Agrolution® pHLow

Agrolution® Special

Precision Nutrition with Fertigation Fertilizers

www.icl-sf.com

ICL Specialty Fertilizers

ICL Fertigation Fertilizers, precise nutrition to enhance crop production

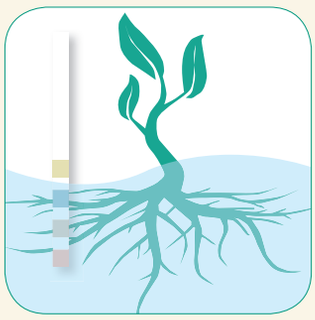
Fertigation is a technique by which soluble fertilizers are mixed with the irrigation water to enhance crop productivity. It is a highly effective and flexible tool for controlling placement, timing, and nutrient application methods. This makes precise nutrient application possible according to the soil fertility status and growth stage of any crop.

PeKacid Technology

PeKacid a unique, patented, mono-crystal, water-soluble phosphoric acid in dry form. It is nitrogen free and contains no sodium or chlorine.

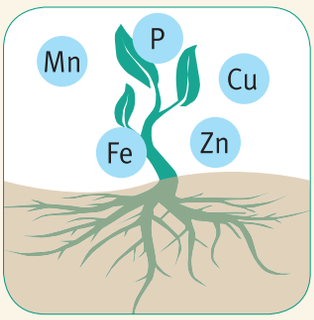
It combines the advantages and efficiency of phosphoric acid with the ease and safety of a solid crystalline fertilizer. The use of PeKacid (An “acid in the bag” product) replaces the conventional application of technical- and agricultural-grade phosphoric acid, resulting in an easier, safer and more effective fertilization process. Due to its acidic nature, PeKacid has an anti-clogging action and enhances nutrients’ uptake. ICL Specialty Fertilizers uses PeKacid technology in many of their water-soluble fertigation formulations.

PeKacid effect



Low pH

Anti clogging action



Enhances nutrient uptake

The benefits of PeKacid technology

1	Reduces pH of hard water when applied directly into the water
2	Prevents clogging in the irrigation / fertigation systems, in turn allowing uniform water and fertilizer distribution across the field
3	Cleans clogged drippers by dissolving precipitates formed during irrigation / fertigation
4	The acidification effect decreases P-fixation in the rhizosphere and promotes trace (elements) uptake in alkaline soils (pH >7)
5	Simplifies handling thanks to the unique dry form of phosphoric acid

The all-in-one fertilizer with acidifying power for better nutrient uptake

Agrolution® pHLow

Agrolution pHLow is perfect for growers who have to deal with high pH and high alkalinity in their irrigation water and/or soils.

The acidic nature of Agrolution pHLow means that all the nutritional elements dissolve more efficiently, even in hard water. It is made of the purest ingredients and all trace elements in the fertilizer are chelated. It will keep the drip lines free of lime scale build up. Agrolution pHLow is a safe method compared to handling liquid mineral acids.

Benefits of Agrolution pHLow

1	Agrolution pHLow range reduces bicarbonates and has an acidifying effect
2	Keeps systems clean and will clean your drip lines
3	Easy-to-use all-in-one package of NPK plus trace elements
4	Pure ingredients
5	Dissolves completely

Fertigation · FeKacid Technology · Clean Dripper Effect · pH Control

"We applied Agrolution pHlow and Solinure in our fertigation program, and the result was amazing. I decided to replant one row of raspberries and I was really surprised when I couldn't move the machine! The root system was so big that it was difficult to divide it to the smaller parts and obtaining the single seedlings was impossible. I have never seen this such big and strong root system."

Mr. Sławomir Brzusek
Grower of soft fruit, raspberry and currant
Urzędów, Poland

Agrolution® Special

Single bag solutions for many needs

Agrolution Special improves the availability of nutrients through its formulations that prevent magnesium and calcium deficiencies.

Fertigation

pH Control

It is made of the purest ingredients and all trace elements in the fertilizer are chelated. Agrolution Special prevents deposits and blockages forming in your irrigation system thanks to its high purity and solubility.

Benefits of Agrolution Special

1	Agrolution Liquid is ideal for dealing with deficiencies
2	Provides all necessary nutrients
3	Easy-to-use all-in-one package of NPK plus trace elements
4	Pure ingredients
5	Dissolves completely

"I use Agrolution because it's a complete fertilizer. I've reduced nitric oxide consumption, saved time, there's less hassle and I don't make mistakes preparing the water-soluble based nutrient solutions."

