



PRODUCT KNOWLEDGE · MICRONUTRIENTS

VL-Micromix

Zn 5% · Fe 2% · Mn 2% · Cu 1% w/v

Four micronutrients in one litre. Hidden hunger is the deficiency that never shows you a symptom until it has already taken the yield.

PS 5469-2020

Licence CM/L-3129/2024

1 L

Foliar & fertigation



Vital Agri Nutrients (Pvt) Ltd · van.com.pk

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

THE PROBLEM

Two thirds of Pakistan's soils are short of zinc.

Percentage of Pakistani soils found deficient in each available micronutrient.

Zinc 64% of soils

Iron 19% of soils

Manganese 4% of soils

Copper 2% of soils

64%

of Pakistani soils are zinc-deficient

against 50% of the world's soils for zinc and 30% for iron

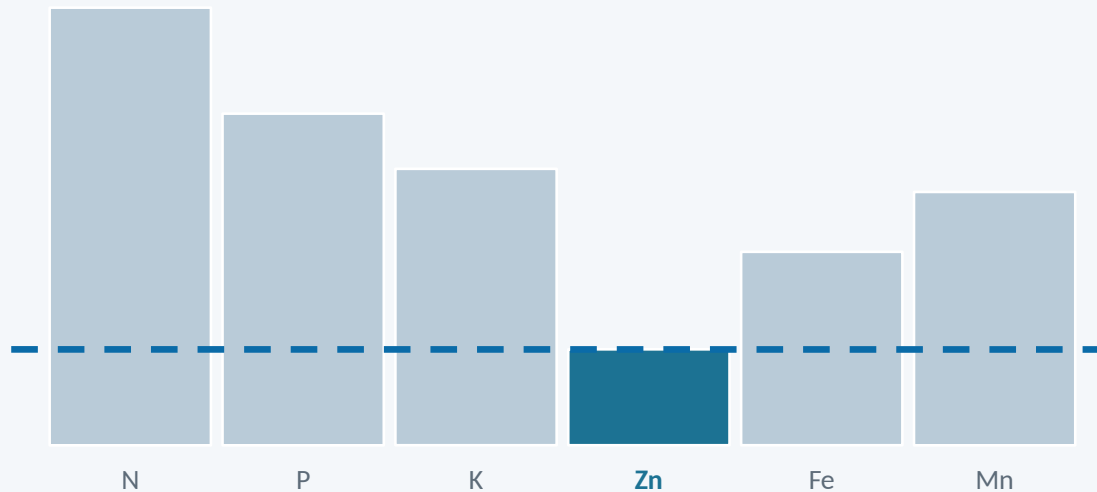
Zinc is not a marginal problem here. It is the single most widespread nutrient deficiency in Pakistani agriculture after nitrogen and potassium.



Micronutrients are needed in grams per acre, not kilograms. That is precisely why they get left out of a programme — and why leaving them out is cheap to fix.

The barrel does not care that the short stave is a small one.

Carl Sprengel set the law out in 1840; Justus von Liebig made it famous. A nutrient needed in grams limits yield exactly as hard as one needed in kilograms.



