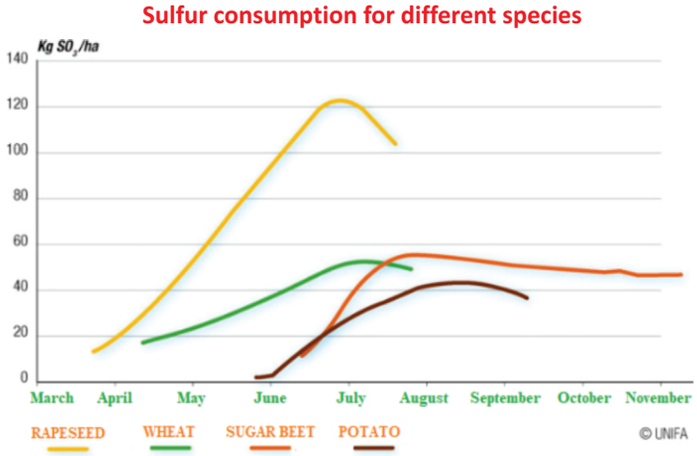


Autumn rapeseed vegetation consumptions



Centre de recherches d'Aspach, Ministère de l'agriculture

Sulfur consumption for different species



CICh®
for a good growth

COMBINATUL DE ÎNGRĂȘĂMINTE CHIMICE S.R.L.
Headquarters: România, Constanța, Năvodari, 1 Principală Street, administrative building, 2nd floor
Tel. +40 241 255 175 | Fax. +40 241 618 640
Commercial office:: România, București, Gheorghe Sisești Road, no. 75B, sector 1

comercial@cich.ro
www.cich.ro