Mr. Roberto Bogoni of the Soc. Agr. Bogoni e Bragolin
Buttapietra, Italy
12 hectares strawberries and vegetables

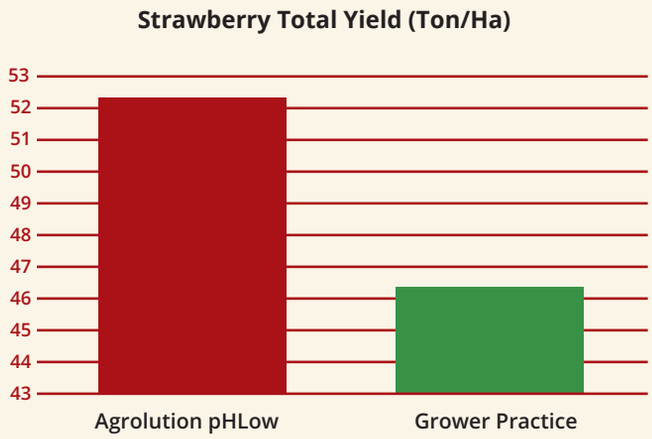
Trial case, Agrolution pHLow

Objective: Prove that using Agrolution pHLow results in higher yields compared to grower´s practice (single fertilizers)

Where: Landwirschaftskammer, Nordhein-Westfalen, Germany

Crop: Strawberry, Sonata variety

Growing Method: Strawberry grown in tunnels on tabletop Media: 30% peat and 70% coco fibers



Economic evaluation	Agrolution pHLow	Grower practice
Commercial Yield (Kg/Ha)	41,460	35,670
Strawberry price	2,5 €	2,5 €
Gross income / Ha	103.650 €	89.175 €
Picking costs /Ha	52.500 €	46.300 €
Extra costs of Agrolution pHLow vs grower practice	350 €/Ha	-
Net Extra Income / Ha	7.925€ / Ha	

A. ICL treatment

Stage	Formula	Dosage (PPM)					
		N	P_2O_5	K_2O	CaO	MgO	E.C
Vegetative growth-Flowering	Agrolution pHLow 15-13-25+TE+MgS	108	90	180	160	40	2.0
Flowering - Harvest	Agrolution pHLow 15-13-25+TE and 10-10-40+TE +MgS	90	80	220	160	45	1.9

B. Grower´s practice

Stage	Tank A 100 lts. (Kg)					Tank B 100 lts. (Kg)					Nutrient content in drip line (PPM)					
	$CaNO_3$	KNO_3	AN 18%	HNO_3 38%	Fe-EDDHA	KNO_3	MKP	$MgNO_3$	HNO_3 38%	Micro	N	P_2O_5	K_20	CaO	MgO	E.C
Vegetative growth - Flowering	1.5	2.1	1.1	2.8	0.3	0.7	3	0.7	2.8	-	220	140	210	194	40	1.7
Flowering - Harvest	1.9	3	-	3.2	-	0.7	3.4	0.9	3.2	-	200	140	235	200	30	1.7

Why Agrolution pHLow ?

- Agrolution pHLow analyses contain the right NPK balance during all growth stages. In the growers practice the N levels were much higher as what the crop demanded
- Applying 1-2 Agrolution pHLow formulas instead of 10 different single fertilizers will result in less human mistakes
- More convenient to calculate nutrient levels in the irrigation solution when only using 1 – 2 formulas

Conclusion

The application of Agrolution pHLow increased the net farmer income per hectare with **16%**

Breakdown Tables (in %)

Agrolution® pHLow

Product	Formulation	Product Name	Item code	N-total	NO_3-N	NH_4-N	Urea-N	P_2O_5	K_2O	CaO	
Agrolution pHLow	10-10-40+TE	114	2193	10	10,0			10	40		
Agrolution pHLow	10-50-10+TE	151	2192	10		4,7	5,3	50			
Agrolution pHLow	15-13-25+Te	335	2194	15	7,4	2,4	5,2	13	25		
Agrolution pHLow	15-30-15+Te	242	2198	15	6,0	5,7	3,3	30	15		
Agrolution pHLow	22-10-7+2MgO+TE	531	2195	22	8,4	10,0	3,6	10	7		
Agrolution pHLow	20-20-20+TE	222	2197	20	4,9	1,8	13,3	20	20		

