

PRODUCT KNOWLEDGE · SECONDARY NUTRITION

Green Sulfur

Elemental sulfur 70% · water-dispersible granule

Elemental sulfur as a water-dispersible granule — a secondary nutrient and a root-zone conditioner in the same bag, on soil that is too alkaline for either.

PS 5449-2020

Licence CM/L-2962/2023

1 kg & 20 kg

WDG



THE PROBLEM

Sulfur is the fourth nutrient, and almost nobody applies it.

Reported sulfur deficiency in agricultural soils.



Figures as cited in VAN's Green Sulfur product-knowledge deck; see sources.

4th

most important nutrient by quantity

after nitrogen, phosphorus and potassium — for a crop like corn

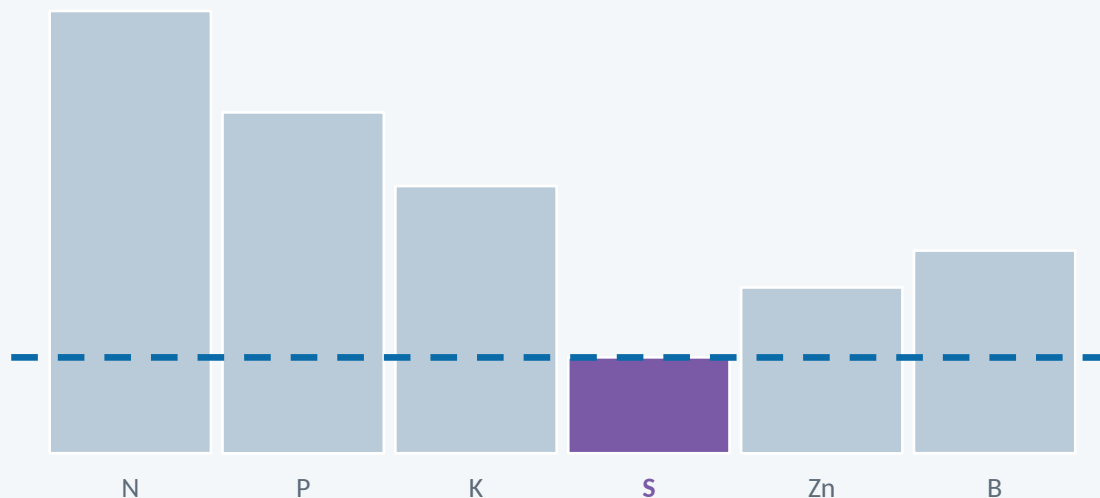
Sulfur is one of the seventeen elements essential to plant growth. It is also the one that fell out of fertilizer programmes when high-analysis products replaced the old sulfur-containing ones, and nobody noticed for a generation.



The deficiency grew because production grew. More tonnage off the field is more sulfur off the field, and nothing was putting it back.

The bucket fills to the height of the broken slat.

Carl Sprengel set the law out in 1840; Justus von Liebig made it famous. Imagine each slat is a nutrient. The water level can only reach the lowest one.



— the water line — what the crop actually yields

Nitrogen you already paid for

Nitrogen and sulfur are used together to build protein. A crop short of sulfur cannot finish the proteins the nitrogen started — so the nitrogen already bought and applied sits unused. Correcting sulfur is often the cheapest way to get value out of a nitrogen programme that is already being paid for.

The staves show the shape of the problem, not measured soil values. A soil test is what tells you your own — VAN Lab publishes its prices.

The plant can only take sulfate. So why sell elemental sulfur?

This is the question the product answers, and it is worth understanding before selling it.

Sulfate (SO_4^{2-})

The only form the root can absorb. Immediately available the moment it is applied.

- Available at once — no waiting
- Also mobile: an anion, so it leaches with water like nitrate does
- Can be gone before the crop's later demand arrives
- On irrigated ground, a single sulfate application may not last the season

Elemental sulfur (S^0)

Not available to the plant as applied. Soil microbes oxidise it to sulfate, progressively.

