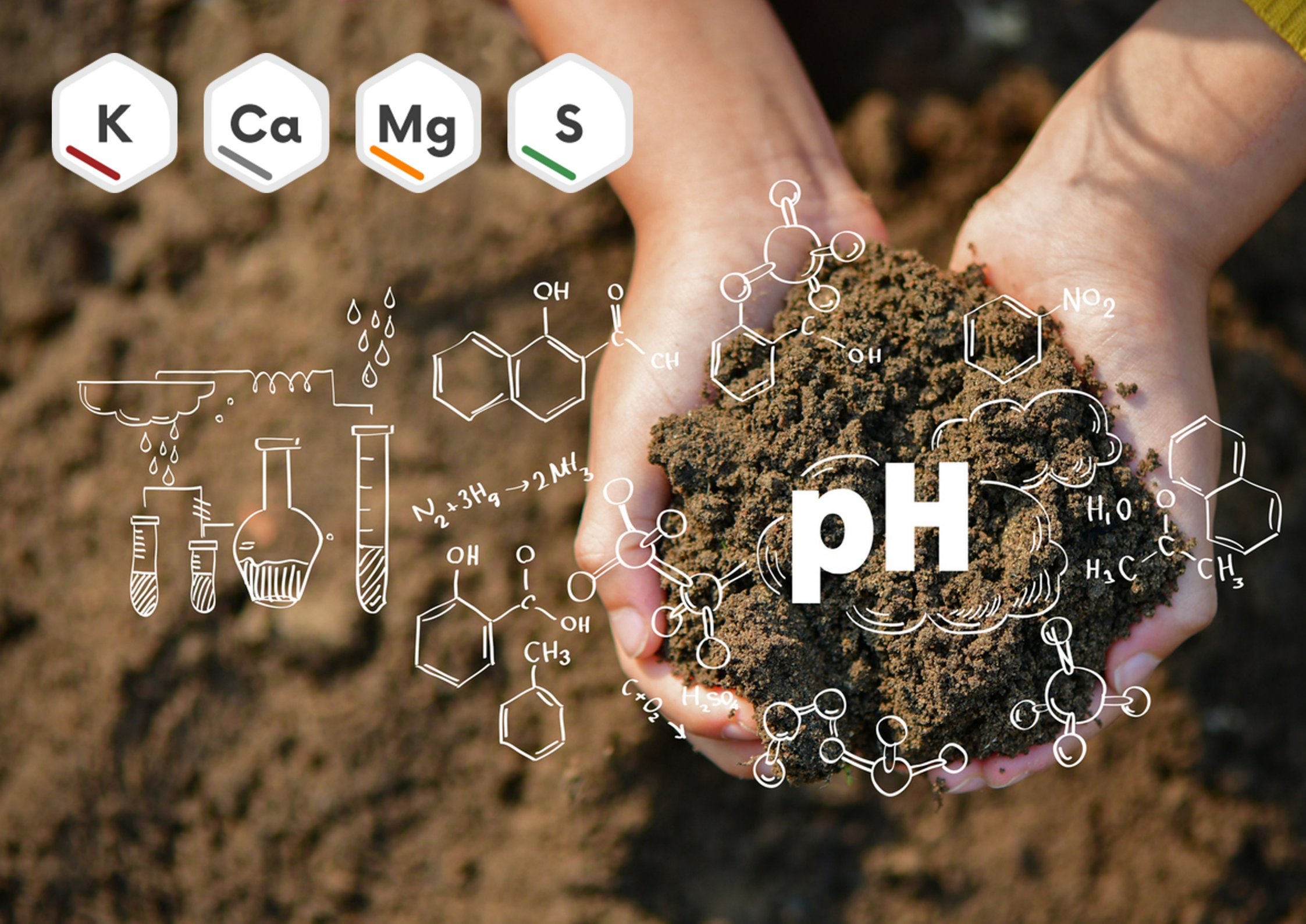
GoudenKorrel®

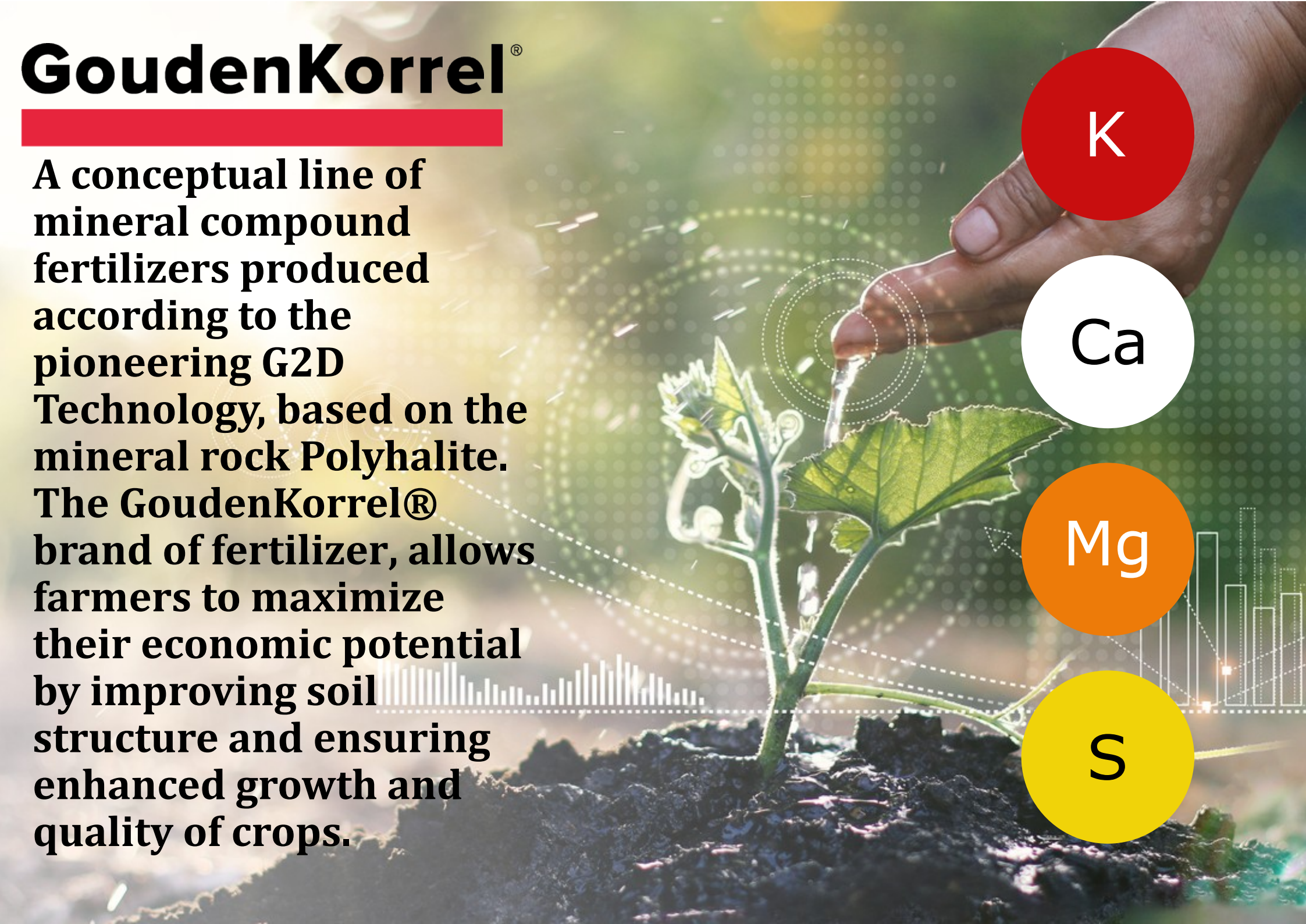
Compound fertiliser manufacturer

PRODUCT HANDBOOK


K
Ca
Mg
S
pH

GoudenKorrel®

A conceptual line of mineral compound fertilizers produced according to the pioneering G2D Technology, based on the mineral rock Polyhalite. The GoudenKorrel® brand of fertilizer, allows farmers to maximize their economic potential by improving soil structure and ensuring enhanced growth and quality of crops.