— the water line — what the crop actually yields

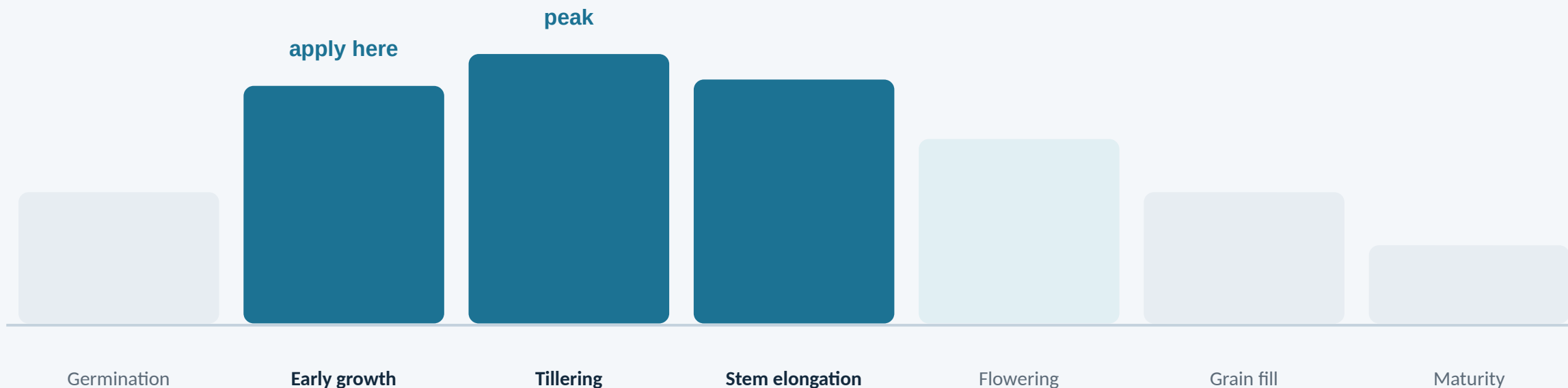
Grams, not kilograms

A grower can spend the entire fertilizer budget on the first three staves and lose the crop to the fourth. Zinc costs a fraction of a nitrogen programme and is short in two soils out of three. This is the cheapest stave in the barrel to lengthen.

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.

Micronutrients are needed early, while the plant is still deciding its size.

Relative micronutrient demand across a cereal season. The enzymes they activate are running hardest during vegetative growth.



VAN's published programme applies VL-Micromix at early to mid-life growth stages, across every crop in the plan — which is where the demand actually sits.

The band shows the shape of demand, not measured uptake for a named crop.

What is actually in the bottle.

One litre, four micronutrients, fully soluble.



VL-Micromix — 1 L

ZINC

Zn 5% w/v — 50 grams per litre

IRON

Fe 2% w/v — 20 grams per litre

MANGANESE

Mn 2% w/v — 20 grams per litre

COPPER

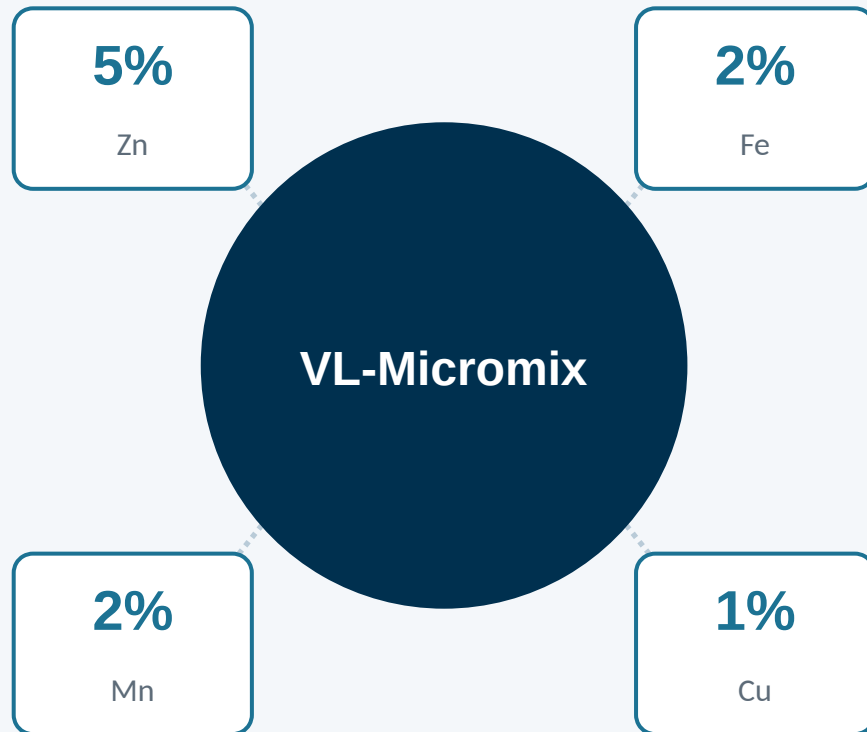
Cu 1% w/v — 10 grams per litre

STANDARD & LICENCE

PS 5469-2020 · PSQCA marks licence CM/L-3129/2024

What the label declares.

As registered under PS 5469-2020 and as published on van.com.pk.



CONCENTRATION

w / v

weight per volume — 50 g of zinc in every litre

SOLUBILITY

100% soluble

liquid formulation; foliar or fertigation

PACK

1 litre

one litre per acre in the published programme

Four metals that will not normally share a bottle.

What has to be solved to put zinc, iron, manganese and copper in one liquid.

1 They compete

Zinc, iron, manganese and copper compete with one another for uptake. A blend that ignores the ratios delivers one of them and wastes the other three. The ratio here is set against measured Pakistani deficiency, not split evenly.

