SCIENTIFIC REVIEW • USER-SPECIFIC DECISION REPORT

Rose nutrition in Ratnagiri cinder media

Separate Monday nitrate and Thursday sulphate / phosphate feeds
Prepared 26 September 2026 • Calendar period: October 2026–September 2027

01 Executive conclusion

Your two-day system is physiologically plausible: a plant and its root medium do not reset their nutrient inventory every morning. Rose deprivation / resupply experiments support storage and changing uptake capacity. They do **not** prove that two feed events supply enough nutrition to heavily irrigated, low-retention cinder. [R2–R4]

Recommendation: retain the two separate days for a measured pilot, but test a lower-P, lower-ammonium, higher-calcium balance. Preserve approximately the same weekly N and K. Do not describe this as a proven "best rose formula," or as a complete formula before the Fe / trace labels are known.

02 What is good about the existing formula

It uses soluble, individually adjustable nutrient sources; nitrate-dominant Monday includes Ca and Mg; Thursday supplies P and S. Separate-day preparation avoids concentrated calcium contacting the concentrated sulphate / phosphate mix. Keeping plain-water irrigation responsive to plant demand can manage salts. These are strengths of the design, not proof that its current quantities are optimal. [U1, M1]

03 What concerns me

The Thursday solution contains about 113 mg/L elemental P, while the equal-volume weekly N input is about 37% ammonium-N. Calcium comes only on Monday; Mg and S inputs are substantial relative to Ca in the known fertilizer budget. Unknown iron plus unknown trace mix can duplicate Fe or introduce disproportionate Cu/Zn. Most importantly, concentrations alone do not reveal milligrams delivered per plant per week.

Scope: a targeted literature review, not a registered systematic review or meta-analysis. Original rose trials were prioritized. Some papers were accessible only as publisher abstracts; these are marked in the references. Manufacturer pages establish composition / compatibility, not efficacy. No blog, social media, YouTube or product-review claims were used to establish rose benefits.

Evidence key: HIGH = replicated rose evidence across studies for the stated principle; MODERATE = some rose evidence plus robust physiology; LOW = limited / indirect evidence or site transfer; SPECULATIVE = untested claim. Arithmetic confidence is separate: calculations are exact only for the assumed label analyses. The proposed grams and monthly factors have LOW local confidence until tested.

BUDGET RECONSTRUCTION • SECTIONS 4–6

What your current feeds contain

All values below exclude unknown Fe / trace products and nutrients already in the irrigation water or medium. Assumed commercial analyses must be checked against your bags. [U1, M1–M3, M7–M8]

Ingredient	Assumed analysis used
Potassium nitrate	13% N as nitrate; 46% K2O
Magnesium nitrate	11% N as nitrate; 9.5% elemental Mg
Calcium nitrate	15.5% N = 14.4% nitrate-N + 1.1% ammonium-N; 19% Ca
MgSO4·7H2O	9.8% Mg; 13% S
MKP	52% P2O5; 34% K2O
Ammonium sulphate	21% ammonium-N; 24% S

04 Monday nutrient analysis

05 Thursday nutrient analysis

Element / N form	Monday mg/L	Thursday mg/L
Total N	113.3	63.0
Nitrate-N	110.6	0.0
Ammonium-N	2.8	63.0
Elemental P	0.0	113.5
Elemental K	122.2	141.1
Calcium	47.5	0.0
Magnesium	28.5	58.8
Sulfur	0.0	150.0

Calculation: mg/L = grams of product × nutrient mass fraction × 1000 ÷ final litres. P = P2O5 × 0.4364; K = K2O × 0.8301. Example: 5 g MKP / 10 L × 0.52 × 0.4364 × 1000 = 113.464 mg/L P. These are elemental nutrients, not oxide percentages.

06 Weekly input is mass, not a new solution concentration

For each plant: **weekly fertilizer nutrient mass = $C_{Mon} \times V_{Mon} + C_{Thu} \times V_{Thu}$**, with C in mg/L and V in litres. Water nutrients enter with *all* irrigation; drainage exports some nutrients. Input is not identical to uptake.

At 1 L on each feed day: N 176.35, P 113.46, K 263.31, Ca 47.5, Mg 87.3, S 150 mg/plant/week. At 10 L on each day these masses are tenfold. The feed-only N average is 88.18 mg/L, but with another 5 L plain water, the fertilizer-derived all-water average becomes 25.19 mg/L. Neither value is a measured root solution.