NEW BEGINNINGS

.....

POLCALC

2009 Purchase of a plot on the site of the former airport in Lubień Kujawski

2011 Commencement of the construction of a calcium fertilizer factory

2012 Tests of the first granulation line and creation of the first granulate

2013 Start of production and first sale

2016 New warehouse halls are built

2018 The investment process has been completed. POLCALC ranked among the leaders in the production of granulated calcium fertilizers in Europe

2021 POLCALC is transferred to the LAFARGE group

GoudenKorrel

2019 Start of work on a new line of mineral fertilizers based on polyhalite

2020 Commencement of the construction of a new Compound Fertilizer Plant in Lubień Kujawski

2021 Launch of a new production line for granulated, multi-component mineral fertilizers

2022 Completion of construction works. A new office is built

2023 BELENUS® - ecological fertilizer wins the "Gold Medal" of the International Agricultural Fair in Kielce, Poland

2024 GoudenKorrel successfully introduces a new fertilizer based on nitrogen and polyhalite to the market

Boulby Mine
Great Britain
Polyhalite

Producer of Compound Fertilizers
Lubień Kujawski Poland
Belenus®, Vervactor®
& PoliSulMag®

Boulby Mine is a 200-hectare site located just southeast of the village of Boulby on the northeast coast of the North York Moors in Loftus, North England. It is operated by Cleveland Potash Limited, which is now a subsidiary of Israel Chemicals Ltd. (ICL).

In early 2016, polyhalite mining commenced. In 2019, GoudenKorrel S.A. began cooperation with ICL by signing a contract for the supply of polyhalite to the Lubień Kujawski Mine.

This marks the beginning of our adventure with polyhalite...

ICL Specialty Fertilizers

GoudenKorrel®

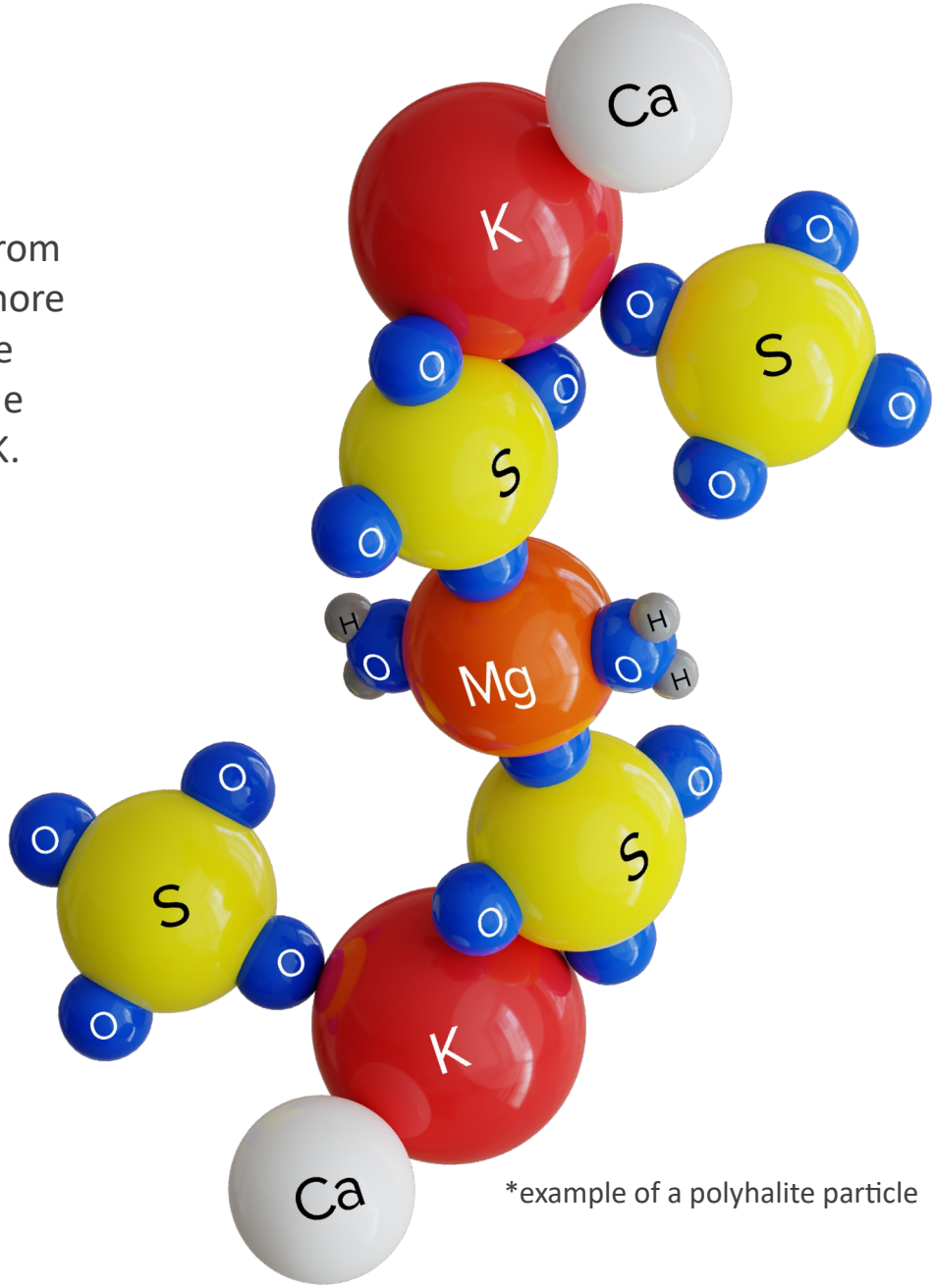
POLYHALITE

$K_2MgCa_2(SO_4)_4 \cdot 2H_2O$

Polyhalite is a naturally occurring mineral derived from a layer of polyhalite rocks more than 1000 meters below the level of the North Sea off the coast of North Yorkshire, UK.

Polyhalite mineral contains only sulfate bonds, which is why the fertilizer is safe for plants and the environment!

Polyhalite is a natural mineral source of potassium, calcium, magnesium, and sulfur with the lowest carbon footprint on the market, at 0.0337 kg of carbon per kg of mined product, as it only requires mechanical processing.