2 Zinc leads for a reason

Zinc is at 5% and the others below it because 64% of Pakistani soils are zinc-deficient against 19% for iron and single figures for manganese and copper. The formulation follows the survey.

3 Held in solution

Micronutrient cations precipitate readily at alkaline pH — which is the condition of the soil and often of the irrigation water too. The formulation holds them in solution to the leaf.

4 One pass, four nutrients

Four separate micronutrient applications is four passes and four chances to get a rate wrong. One balanced liquid is one operation.

Where a soil test shows a single dominant deficiency, a single-nutrient product is the better answer — VAN makes V-Zinc and VL-Boron for exactly that case.

Micronutrients are where the antagonisms bite hardest.

Established interactions between soil nutrients — after Mulder. These describe how nutrients behave with one another, not how VL-Micromix performs.



Works with

Balanced potassium improves both iron and manganese uptake

Balanced manganese improves potassium and sulfur uptake in return

Balanced copper supports molybdenum, and molybdenum supports nitrogen and copper

An acidic delivery keeps all four cations in solution — the same principle behind VAN's acidic phosphate and its sulfur-coated urea



Competes with

Excess phosphorus reduces zinc, iron and copper — heavy DAP use is a common route into exactly the deficiency this product corrects

Excess calcium, the standing condition of a calcareous soil, suppresses zinc, iron, manganese and boron together

Excess zinc reduces iron and phosphorus; excess iron reduces copper, manganese and zinc — the four compete with each other as well

Excess manganese reduces iron and copper, which is why the ratios in a blend are the formulation and not an afterthought

Read the right-hand column and the phosphorus line explains most of Pakistan's micronutrient problem: decades of phosphate applied to calcareous ground.

What the four are actually doing.

None of them builds tissue. All of them run the machinery that does.

1 Zn — enzymes

Activates over three hundred enzymes; central to the synthesis of auxin, the hormone that governs growth

2 Zn — grain

Improves grain filling, root vigour and drought tolerance; also determines the zinc in the grain that people then eat

3 Fe — chlorophyll

Required for chlorophyll synthesis and for the electron transport that photosynthesis runs on

4 Mn — photosystem II

Vital to photosystem II activity, and activates the enzymes of nitrogen and carbohydrate metabolism

5 Mn — stress

Raises resistance to oxidative and environmental stress

6 Cu — lignin & pollen

Central to lignin formation, to reproductive development and to pollen viability — a copper-short crop flowers and sets badly

What hidden hunger looks like when it finally shows.

General agronomy, not a VAN measurement. By the time these are visible, yield has already been lost.

1 Zn — banding

Pale bands either side of the midrib on younger leaves; shortened internodes and small leaves

2 Fe — interveinal, young

Yellowing between green veins on the newest leaves — iron is immobile, so it starts at the top

3 Mn — interveinal, mid

Similar yellowing but on middle-aged leaves, with yellow spots and elongated holes as it advances

4 Cu — pale and narrow

Pale, narrow, twisted leaves with short darker veins; dieback of growing tips

5 The general case

Green veins on a yellow leaf almost always means a micronutrient. Which one depends on how old the leaf is

6 No symptom at all

The commonest case. Hidden hunger takes the top off the yield and never announces itself

In 16 of VAN's published crop programmes.

These are the programmes VAN publishes on van.com.pk, with a dose and a growth stage for each.

Wheat

Basmati Rice

Hybrid Rice

Potato

Garlic

Chili

Chickpea

Lentil

Mungbean & Mash

Sesame

Soybean

Sunflower

Turmeric

Strawberry

Guava

Banana — 1st year

16 crop programmes, published in full and free at van.com.pk/crops/.

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Sugarcane, maize, cotton and tomato also carry published stages for VL-Micromix — see the 4R slide.