NITROGEN AND PHOSPHORUS • SECTIONS 7–8

Do the rose experiments support it?

07 Nitrogen: dose, form and growth stage

Feigin et al. (1986): roses in volcanic tuff received 140 mg/L total N, 4–5 irrigations/day, with different ammonium fractions. The 25% treatment gave the greatest cumulative yield; higher fractions reduced summer yields, and much ammonium was nitrified. This supports a context-dependent nitrate/ammonium balance, not a universal zero-ammonium rule. Your once-weekly ammonium pulse is not the same exposure. [R1]

Cabrera et al. (1996): with pH and nitrification controlled, nitrate versus ammonium supply did not significantly change rose yield / quality in that experiment. Uptake also varied through the flowering shoot cycle. This is an important counterpoint: N form cannot be interpreted independently of root-zone pH and conditions. [R2]

Intermittent N deprivation increased subsequent short-term uptake, but longer deprivation reduced cumulative N acquisition. A separate study found nutrient-uptake plasticity after N, P or K withdrawal. These experiments explain why alternating supply can work; they do not prove a weekly feast / famine schedule is optimal. [R3, R4]

Inference for your garden: do not cut total N sharply just because "more N means fewer flowers." Plant size, light, cultivar, total water, leaching and stored nutrients change the optimum. The proposed trial redistributes N toward nitrate while keeping total weekly N almost unchanged. In pure, freely draining cinder, insufficient total weekly N can still be the dominant problem.

Growth-stage interpretation: avoid large N bursts to force basal shoots, but also avoid starving a flowering flush. Shoot appearance alone is not a reliable uptake meter. Nitrogen is not a guaranteed disease or aphid-control lever; this review found stronger directly useful evidence for thrips and mites, discussed in section 22. [R2, R11, R12]

08 Phosphorus / MKP: neither "more blooms" nor "less is always better"

Yu et al. (2007) compared 10, 20 and 40 mg/L P in recirculating miniature roses. The 40 mg/L treatment had the greatest shoot dry matter and P content. That finding argues against a universal claim that roses need only tiny P concentrations. It did not establish that 113 mg/L weekly pulses improve flower number. [R5]

Mattson and Lieth used a complete basal solution with about 15.5 mg/L P in one deprivation experiment; it was not a P optimum trial. Commercial rose soil-diagnostic research also documented nutrient imbalance / accumulation, but that observational setting cannot diagnose your pot medium. [R4, R6]

Candidate Thursday P is reduced from 113.5 to 34.0 mg/L. This is a deliberately testable reduction, not proof that the original caused toxicity or that 34 mg/L is ideal. High-P "bloom booster" escalation has no demonstrated advantage for this garden.

OTHER MACRONUTRIENTS • SECTIONS 9–12

Balance rather than extra ingredients

09 Potassium

K supports osmotic regulation and enzyme function; insufficient K can restrict shoot and flower quality, while excess K can complicate Ca/Mg uptake. A controlled rose K experiment found yield / stem-quality responses, with cultivar-dependent disease observations. Its area-based annual rates cannot be converted directly into your pot solution. [R7]

The existing program supplies 263.3 mg K per equal 1 L + 1 L cycle. Candidate B supplies 278.1 mg, a small increase, rather than removing large amounts of K when reducing MKP. Soluble SOP replaces P-associated K without adding N. Do not expect guaranteed color, flower size, drought resistance or disease suppression from extra K alone.

10 Calcium

Ca is important for cell walls, membranes and growing tissues; redistribution from older leaves is limited and delivery depends strongly on water flow. Consequently, more calcium nitrate cannot repair poor root oxygen or poor water delivery by itself. This physiology is strong general evidence, not a precise rose dose optimum. [R10]

Monday Ca rises from 47.5 to 95 mg/L in the candidate. That addresses the low Ca share of the known fertilizer budget, but water may already supply substantial Ca. A cinder garden irrigated frequently with low-Ca water may instead need Ca more often. Once-weekly sufficiency cannot be certified without water, drain and tissue data.