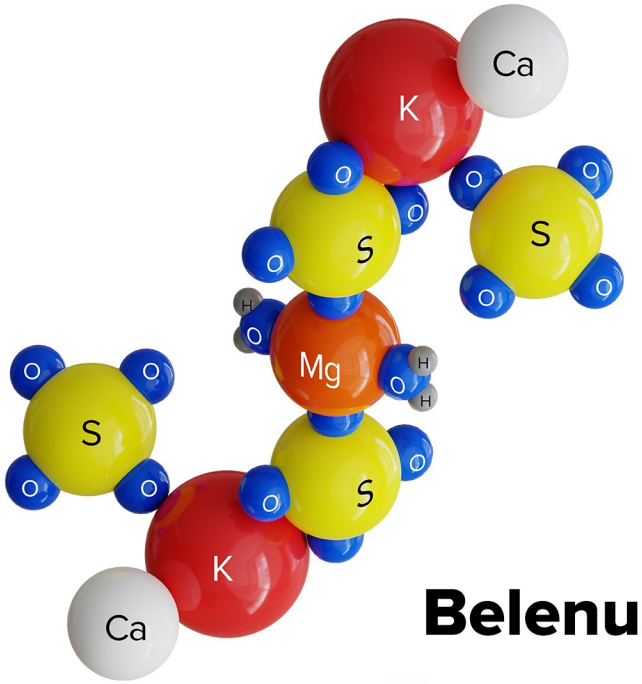


*example of a polyhalite particle

GoudenKorrel®

POLYHALITE (ECO SOP)

$K_2MgCa_2(SO_4)_4 \cdot 2H_2O$

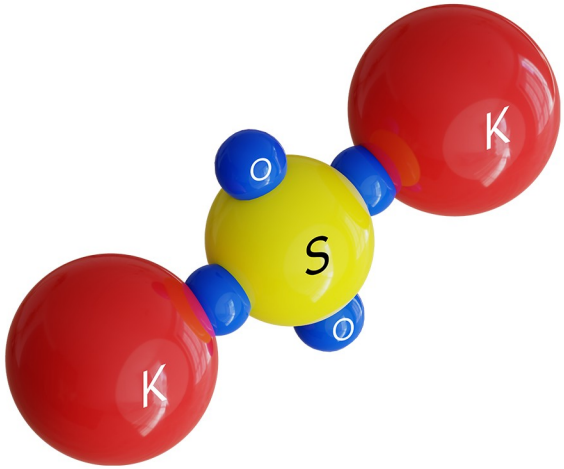


Belenus®

K	K_2O - 12%
Ca	CaO - 19%
Mg	MgO - 5,5%
S	SO_3 - 42%

SULPHATE of POTASH (SOP)

K_2SO_4



Synthetic potassium sulfate

K	K_2O - 50%
S	SO_3 - 44%

POTASSIUM CHLORIDE (MOP)

KCl

Potassium salt

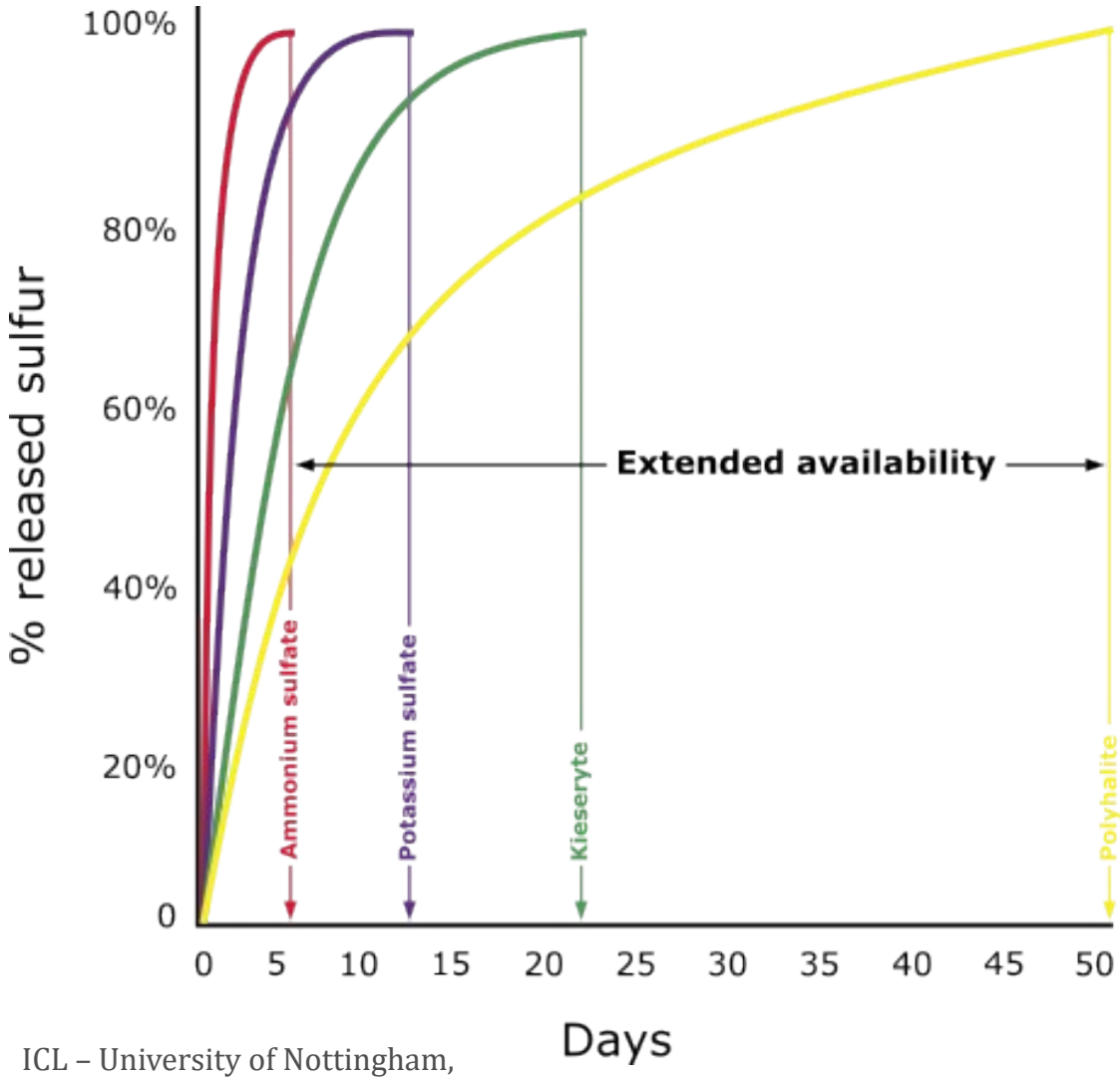
K	K - 49,8%
Cl	Cl - 46%

GoudenKorrel®

RELEASE OF SULFUR CONTAINED IN POLYHALITE VERSUS OTHER SOURCES

The sulfur contained in polyhalite fertilizers remains available to plants for over 50 days, allowing them to fully utilize other essential elements such as nitrogen, potassium, calcium, and magnesium.