- Releases across the season instead of all at once
- Does not leach while it is still elemental
- The oxidation itself acidifies the soil around the granule
- Needs water, oxygen and warmth — and time

Neither form is better. They answer different questions, and a crop on irrigated alkaline ground usually needs the second one.

What decides how fast elemental sulfur becomes usable.

Oxidation is a microbial process. These are the conditions that speed it up — and Pakistan supplies the two that matter most.



Oxidation is faster in warm, moist soils with high organic matter, and fastest of all when the sulfur is finely divided. Alkalinity is not on that list: in a controlled comparison elemental sulfur oxidised FASTER in acid soil than in a slightly alkaline one (Mattiello et al., 2017). Pakistan supplies the warmth, irrigation supplies the water, and the one variable VAN controls is particle size.

Relative, not measured rates. The point is which conditions matter, not by how much — and alkalinity is the one most often assumed to help that does not.

THE PACK

What is actually in the bag.

Two pack sizes — 1 kg for horticulture, 20 kg for field crops.



Green Sulfur — 1 kg and 20 kg

ELEMENTAL SULFUR

70% minimum

WETTING AGENT

3 - 6% — what makes it disperse rather than float

DISPERSING AGENT

5 - 10% — what keeps the particles apart in the tank

FORM

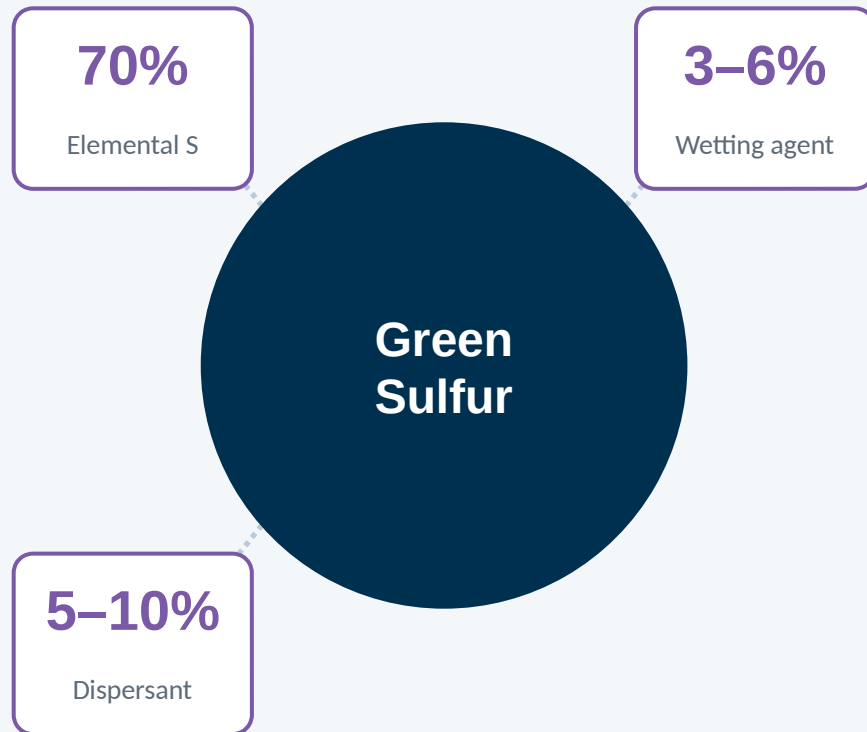
Water-dispersible granule (WDG) — a granule that becomes a suspension

STANDARD & LICENCE

PS 5449-2020 · PSQCA marks licence CM/L-2962/2023

What the label declares.

As registered under PS 5449-2020 and as published on van.com.pk.



FORM

WDG

water-dispersible granule — handles dry, applies wet

PACKS

1 kg · 20 kg

the crop plan quotes whichever pack suits that crop

ROUTE

Soil & foliar

also used through drone and ultra-low-volume systems

Oxidation is a surface reaction. That is the whole engineering problem.

Why particle size decides everything about an elemental sulfur product.

1 Surface area is the rate

Soil microbes can only oxidise the sulfur they can reach. The available surface — not the tonnage applied — sets how fast sulfate appears. Halve the particle size and you multiply the surface for the same weight.