11 Magnesium

Both magnesium nitrate and Epsom salt provide the same Mg ion after dissolution; having two sources is not inherently wasteful. Mg is essential to chlorophyll and metabolism. Excess relative to other cations may disturb balance, but there is no single universally correct Ca:Mg:K ratio for all rose media.

Keep magnesium nitrate at 3 g/10 L rather than change it arbitrarily. Halve Epsom salt to reduce combined Mg and S. Weekly Mg falls from 87.3 to 57.9 mg per equal 1 L + 1 L cycle. Ca:Mg mass ratio changes from 0.54 to 1.64; this is a description, not a target backed by a direct rose trial.

12 Sulfur

S is necessary for sulfur-containing amino acids and proteins. Magnesium sulphate plus ammonium sulphate supply 150 mg/L S on the original Thursday. Candidate Thursday supplies 87 mg/L including SOP. This reduces sulfate-associated salt loading; it does not prove S toxicity was occurring.

Judgment	Evidence / limitation
K and Ca matter for growth and quality	MODERATE for rose-relevant mechanisms; low confidence in exact local grams.
Mg duplication can be adjusted	Arithmetic is clear; optimal amount depends on water / medium / tissue.
Less sulfate can reduce ionic loading	Chemically sound; final EC cannot be predicted from total fertilizer mass.
Universal “perfect” cation ratio	Not established for this collection. Avoid using a ratio as a diagnosis.

TRACE ELEMENTS AND N FORMS • SECTIONS 13–14

The unknown labels are consequential

13 Iron and micronutrients

0.5 g iron product in 10 L equals 50 mg product/L. It does not equal 0.5 mg Fe/L. Representative possibilities:

Iron label	Fe contributed by 0.5 g / 10 L
Fe-EDTA 12%	6.0 mg/L Fe
Fe-DTPA 11%	5.5 mg/L Fe
Fe-EDDHA 6%	3.0 mg/L Fe

Any Fe in the separate trace mix must be added. “Chelated micronutrients” does not identify the elemental percentages. A hypothetical 0.5 g/10 L dose of Naval Super Micro 7, using its website mass percentages, would add Fe 1.25, Mn 0.50, Zn 1.50, B 0.25, Cu 0.50 and Mo 0.05 mg/L. This is a calculation scenario, not a dose recommendation or confirmation that it is your current mix. The liquid density is needed to convert grams to mL. [M10]

For context, one professionally specified CalMag fertilizer at 1 g/L provides Fe 1.2, Mn 0.6, Zn 0.15, B 0.2, Cu 0.15 and Mo 0.1 mg/L. These are a product benchmark, not proven optimal concentrations for every rose. Increasing a Zn/Cu-rich blend merely to reach an Fe target can oversupply other elements. [M4]

Chelate selection: EDTA becomes less reliable as pH rises; DTPA is generally useful further into the near-neutral range; EDDHA is an option for persistently alkaline conditions. Use measured root-zone pH, not the color of the powder or water pH alone. Correct water / substrate causes rather than routinely combining all three chelates. [G2]

No definitive Fe or complete trace dose is justified without the exact labels. Do not blindly repeat 0.5 g iron + 0.5 g micro mix, and do not run a long-term cinder program with trace elements omitted.

14 Weekly NH4:NO3 calculation

Original equal-volume cycle: ammonium-N = 2.75 + 63 = 65.75 mg; nitrate-N = 110.60 mg. Thus NH4-N / total N = **37.28%**; NH4:NO3 by N mass is 0.595:1. Thursday alone supplies its known N entirely as ammonium.

Candidate equal-volume cycle: ammonium-N = 5.5 + 10.5 = 16.0 mg; nitrate-N = 157.0 mg. NH4 fraction = **9.25%**; NH4:NO3 = 0.102:1. This lower fraction is a cautious design choice for testing, not the demonstrated optimum of a Ratnagiri rose trial. If ammonium sulphate is omitted, recalculate: the candidate cycle contains 162.5 mg N and 5.5 mg ammonium-N. [R1, R2]

ROOT-ZONE MEASUREMENTS • SECTIONS 15–16

pH and EC are different questions

15 pH: water, alkalinity and root medium

Water pH describes its current acid/base state; alkalinity describes how strongly it resists acidification, often through bicarbonate. They are not interchangeable. Fertilizer solution pH is also not the same as root-zone pH. Ammonium uptake / nitrification tends to acidify; nitrate-dominant nutrition can drive pH upward, with the net effect dependent on the medium and water. [R1, G1, G2]

Working hypothesis: maintain root-zone pH around 5.8–6.5 while collecting data. Persistent values below roughly 5.5 or above 6.8 warrant investigation. These are conservative horticultural operating windows, not a newly proven cultivar-wide rose optimum.