In the initial stage, sulfur becomes 50% available within 15 days of applying the fertilizer. As the process progresses, this availability increases. Sulfur is released slowly, extending its action in the soil, allowing plants to absorb it for longer periods, and helping to prevent rapid leaching



ICL – University of Nottingham, UK Raport 2016

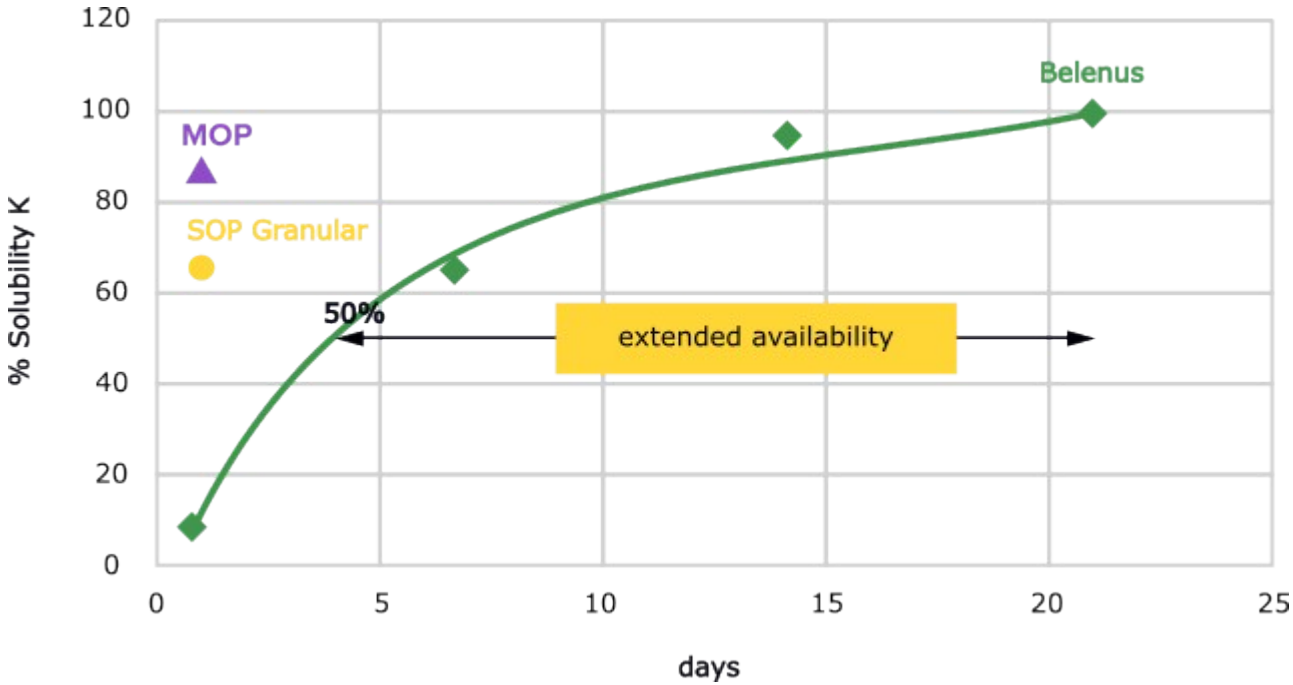
GoudenKorrel®

SOLUBILITY OF K FROM POLYHALITE, MOP AND SOP

The potassium available in polyhalite fertilizer is 100% soluble, and its availability process is extended over time.

In the initial stage, potassium becomes 50% available within 5 days of applying the fertilizer, and its accessibility increases over time. Potassium is released slowly, which extends its action in the soil, allowing plants to absorb it for longer periods, and additionally, we prevent rapid leaching.

Solubility K from Belenus, MOP, SOP

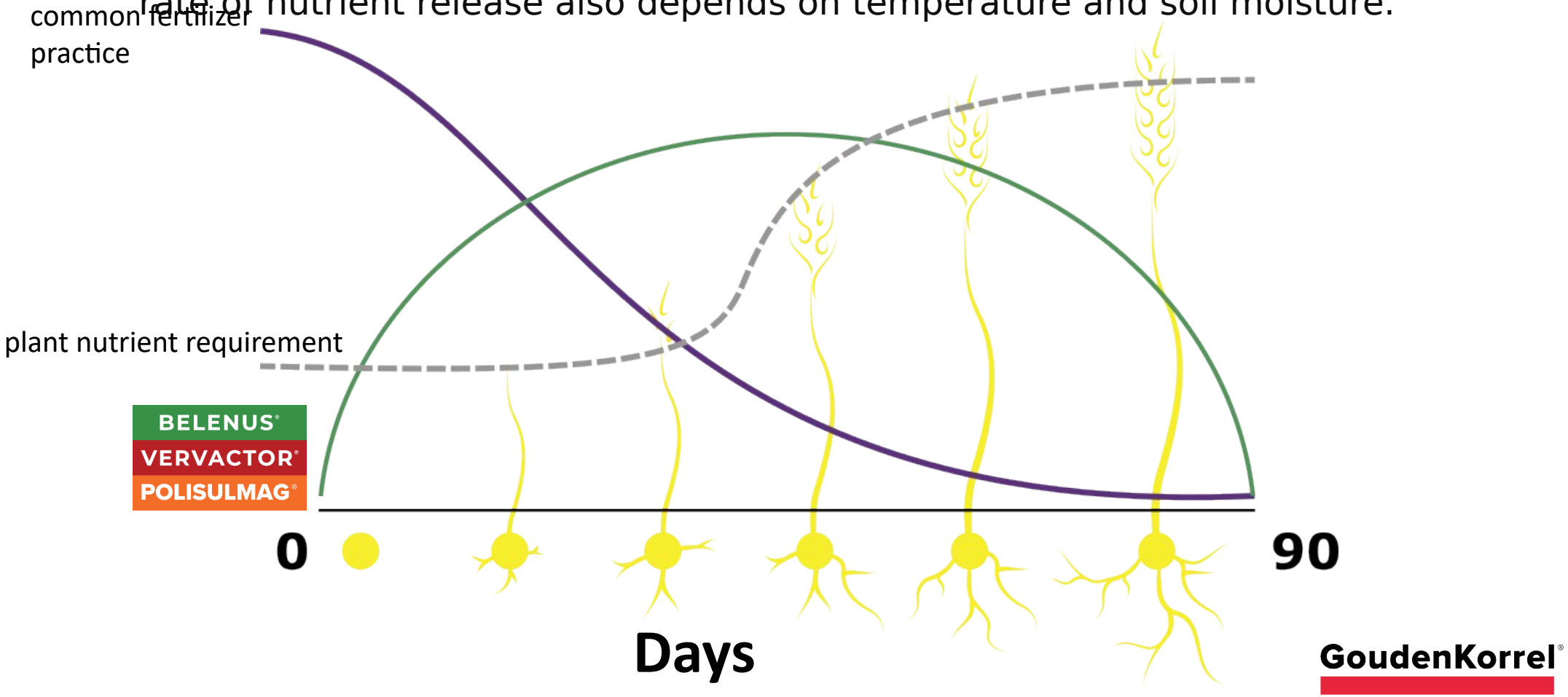


ICLSF lab R&D Netherlands, 2016

GoudenKorrel®

SUSTAINED RELEASE FERTILIZER

In GoudenKorrel® brand sustained release fertilizers, nutrients such as sulfur, potassium, calcium, magnesium, and sodium are already 50% available in the first stage, which occurs 15 days after fertilizer application. As the process progresses over time, this availability increases. The G2D Nodens Technology™ used in the production of GoudenKorrel® mineral fertilizers ensures that the granules have a sustained activation time, with the decomposition process taking about 3 months. The elements are released slowly, prolonging their duration of action in the soil and preventing rapid leaching. The rate of nutrient release also depends on temperature and soil moisture.