2 A granule that stops being one

Fine sulfur cannot be spread: it drifts and it cakes. A water-dispersible granule is handled and stored as a granule, then breaks into fine particles the moment it meets water — you get both properties from one product.

3 Concentration matters too

Surface available for oxidation also depends on how concentrated the sulfur is in the granule, because a denser granule has less of its sulfur in contact with soil.

4 It acidifies as it works

The oxidation reaction itself lowers pH around the particle. On calcareous ground that is a second benefit: it is a recognised method of reducing soil pH and of reclaiming sodic soils.

The wetting and dispersing agents are what convert a storable granule into a fine suspension. They are the difference between a sulfur product and a bag of sulfur.

Sulfur is the nutrient that makes other nutrients work.

Established interactions between soil nutrients — after Mulder. These describe how nutrients behave with one another, not how Green Sulfur performs.



Works with

Sulfur and nitrogen improve each other's use efficiency — both are required to build protein, and neither finishes the job alone

Balanced sulfur also improves manganese uptake

Acidification around the oxidising particle frees phosphorus that free calcium had locked away

The same acidification improves zinc and iron availability on calcareous ground



Competes with

Excess sulfur reduces calcium, copper and molybdenum uptake — sulfur is not exempt from the rule that everything in excess suppresses something

Excess molybdenum reduces sulfur in return

Excess calcium suppresses sulfur along with almost everything else

Sulfate is an anion and leaches like nitrate; over-application on light irrigated soil is money into the groundwater

The N:S ratio is the practical number to watch. Protein quality — and therefore what a miller or a buyer pays — depends on it, not on nitrogen alone.

What sulfur is actually doing in there.

Six functions, none of which the plant can perform without it.

1 Amino acids

Cysteine and methionine are sulfur amino acids. Without sulfur the plant cannot make them, and therefore cannot make the proteins that use them

2 In every cell

Sulfur is part of every living cell in the plant

3 Photosynthesis

Required for the photosynthetic machinery to function

4 Oil content

Raises the oil content of seed — which is the entire value of an oilseed crop

5 Protein & forage

Raises protein percentage in the plant and in the harvested produce, and improves forage quality through a balanced N:S ratio

6 Winter hardiness

Contributes to the crop's ability to survive cold — relevant to Pakistan's rabi season

Sulfur deficiency is mistaken for nitrogen deficiency. Here is how to tell.

General agronomy, not a VAN measurement — and this is the single most useful diagnostic distinction in the whole product range.

1 They look identical

Both show as stunted plants with a general yellowing. In the field they are confused constantly

2 Sulfur: YOUNGEST leaves

Sulfur is immobile in the plant, so it cannot be moved to new growth. Deficiency appears on the youngest leaves first

3 Nitrogen: OLDEST leaves

Nitrogen is mobile, so the plant strips old leaves to feed new ones. Deficiency appears on the oldest leaves first

4 The confirming test

Sulfur symptoms persist even after nitrogen is applied. If yellowing does not respond to nitrogen, look at sulfur

5 Pale yellow, not brown

Leaves go pale-yellow or light-green rather than scorched

6 Whole-plant

Uniform paleness across the newer growth rather than a pattern between the veins

WHERE IT IS USED

Across field crops and horticulture.

Green Sulfur appears in VAN's published crop programmes and is one of the products already supplied in drone and ultra-low-volume grades.