Do not specify acid mL per tank before measuring alkalinity. Never add acid simply because source-water pH is above 7. First test alkalinity as mg/L CaCO3 or bicarbonate, plus Ca and Mg. With low alkalinity and falling root pH, the proposed ammonium sulphate is unnecessary or undesirable; omit pending review.

16 EC / salinity: use the right sampling method

Rose salinity responses vary by rootstock, salts and system. The reviewed rootstock study distinguishes feed-solution EC from saturated-media-extract EC. A soil-extract threshold must not be relabeled as a drainage or PourThru threshold. University monitoring guidance similarly requires method-specific EC interpretation. [R13, G1]

Measurement	Practical interpretation
Source-water EC	Measures background dissolved ions, not whether they are useful Ca/Mg or undesirable Na/Cl. Test ion composition if EC is appreciable.
Final mixed feed EC	Provisional mild pilot around 1.0–1.5 mS/cm including water. Measure each day separately; dilute if needed. This is not a universal ceiling or optimum.
Collected drainage	Standardize pot, pre-watering state, collection timing and volume. Watch persistent rise against your own baseline; an approximately +0.7 mS/cm rise is a review trigger, not proof of injury.
PourThru / 1:2 / saturated extract	Different dilution / extraction procedures. Record the method; do not compare their absolute numbers directly.

Calibrate pH and EC meters with appropriate standards. Check at similar temperature and use temperature compensation consistently. EC describes total conductivity: it does not measure individual nutrients, detect every toxic contaminant or confirm the correct nutrient ratio. The new Monday has more salts than the old Monday even though the total weekly dry mass is lower.

FERTILIZER CHEMISTRY • SECTION 17

Dry storage is not dilute-water mixing

17 Compatibility and preparation

Situation	What follows chemically
Bulk dry nitrate premix	Calcium / magnesium nitrate can be moisture-sensitive; mixtures can cake or segregate. Initial moisture remains even in an airtight container. Keep original salts separately as the default.
Bulk dry sulphate / phosphate premix	No inevitable violent reaction follows from the recipe, but storage humidity, particle segregation and impurities affect uniform dosing. Small fresh portions are more defensible than a months-long mixed batch.
Concentrated Ca + sulphate / phosphate	Precipitation risk is real. Keep calcium-rich concentrated solutions away from concentrated MKP / sulphate solutions. Your different-day workflow avoids this contact.
Fully diluted final irrigation	Compatibility depends on final ion activities, source-water Ca, pH, temperature and chelation. Stock incompatibility does not mean every dilute mixture will precipitate.

These are chemistry / handling conclusions, not evidence that a specific storage duration is safe. Hygroscopic compatibility literature and manufacturer calcium-nitrate instructions support the distinction. A generic chart cannot certify an unknown Fe blend or a humid Ratnagiri storage environment. [G3, M1]

Preparation sequence: use a clean labeled vessel with most of the final water already in it. Weigh each identified salt separately. Dissolve one at a time in a small separate portion of water, then add to the main, already dilute volume with stirring. Top up to 10 L final volume, mix, then measure pH / EC. Never combine small concentrated “ingredient solutions” with one another before dilution.

First test the actual ingredients in the actual source water at the same final concentrations. Inspect for haze / sediment after mixing and again later; a clear jar does not prove nutrient adequacy or long-term chelate stability. High-pH water can change phosphate precipitation risk, including on the calcium-free Thursday because the source water may contain calcium.

Use promptly rather than store mixed dilute feed in the sun. Rinse equipment between feed days. Flush delivery lines only enough to clear their residual feed volume; do not turn line rinsing into excessive root-zone leaching. Use suitable irrigation filtration and inspect emitter uniformity.

Do not add Naval products, pesticides, copper formulations or silicate to either fertilizer mix without product-specific compatibility evidence. These recipes are for root application, not foliar sprayers. Keep salts dry, labeled and away from children, heat, fuel and incompatible materials; follow each product SDS.