GoudenKorrel®

CONTENT OF CHLORIDES IN FERTILIZERS

Ideal for chloride – sensitive crops

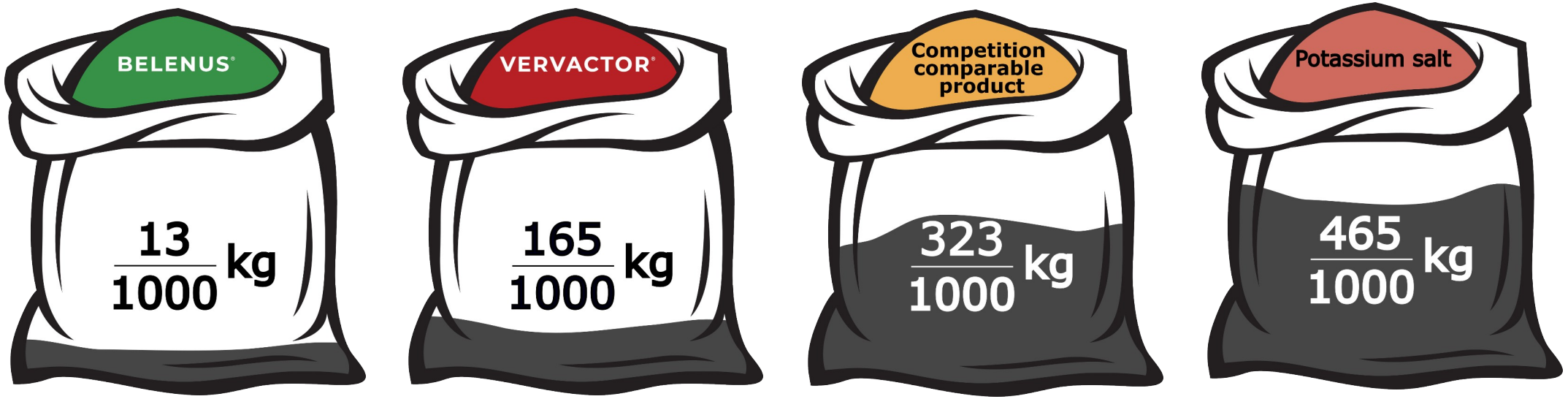
Low salinity index and neutral pH

Substance pH: 7,7

A high content of chlorine in fertilizer can disinfect the soil, disrupt the bacterial flora, impair the plant's ability to absorb water, restrict plant growth and development, and lead to diseases and damage to plant tissues.

Belenus® & Vervactor® fertilizers, are safe for the environment and plants.

CHLORIDE CONTENT PER 1 TON OF FERTILIZER



GoudenKorrel®

TECHNOLOGY

G2D Nodens Technology™

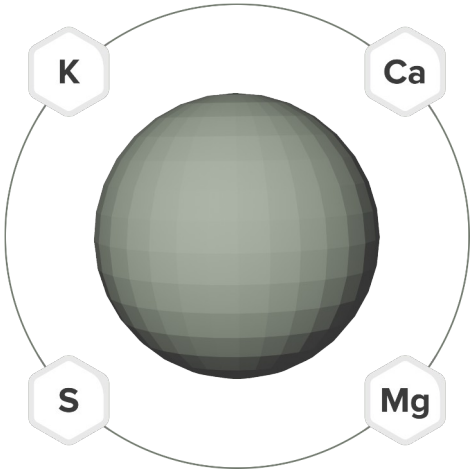
The Grind to Dust Nodens Technology™ is a unique, multi-stage process that atomizes materials down to tens of microns. In the first stage of treatment, the crystal structure of the polyhalite is broken down, releasing the sulphates 'trapped' in the rock. Only the raw material processed in this manner undergoes further processing, including the separation of active particles, their mixing, and aggregation. Each fully reactive granule obtained is equipped with a smart decomposition activation system, ensuring the product's highest performance, characterized by complete solubility and gradual release of nutrients

Our technology enables us to produce a product that is optimized in its form, resulting in nearly double the effectiveness! While we don't claim to be the sole recognizers of the power contained in polyhalite, we are the ones who go beyond where others stop.

GoudenKorrel®

G2D Nodens Technology™

GoudenKorrel® granulate polyhalite using a patented G2D Technology™ to produce **Belenus®, Vervactor® & Polisulmag®**



98% of the products are in the form of granules measuring 2-5 mm

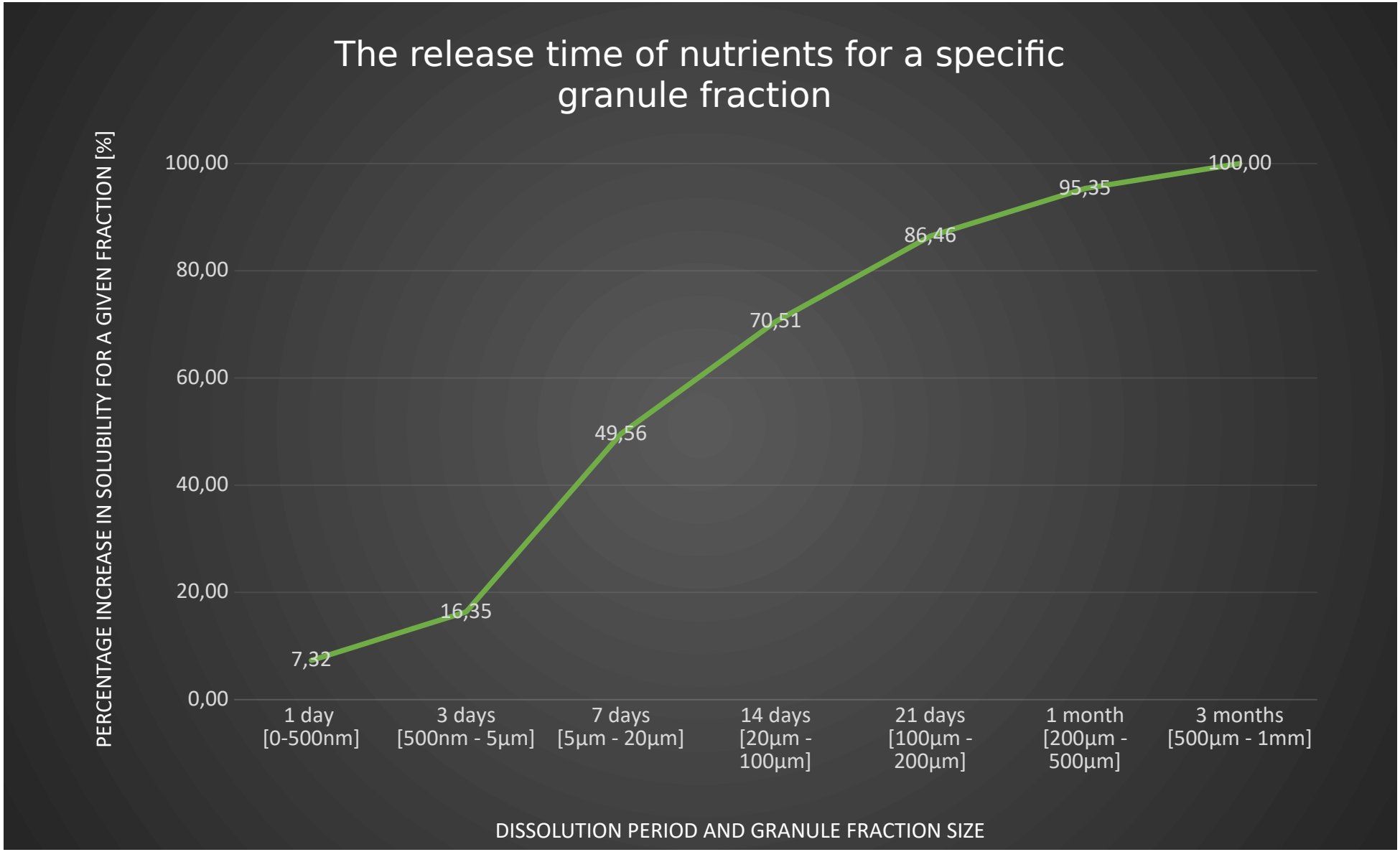
ICL, POLYHALITE – crushed rock

Technology G2D™

GoudenKorrel® products

GoudenKorrel®

Solubility of nutrients contained in particles of various fractions within a single granule of mineral fertilizers based polyhalite