Agrolution® Special

Product	Formulation	Product Name	Item code	N-total	NO_3-N	NH_4-N	Urea-N	P_2O_5	K_2O	CaO	
Agrolution Special	13-5-28+2CaO+2.5MgO+TE	316	2168	13	11,0		2,0	5	28	2,0	
Agrolution Special	14-7-14+14CaO+TE	313	2159	14	11,6	0,6	2,2	7	14	14,0	
Agrolution Special	14-8-22+5CaO+2MgO+TE	324	2189	14	10,6	0,2	3,2	8	22	5,0	
Agrolution Special	23-10-23+TE	212	2169	23	5,2		17,8	10	23		
Agrolution Special	7-14-35+3.5MgO+TE	125	2179	7	5,9		1,1	14	35		
Agrolution Special	12-6-29+7CaO+TE	214	2167	12	12,0			6	29	7,0	

** EDTA chelated* *** DTPA chelated* **** Measured in soft water (comparable to rainwater)*

The key parameters of a fertigation programme

Before designing a fertigation programme, several parameters need to be taken into consideration:

1. Soil: the soil analysis is a very important factor in determining the fertilization plan; knowledge of the nutrient levels in the soil means the grower can adjust the fertilization plan (adding or reducing nutrients). The pH of the soil makes it possible to predict which nutrients will be available in large or small quantities for the plant roots.

2. Water: the water analysis is important as it informs the grower which nutrients the water will supply. The common nutrients in water are: Ca, Mg, and Cl. Knowing the pH levels of the water allows a grower to choose the best formula for his/her conditions. For example, if the pH levels of the water and the bicarbonates are high, the grower will choose fertilizers with an acidifying effect to neutralize the bicarbonates and to reduce the pH of the water. (More information is available in the 'water quality' section).

3. Crop demand: knowing the nutrient demands of various crops during the growing cycle allows the grower to create an accurate fertilization plan that will result in an optimum yield.

	MgO	SO_3	B	Cu	Fe	Mn	Mo	Zn	HCO_3 reduction mg/g WSF***	EC at 1g/l (mS/cm)	pH at 1 g/l	Max. solubility (kg/100 l)
			0,01	0,010*	0,16*	0,06*	0,006	0,010*	45	1,4	3,1	20
		1,8	0,01	0,010*	0,16*	0,06*	0,006	0,010*	118	1,0	3,0	20
		7,8	0,01	0,010*	0,16*	0,06*	0,006	0,010*	123	1,6	2,9	20
		6,1	0,01	0,010*	0,16*	0,06*	0,006	0,010*	74	1,3	2,9	20
	2,0	14,6	0,01	0,010*	0,16*	0,06*	0,006	0,010*	71	1,6	2,8	20
			0,01	0,010*	0,16*	0,06*	0,006	0,010*	47	0,9	3,1	20

	MgO	SO_3	B	Cu	Fe	Mn	Mo	Zn	HCO_3 reduction mg/g WSF***	EC at 1g/l (mS/cm)	pH at 1 g/l	Max. solubility (kg/100 l)
	2,5		0,01	0,010*	0,16**	0,08*	0,006	0,040*	44	1,3	3,3	13,3
			0,01	0,010*	0,16**	0,08*	0,006	0,040*	50	1,3	3,1	23,7
	2,0		0,01	0,010*	0,16**	0,08*	0,006	0,040*	70	1,4	3	23,7
			0,01	0,010*	0,16**	0,08*	0,006	0,040*	16	0,8	3,8	23,7
	3,5	14,0	0,01	0,010*	0,16**	0,08*	0,006	0,040*	34	1,3	3,4	17,1
			0,01	0,010*	0,16**	0,08*	0,006	0,040*	27	1,3	3,5	23,7

Overview is subject to formulation changes and misprints.

Principles for a good fertigation plan

- Look at the crop's nutrient requirements during the growth cycle
- Calculate the nutrients acquired from other sources (soil, water, organic fertilizer)
- Take into consideration the amount of water the crop needs each day
- Find the right formula for each growth stage
- Calculate the total amount of water soluble fertilizer that the crop needs for every growth stage (in kg per hectare per day)

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