CINDER AND AUTOMATION • SECTION 18

Water delivery may be the limiting factor

18 Irrigation analysis

Your current statement confirms cinder, but not whether it is pure cinder or mixed with soil, cocopeat or manure. Do not equate coal-derived cinder, crushed brick and volcanic tuff. The N-form rose study used porous volcanic fragments; it does not establish the chemistry of your material. Test pH / EC, fines, drainage and water retention; establish the source before deciding whether contaminant screening is appropriate. [U1, R1]

A rose root-oxygen experiment found lower shoot performance in low-air-porosity media. Conversely, research on soilless roses emphasizes that water availability depends on hydraulic properties, not merely whether a pot feels damp. Frequent small pulses can be appropriate in coarse media, but continuously saturated fine pockets can still be harmful. [R8, R9]

Emitter calibration: collect output from at least 10 representative emitters for 1 minute. Record the average and range. Repeat at the beginning, middle and far end of a line. Convert seconds into litres with:

L/pot/day = [emitter mL/min × run seconds ÷ 60 × runs/day × emitters/pot] ÷ 1000.
Example: 2 L/h × 50 seconds × 6 runs = 0.167 L/pot/day for one emitter. This is an illustration, not a rose water recommendation.

Pot weighing: wet the medium uniformly, allow free drainage, then record the reference wet weight. Weigh again before the next irrigation. Short-term 1 g weight change approximates 1 mL water loss. Do not treat a fixed percentage of total pot mass as available water; heavy cinder and pot mass distort that calculation. Recheck as plants grow.

Choose the next pulse from measured drawdown, plant size and weather. Stop irrigation when rainfall already meets demand; keep drainage holes open and avoid standing runoff. Root hypoxia is not corrected by more fertilizer. Short pulses that bypass dry zones can waste nutrients without wetting all roots.

A 10–20% leaching fraction can be an initial dry-weather audit reference, not a requirement at every irrigation. Calculate collected drainage ÷ applied water using representative pots. Minimize runoff while preventing accumulation. Rain-exposed monsoon pots do not need an automatic weekly flush. This fraction is a management hypothesis, not a site-calibrated rose optimum.

If confirmed low-retention cinder receives substantial plain-water leaching between feed days, test more frequent dilute complete nutrition rather than ever-larger weekly pulses. That would be a deliberate, data-led strategy change, not a reinterpretation of your current system.

Timer ambiguity: literal “every 23 hours” moves the next run 1 hour earlier each day; it cannot remain fixed to morning. “Every 2–3 hours” is a different program. Neither is automatically correct. Prefer rain shutoff and moisture-responsive daytime operation. Avoid extending overnight leaf wetness with routine foliar sprinkling.

LOCAL SEASONS • SECTIONS 19–20

Twelve months, not one fixed strength

19 Ratnagiri climate and seasonal adjustment

Official IMD normals below are for **1981–2010**, not a forecast or claim to be the latest climate-normal series. Historical meteorological descriptions identify humid conditions and heavy monsoon cloud; precise current monthly RH / solar-radiation values were not verified. [C1, C2]

Month	Min / max °C	Rain mm	Pilot strength
January	19.1 / 31.7	0.3	100%
February	19.4 / 31.5	0.1	100%
March	21.9 / 31.8	0.3	75%
April	24.5 / 32.3	2.1	75%
May	26.2 / 32.9	43.8	75%
June	24.9 / 30.5	869.5	50%
July	24.4 / 29.0	972.5	50%
August	24.1 / 28.6	723.3	50%
September	23.8 / 29.4	364.9	50%
October	23.5 / 32.2	123.6	75% → 100%
November	22.0 / 33.6	17.0	100%
December	20.2 / 32.8	0.8	100%

Monthly factors are **garden-management hypotheses**, not treatment optima established by the weather table. Apply the factor to both feed recipes. First two trial weeks remain at 75% or the lower seasonal factor. Mild December nights do not mean November daytime heat disappears. [C1]

20 Monsoon plan

June–September supplies about 94% of the historical annual rainfall. Reduce or stop automatic irrigation when pots are already wet. On a drained, growing plant, a 50% feed is a starting point; skip during saturation, root decline or heavy rain that would immediately wash it out. Do not double the next dose. [C1; inference]

Rain can also deplete nutrient supply. Therefore, “no fertilizer for all four months” is not a scientifically justified blanket rule. Rain-sheltered, strongly growing pots may need a higher monitored rate. Cloud reduces demand, while drainage removes nutrients: weigh both instead of responding to rain with either more fertilizer or permanent starvation. Maintain air movement and avoid unnecessary prolonged leaf wetness; this report does not prescribe disease medicines.