*assuming normal rainfall

GoudenKorrel®

RESULTS OF USING THE MINERAL FERTILIZER BELENUS® AS A SOURCE OF SULFUR ENRICHED WITH POTASSIUM, MAGNESIUM, AND CALCIUM.

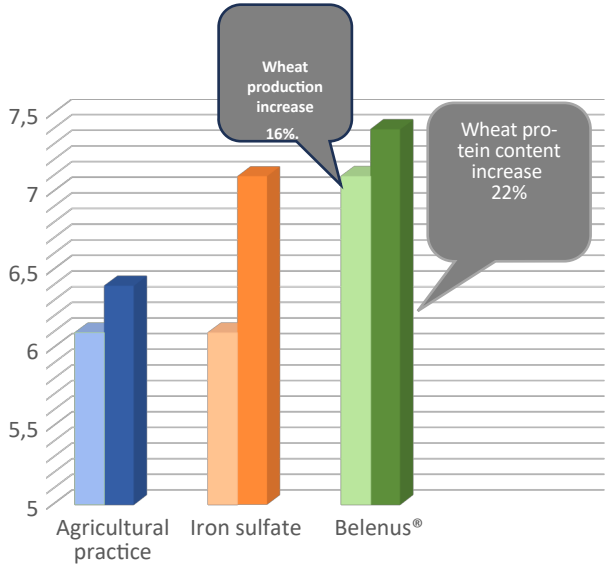
Wheat

Clayey soil, pH 7,4

Sowing: December 21, 2021
Harvest: July 27, 2022

Province of León, Spain

* NDVI Index
* Dosage
* Grain protein content
* Grain specific weight



*Belenus significantly increased biomass, as measured by the NDVI method, both during the budding and flowering stages.
*An extraordinary increase in wheat production was observed with the use of Belenus® by +16%, compared to iron sulfate.
*The protein content in wheat fertilized with Belenus showed a significant improvement: an increase of 0.8%, representing an 8% increase compared to iron sulfate, and a significant increase of 2.2% (a 22% increase) compared to traditional agricultural practice.
*Belenus® increased grain specific weight by 1.7% compared to iron sulfate and by 2.1% compared to the common method used by the farmer.

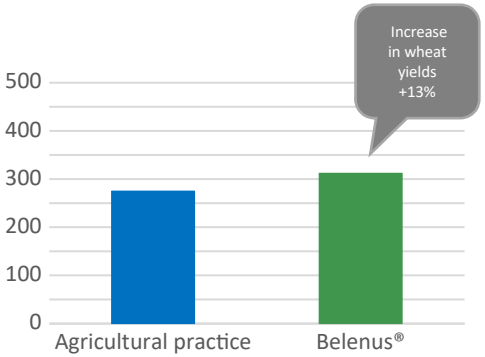
Tomato

Fertile Soil

May 2020

Voivodeship of Lublin, Poland

* Yield per plant
* Dosage



Given the use of the Belenus fertilizer, there was an increase of 13 kg in plant yield, while with standard agricultural practice, the increase was 10 kg. The shelf life for consumption was 12 days with the use of the Belenus fertilizer and 8 days with standard agricultural practice. The production per hectare was 312 quintals with the use of the Belenus fertilizer and 275 quintals with standard agricultural practice.

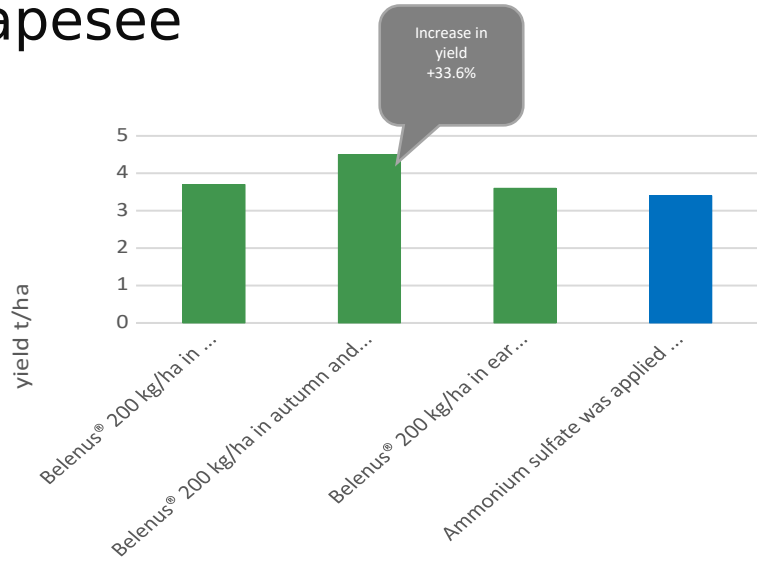
Rapeseed

Sandy clay

United Kingdom

2018

*Dosage



*The use of the Belenus fertilizer increased the amount of harvest in each case compared to standard agricultural practice.

GoudenKorrel®

OUR PRODUCTS

.....

Our common goal is to maximise the beneficial power of **polyhalite**!

INORGANIC FERTILIZER (PFC1(C)(I)(a)(ii)) NPK(Ca, Mg, Na, S) MULTI-COMPONENT SOLID INORGANIC MACRONUTRIENT FERTILIZER 12,11,18(+4+1.5+1+29)

MINERAL FERTILIZER (PFC1(C)(I)(a)(i)) K(Ca, Mg, Na S) SIMPLE SOLID INORGANIC MACRONUTRIENT FERTILIZER 12(+19+5,5+6,5+42)