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

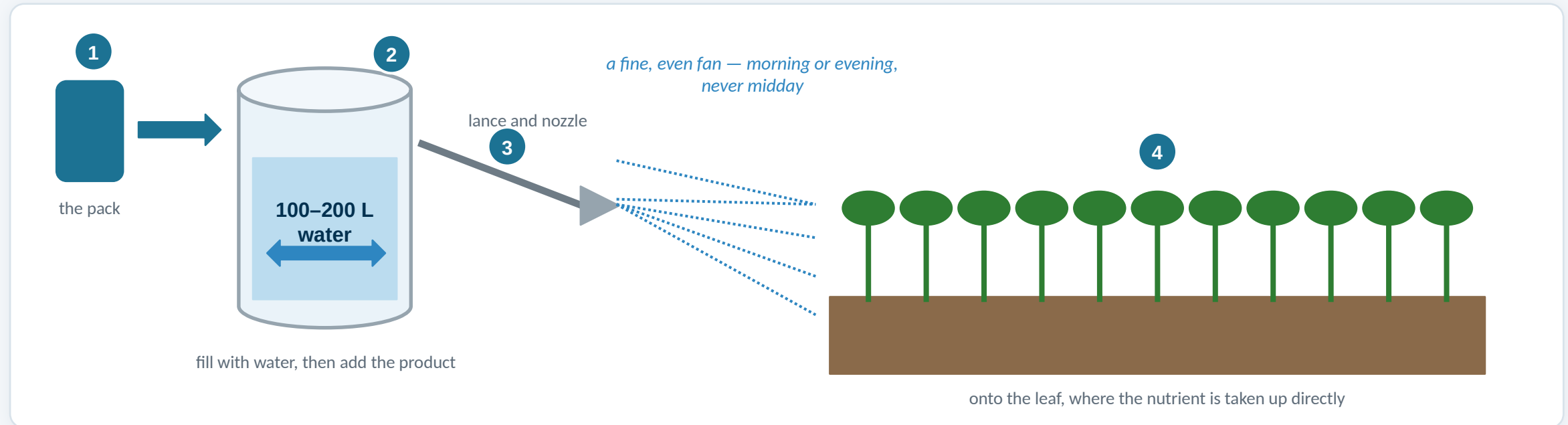
One product, one rate, one window — which is most of why it gets used.



Applying micronutrient cations to a calcareous soil surface is the least effective route available: the free calcium takes them straight back out of solution.

Water first, product second — never the other way round.

Micronutrients on the leaf bypass the calcareous soil that would lock them up.



1 Water first

100–200 L of clean water in the tank. Always water first, product second — never the other way round.

2 Add and keep agitating

1 litre per acre. A tank that settles sprays the last acre at a different rate from the first.

3 A fine, even fan

Cover the leaf without running off it. Morning or evening — midday is the wrong half of the day.

4 At the right stage

Early to mid-life, before the deficiency shows.

Doses are per acre, from VAN agronomy. The dilution is part of the rate: cutting the water to save a pass doubles the concentration on the leaf.

Four things that decide whether it works.

1

Foliar beats soil

On calcareous ground, a micronutrient applied to the soil is largely captured before the root reaches it. The leaf route bypasses the problem.

2

Early beats late

These nutrients run the enzymes of vegetative growth. Applied at flowering they are correcting a shortage that has already cost the crop.

3

Do not stack with phosphate

Phosphorus suppresses zinc, iron and copper. Separate the applications rather than tank-mixing a micronutrient into a phosphate.

4

Test before you specialise

If a soil test shows one dominant deficiency, a single product is better value. VAN makes V-Zinc and VL-Boron for that case.

What is behind the bottle.

1

PS 5469-2020

Registered against the Pakistan Standard for liquid nutrient supplements.

2

Licence CM/L-3129/2024

PSQCA marks licence, current, printed on the pack.

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 pack 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

Weighted to the deficiency

Zinc at 5% because 64% of Pakistani soils are short of it — the ratio follows the national survey, not a round number.

2

One pass, four nutrients

Four separate applications become one, with the ratios already resolved.

3

Fully soluble

Delivered as a liquid to the leaf or through the irrigation, rather than broadcast onto soil that will capture it.

4

Cheap relative to the loss

One litre per acre against a deficiency that takes the top off the yield without ever showing a symptom.

SOURCES

Where every figure in this deck came from.

Analysis, standard, licence

van.com.pk guaranteed-analysis table — Zn 5%, Fe 2%, Mn 2%, Cu 1% w/v, PS 5469-2020, CM/L-3129/2024

National deficiency figures

64% zinc, 19% iron, 2% copper, 4% manganese — as cited in VAN's VL-Micromix deck, references 1–3 of that deck

World figures

About 50% of world soils zinc-deficient, 30% iron-deficient — same source

Micronutrient roles

Standard plant physiology; the enzyme and photosystem functions are not manufacturer-specific

Nutrient interactions

After Mulder's chart — established relationships

Law of the minimum

Carl Sprengel (1840), popularised by Justus von Liebig

Doses and stages

van.com.pk/crops/ — 16 published programmes name VL-Micromix

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