OPTIONAL PRODUCTS AND PESTS • SECTIONS 21–22

Nutrition first; extras need evidence

21 Biostimulants and your Naval products

Nutrition supplies essential elements; biostimulation describes other effects on plant processes or stress responses. One small rose humic-acid / regulator trial reported growth and flower responses, and a recent damask-rose experiment tested biostimulants during drought. Neither validates a Naval mixture, routine monthly stacking, more basal shoots or a seaweed product in wet Ratnagiri pots. [R14, R15]

The drought experiment included freshwater Chlorella, not an Ascophyllum seaweed extract, and focused largely on stress physiology. For fulvic acid, amino formulations and mycorrhizal products, this review did not establish a sufficiently transferable, product-specific rose dose for your setup. This is an evidence gap, not proof that every such product is ineffective. [R15]

Official Naval page	What is stated / decision
Takat	Lists amino / seaweed / humic / fulvic-type components without a usable guaranteed nutrient breakdown on the reviewed page. Do not count it as complete nutrition. Keep out of the initial A/B trial. [M9]
Super Micro 7	Fe 2.5%, Zn 3%, Cu 1%, Mn 1%, B 0.5%, Mo 0.1% by mass. Do not combine blindly with an existing trace mix and iron. [M10]
Kittysil	23% SiO_2 and 10% K_2O stated; not 23% elemental silicon. Alkaline silicate is not a default addition to the acid / calcium feeds. [M11]
Amico Gold	Website lists 2% N (also described as organic amino N) and 4% amino-chelated copper. The two N descriptions must not be added to make 4% N. Count copper exposure, including existing copper sprays. [M12]

Your actual bottles and current labels take precedence over a website. I could not establish independent, product-specific controlled rose evidence for these exact mixtures. Optional additives should be tested later in a separate comparison, not used to obscure the fertilizer trial.

22 Thrips and spider mites: direct rose evidence

Chow and colleagues found that reducing the concentration of a complete fertilizer could lower thrips abundance without reducing flower production in their experiment. Their spider-mite work also found benefits from moderate versus high feeding, while very low feeding harmed productivity. These were whole-fertilizer treatments, not isolated tests of N form. [R11, R12]

Candidate B keeps total N almost unchanged, so it cannot be promised to reduce pests. Keep your existing label-compliant crop-protection program unchanged during the nutrition trial. Scout the same 10 plants on Wednesday and Saturday: 2 leaf undersides and 1 bud each, record counts / severity. Do not add new pesticide or tonic schedules from this report.

PROFESSIONAL ALTERNATIVES • SECTION 23

What is actually specified and listed

23 Ready-made fertilizer alternatives in India

A named manufacturer is not proof of a local batch, exact formulation or rose superiority. The following separates verified specification from India availability. A marketplace listing is evidence of an offer only, not verified stock, authorization or authenticity.

Candidate	Verified composition / N forms	India status / fit
ICL Peters Excel CalMag Grower	15-5-15 + 7% CaO + 3% MgO + trace elements; N = 11.5% nitrate + 1.4% ammonium + 2.1% urea. Elemental Ca ~5%, Mg ~1.8%; S not quantified. [M4]	Most integrated candidate for soft water. Exact authorized Indian stock of this grade was not verified. Imported "CalMag Special" listings are not proof of the identical formulation.
Haifa Poly-Feed Drip 14-7-21 + 2MgO	N = 5.7% nitrate + 8.3% ammonium; Mg ~1.21%; Fe/Mn/Zn/B/Cu/Mo specified. No declared Ca; S quantity not specified. [M5]	An Indian seller lists 25 kg. Its ~59% ammonium share makes it a poor blind substitute for a low-buffer, warm root zone. Ca / additional Mg may still be needed. [M6]
YaraTera Calcinit + Krista K	India pages: Calcinit 15.5% N, 18.8% Ca; Krista K 13-0-45. These are identified raw fertilizers, not complete diets. [M1, M2]	Official India products verified. Useful DIY sourcing route; other macro and trace sources still required.
YaraTera Deltaspray 19-19-19	Official India listing confirms NPK, but does not establish the complete Ca/Mg/S/trace budget or N forms needed here. [M3]	Not automatically low quality. Its nutrient ratio is different from a low-P complete CalMag formulation.