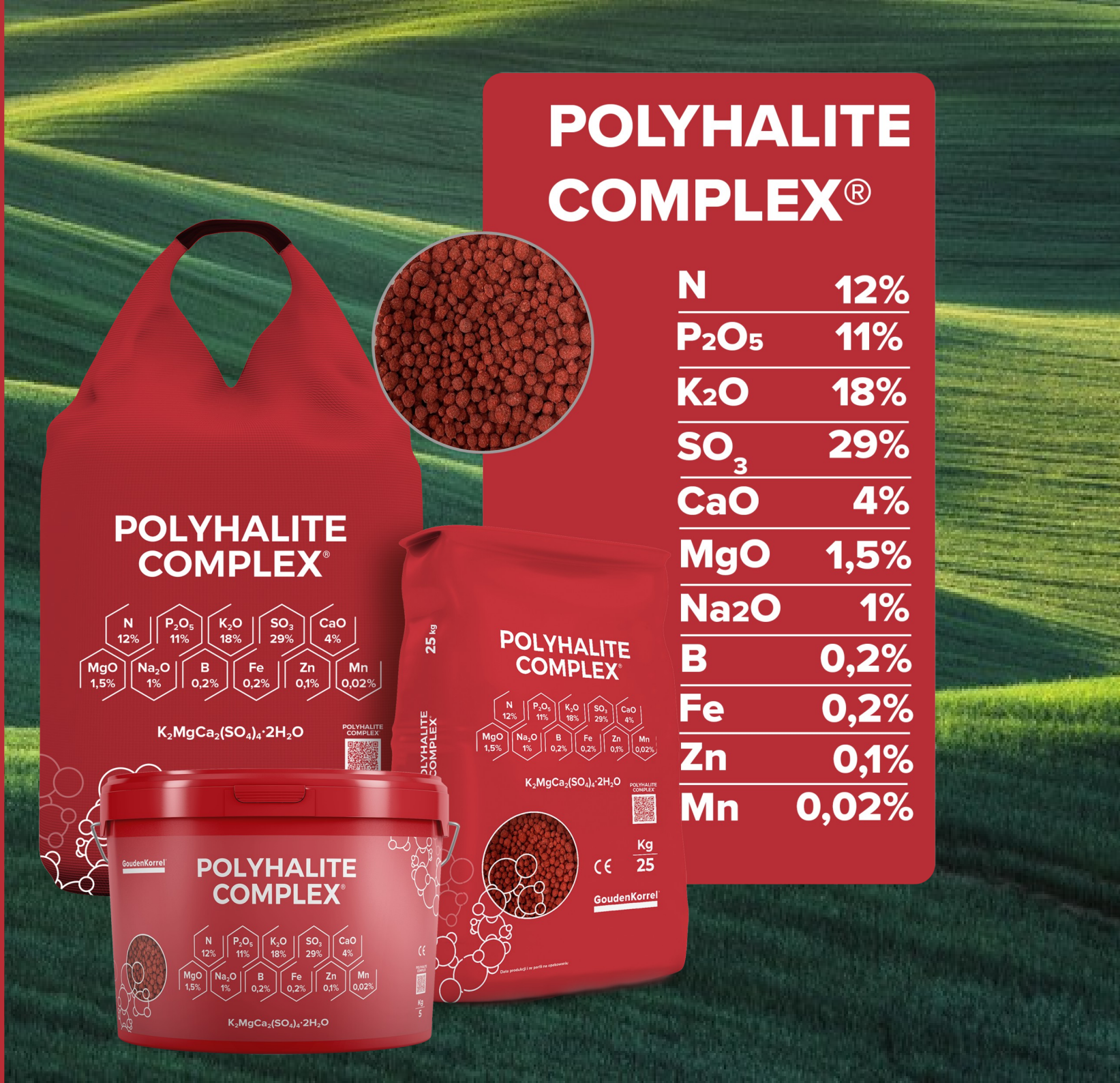
MINERAL FERTILIZER (PFC1(C)(I)(a)(i)) K(Ca, Mg, Na, S) SIMPLE SOLID INORGANIC MACRONUTRIENT FERTILIZER 30(+15+3+5,5+22)

MINERAL FERTILIZER (PFC1(C)(I)(a)(i)) K(Ca, Mg, Na, S) SIMPLE SOLID INORGANIC MACRONUTRIENT FERTILIZER 5,5(+15+21+1,8+22)

GoudenKorrel®

POLYHALITE COMPLEX®

MACRONUTRIENTS POWERFUL FERTILIZER



6 reasons to choose

POLYHALITE COMPLEX

1. Complete composition of up to 11 fertilizer components

2. Created on the basis of several years of experience with polyhalite

3. Fully soluble in water

4. Chloride-free composition

5. Polyhalite as a urease inhibitor supercharges nitrogen efficiency

6. Patented formulation using an unique technology

BELENUS® ECOLOGICAL

MINERAL FERTILIZER

6 reasons to choose

BELENUS®

1. Eco SOP = granulated fertilizer based on milled chloride-free polyhalite

2. A safe source of natural sulfur, potassium, magnesium and calcium for ecological farming

3. High solubility and extended plant availability

4. No effect of acidification, salinity and elimination of soil bacterial flora substance pH: 7,7

5. For use before sowing and top dressing, also for ecological farming & gardening

6. Patented formulation

ECO CERTIFICATE

Instytut Uprawy
Nawożenia i Gleboznawstwa
Państwowy Instytut Badawczy

Puławy, 2022.08.18

Your letter from 01August 2022
Our sign: NŻN.501.387.2022.JT

Certificate of the qualification of the product for use in organic farming

issued for: GoudenKorrel S.A.

At the request of the producer: GoudenKorrel S.A., in accordance with Regulation (EU) 2018/848 and Regulation (EU) 2021/1165, EC fertilizer BELENUS - straight solid inorganic macronutrient fertilizer PFC 1(C)(I)(a)(i), was qualified by IUNG-PIB in Puławy for use in organic farming.

The product is included in the list of products qualified for use in organic farming under number NE/647/2022.

The certificate is not a guarantee of utility value and quality of the product. The party responsible for it, is GoudenKorrel S.A.

The certificate expires when the production technology (raw material composition or source of raw materials, etc.) changes and significantly affects properties of the product. The manufacturer is obliged to immediately inform IUNG-PIB in Puławy of any such modifications.

The certificate shall be withdrawn if facts about the adverse effects of the product on the environment, human or animal health, or non-compliance with the applicable regulations on organic farming, unknown at the date of issue, are discovered.

Issued to: GoudenKorrel S.A.

dr inż. Tamara Jadczyszyn

Kierownik Zakładu
prof. dr hab. Anna Podleśna

Institute of Soil Science and Plant Cultivation – State Research Institute
Department of Plant Nutrition and Fertilization
Contact person: Tamara Jadczyszyn
Phone: +814786832, +48 516 203 554
e-mail: tj@iung.pulawy.pl

ul. Czartoryskich 8, 24-100 Puławy
tel.: +48 81 47 86 700, +48 81 47 86 800
www.iung.pl, e-mail: iung@iung.pulawy.pl
NIP: 716-000-42-81

OF&G
Approved Inputs
Scheme

Certificate of Evaluation for Compliance

This is to certify that the products or services listed below comply with the OF&G Standards (incorporating EC Regulation 834/2007) and are approved for use in Organic Systems:

GoudenKorrel S.A.

ul. Sienkiewicza 82/84, 90-318 Łódź, Poland
Tel: +48 887 098 800

Product Approved for Restricted Use - Approval Required

Fertilisers	Belenus®

Registration Number: UKE1864 **Renewal Month:** 06 (June)

Date Issued: 19 June 2023 **Certificate Expiry Date:** 30 June 2024

Signed by: J Gadsbey Julie Gadsbey - Certification Officer

This Certificate remains at all times the property of OF&G
Old Estate Yard, Shrewsbury Road, Albrighton, Shrewsbury, Shropshire, SY4 3AG
Tel: 01939 291800 Email: info@ofgorganic.org