Wheat

Maize

Cotton

Sugarcane

Rice

Potato

Onion

Garlic

Canola

Sunflower

Soybean

Chili

Tomato

Orchards

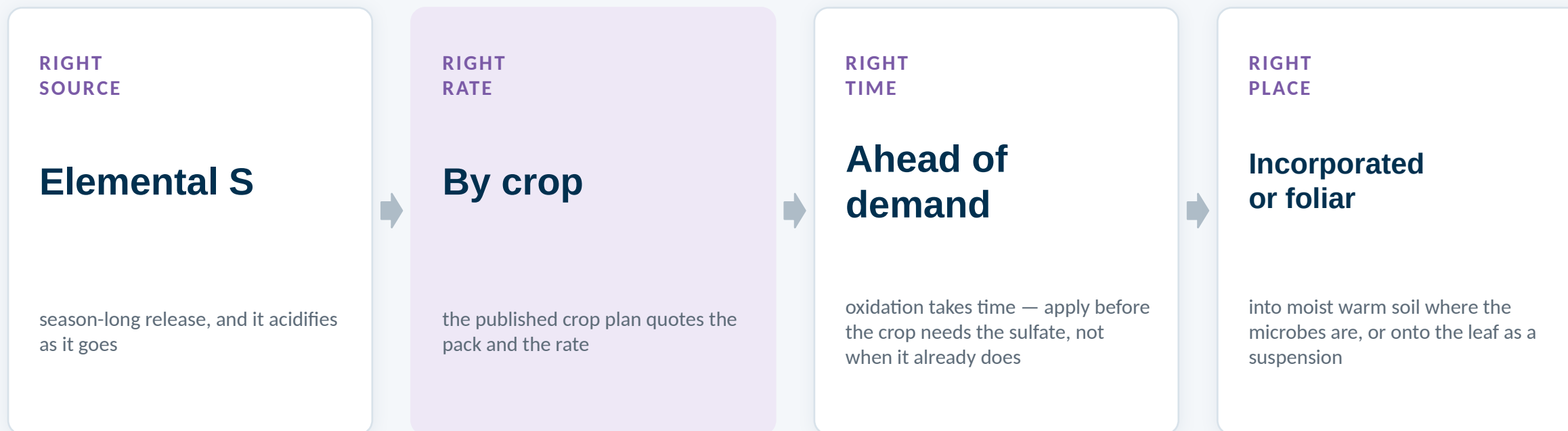
The crop plans quote whichever pack suits the crop — 1 kg for some, 20 kg for others. Both pack sizes genuinely exist; that was confirmed on 17 August 2026.

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Green Sulfur 70% WDG is one of six VAN products already in commercial production in drone and ultra-low-volume grades.

Right source, right rate, right time, right place.

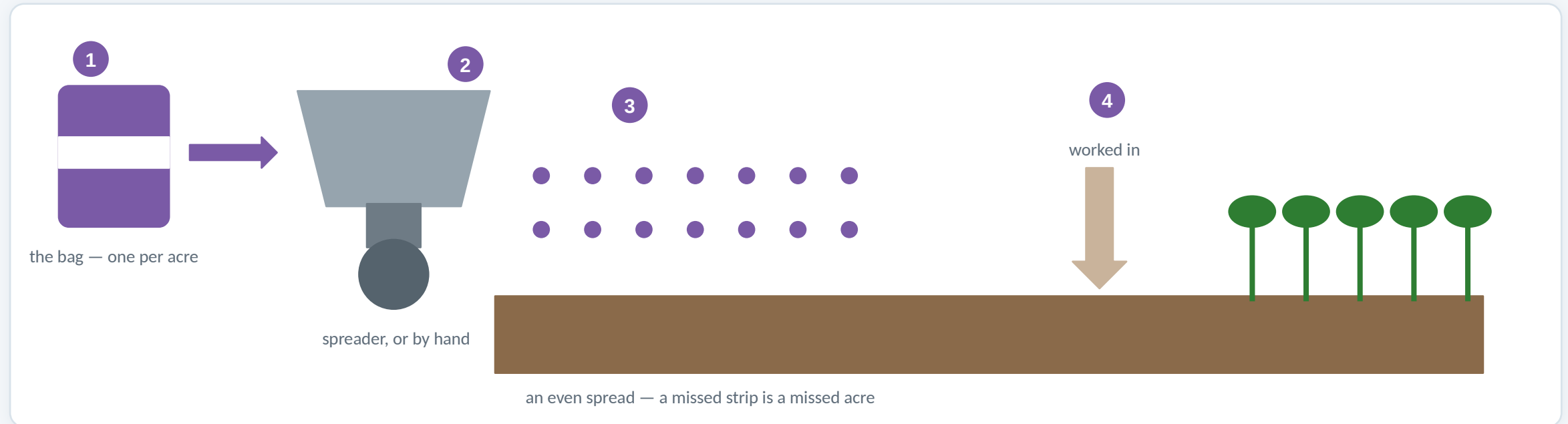
Elemental sulfur needs lead time. That single fact drives the whole schedule.