VERVACTOR®
MINERAL POTASSIUM FERTILIZER

6 reasons to choose

VERVACTOR®

1. High proportion of potassium in combination with sulfur and calcium with magnesium and sodium

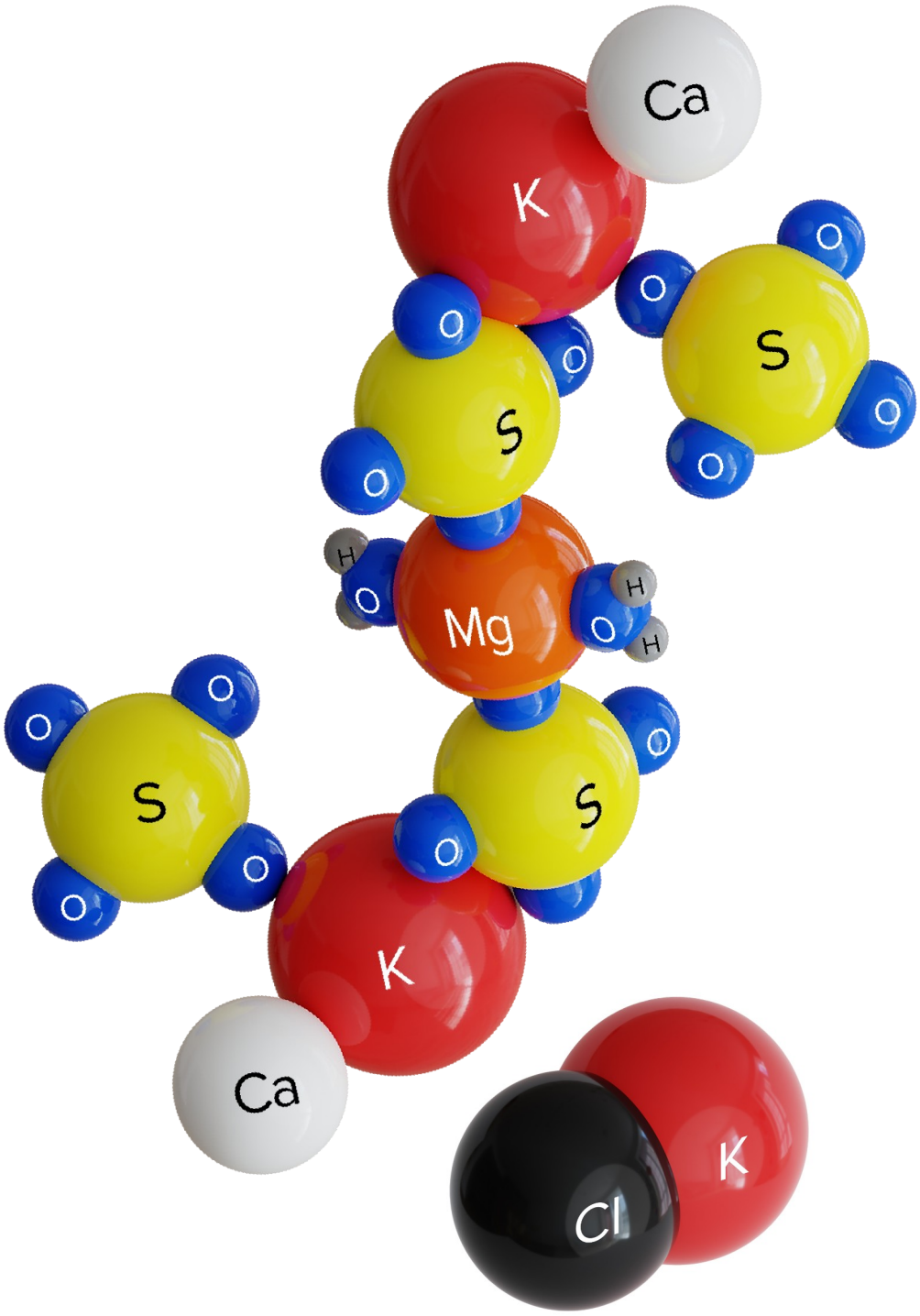
2. Reduced content of toxic chlorides - only 16.5% (potassium salt 46%)

3. For use before sowing and top dressing, on agricultural and vegetable crops

4. High solubility and extended availability to plants

5. No effect of salinity and acidification of the soil

6. Patented formulation



VERVACTOR® fertilizer is made from natural rock, specifically polyhalite, with the addition of potassium salt. As a result, its composition contains both sulfate and chloride elements, leading to a lower degree of salinity compared to similar fertilizers of this type.

Low chloride content – 16,5%

GoudenKorrel®

POLISULMAG®

MAGNESIUM SULPHATE MINERAL FERTILIZER

6 reasons to choose

POLISULMAG®

1. High magnesium and sulfur ratio with added potassium, calcium and sodium

2. Minimum content of toxic chlorides

3. High solubility and extended plant availability

4. No effect of soil salinity and acidification

5. To be used before seeding and top dressing, in agricultural, vegetable and horticultural crops

6. Patented formulation

ECO CERTIFICATE

Instytut Uprawy
Nawożenia i Gleboznawstwa
Państwowy Instytut Badawczy

Puławy, 04.09.2023

Our sign: NŻN.501. 345.2023

GoudenKorrel S.A.
ul. Sienkiewicza 82/84, 90-318 Łódź

Certificate of the qualification of the product for use in organic farming

issued for: GoudenKorrel S.A.

At the request of the producer: GoudenKorrel S.A., in accordance with Regulation (EU) 2018/848 and Regulation (EU) 2021/1165, CE fertilizer **PoliSulMag** - straight solid inorganic macronutrient fertilizer PFC 1(C)(I)(a)(i), was qualified by IUNG-PIB in Puławy for use in organic farming.

The product is included in the list of products qualified for use in organic farming under number NE/730/2023.

The certificate is not a guarantee of utility value and quality of the product. The party responsible for it, is GoudenKorrel S.A.

The certificate expires when the production technology (raw material composition or source of raw materials, etc.) changes and significantly affects properties of the product. The manufacturer is obliged to immediately inform IUNG-PIB in Puławy of any such modifications.

The certificate shall be withdrawn if facts about the adverse effects of the product on the environment, human or animal health, or non-compliance with the applicable regulations on organic farming, unknown at the date of issue, are discovered.

Issued to: GoudenKorrel S.A.

dr inż. Tamara Jadczyszyn

Kierownik Zakładu
prof. dr hab. Anna Podleśna

Institute of Soil Science and Plant Cultivation – State Research Institute
Department of Plant Nutrition and Fertilization
Contact person: Tamara Jadczyszyn
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OF&G
Approved Inputs
Scheme

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GoudenKorrel S.A.

ul. Sienkiewicza 82/84, 90-318 Łódź, Poland
Tel: +48 887 098 800

Product Approved for Restricted Use - Approval Required

Fertilisers	Belenus®
Fertilisers	POLISULMAG®

Registration Number: UKE1864 **Renewal Month:** 06 (June)
Date Issued: 16 October 2023 **Certificate Expiry Date:** 30 June 2024
Signed by: J Gadsbey Julie Gadsbey - Certification Officer

This Certificate remains at all times the property of OF&G
Old Estate Yard, Shrewsbury Road, Albrighton, Shrewsbury, Shropshire, SY4 3AG
Tel: 01939 291800 Email: info@ofgorganic.org









GoudenKorrel® fertilizers are dedicated to all types of crops and soils!







EXPORT TEAM :

Misael Machado
Export Sales Director
machado@goudenkorrel.com
+48 663 606 040

Compound Fertilizers
Production Plant
Kaliska, Fabryczna
Street, 5
87-840 Lubień
Kujawski, Poland