If the requirement is immediate, a sulfate source is the correct answer and elemental sulfur is the wrong one. Knowing which question is being asked is the job.

An even spread, then worked in.

Elemental sulfur has to be oxidised before the crop can use it. Apply early.



1 Measure it

By crop, per the published plan.

2 Spread evenly

Spreader or by hand. A missed strip is a missed acre and it shows at harvest, not on the day.

3 Work it in

Incorporate into the root zone. Material left on the surface is not where the roots are.

4 At the right stage

Ahead of the sulfur demand window — oxidation takes time.

Doses are per acre, from VAN agronomy. Incorporation is not optional — it is the difference between feeding the crop and feeding the surface.

Four things that decide whether it works.

1

Give it time

Elemental sulfur is not plant food on the day it lands. It becomes plant food when microbes oxidise it. Apply ahead of the demand, not into it.

2

Keep it moist and warm

Oxidation needs water and oxygen. Dry soil stops the process; waterlogged soil removes the oxygen. Irrigated warm ground is ideal.

3

Do not confuse it with nitrogen

A pale crop that does not respond to nitrogen is telling you something. Check the youngest leaves.

4

Watch the N:S ratio

Sulfur's value is largely in what it lets nitrogen do. Balance the two rather than maximising either.

What is behind the bag.

1

PS 5449-2020

Registered against the Pakistan Standard for the product class.

2

Licence CM/L-2962/2023

PSQCA marks licence, printed on the pack. ⚠ This licence carries an expiry of 30 September 2026 — check the renewal before quoting it.

3

Tested before it ships

Every batch is tested in VAN's own PNAC-accredited laboratory, ISO/IEC 17025:2017, LAB-336.

4

Certificate on request

Send the batch number off the bag and VAN will send the certificate of analysis for that batch. Free, no sample, no form.

Four reasons, and none of them is a yield claim.

1

Season-long, not one-shot

Elemental sulfur releases as microbes oxidise it, instead of arriving all at once and leaching away.

2

It works better here

Oxidation is faster in warm, moist soil with active biology, and fastest when the sulfur is finely divided. Pakistan supplies the heat, irrigation supplies the water, and VAN controls the particle size.

3

Two jobs, one bag

A secondary nutrient and, in the few centimetres around each particle, an acidifier that can bring phosphorus and zinc held by alkalinity back into solution. A microsite effect, not a field one.

4

Handles dry, applies wet

A water-dispersible granule gives you storage and spreading as a granule, and fine-particle surface area in the tank.

SOURCES

Where every figure in this deck came from.

Analysis	SPECIFICATION SHEET OF GREEN SULFUR — elemental sulfur 70% min, wetting agent 3–6%, dispersing agent 5–10%
Standard and licence	van.com.pk — PS 5449-2020, CM/L-2962/2023
Deficiency prevalence	88% of grassland and 85% of arable soils — as cited in VAN's Green Sulfur product-knowledge deck
Sulfur as 4th nutrient	Same deck, in terms of quantity required by corn
Oxidation conditions	Established soil microbiology — warm, moist, high organic matter, fine particles. Alkalinity is NOT an accelerant: elemental sulfur oxidised faster in acid soil in a controlled comparison (Mattiello, da Silva, Degryse et al., 2017, doi:10.1021/acs.jafc.6b04586) — same finding the Vital Urea page publishes
Diagnostic distinction	Sulfur is immobile: symptoms on the youngest leaves, and they persist after nitrogen is applied
Nutrient interactions	After Mulder's chart — established relationships
⚠ Removed	All "MicroEssentials®" references — that is a registered trademark of The Mosaic Company and cannot describe a VAN product

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For information only. VAN may change a product's composition at any stage for agronomic, efficiency or upgrade reasons.