Concentration comparison: CalMag at 5.8 g/10 L gives about 87 mg/L N, 12.7 P, 72.2 K, 29 Ca and 10.4 Mg. The manufacturer publishes 0.5–1.5 g/L for continuous feeding and 0.8–2 g/L for occasional feeding; these are not a validated twice-weekly cinder schedule. Additional Ca/Mg depends on water and total delivery. [M4]

Haifa 14-7-21 at 5 g/10 L gives 70 mg/L N, 15.3 P, 87.2 K and about 6.0 Mg, with 41.5 mg/L ammonium-N. This is a composition illustration, not the preferred replacement dose. No equally well-verified, exact low-P Ca/Mg SKU with confirmed local stock was established for SQM / COMPO Expert in this review. Do not treat that as evidence their products are unavailable everywhere. [M5]

CHOOSING A STRATEGY • SECTION 24

DIY control versus complete premix

24 Original vs optimized vs ready-made

The comparison below assumes **1 L Monday + 1 L Thursday**, the same source water, and no other fertilizers. Strategy C uses 0.58 g/L of the specified ICL product on each day to roughly match total N; this is an analytical scenario, not proof of sufficient twice-weekly nutrition. [M4]

Cycle input, mg/plant	A Original	B Candidate	C ICL scenario
N	176.4	173.0	174.0
P	113.5	34.0	25.3
K	263.3	278.1	144.4
Ca	47.5	95.0	58.0
Mg	87.3	57.9	20.9
S	150.0	87.0	Not declared
N form	37.3% NH4	9.25% NH4	9.3% NH4 + 14% urea
Micros	Unknown labels	Pending label-specific plan	Declared blend; dose must fit total feeding

A: familiar workflow but relatively high Thursday P and ammonium share; the trace budget is unknown. **B:** lower P/S and ammonium with higher fertilizer Ca, but more weighing, a stronger Monday and untested local performance. **C:** less measuring and a defined trace blend, but a different K/Ca/Mg balance, some urea, unquantified S and uncertain availability of the exact India SKU.

Quality versus NPK number: at equal 100 mg/L N, 18-18-18, 19-19-19 and 20-20-20 each give roughly 43.6 mg/L elemental P and 83.0 mg/L K. A 15-5-15 gives about 14.5 P / 83.0 K; 15-5-30 gives about 14.5 P / 166.0 K; 17-5-17 gives about 12.8 P / 83.0 K. None of those three headline numbers identifies purity, N forms, calcium, magnesium or trace quality.

Cost: compare cost per matched nutrient delivery and month, not price per kg alone. B uses 19.0 g of known macronutrient salts per 10 L + 10 L cycle versus A's 22.7 g, but retail prices, labor and trace inputs can reverse the savings. No reliable local delivered-price comparison was established.

Best present choice: measured DIY pilot B if its exact salts and trace plan can be verified. A genuine complete low-P CalMag product may be simpler, but do not buy a look-alike grade and assume the same analysis. Neither strategy is proven to flower better in your garden.

CANDIDATE FORMULA • SECTIONS 25–26

A purposeful change, not cosmetic edits

25 Proposed Monday nitrate formula

26 Proposed Thursday sulphate / phosphate formula

Full-strength **candidate for testing**, grams per 10 L final water. Match the analyses in section 4. SOP is assumed 50% K2O and 18% S. Fe / complete trace plan must be resolved separately.

Day / ingredient	Original	Candidate	Change / reason
Mon: potassium nitrate	3.2 g	4.0 g	+25%; replace part of removed ammonium N with nitrate.
Mon: magnesium nitrate	3.0 g	3.0 g	Unchanged; no reason to eliminate it solely for duplication.
Mon: calcium nitrate	2.5 g	5.0 g	+100%; increase Ca contribution, with more nitrate N.
Mon: Fe / micro products	0.5 g each	Not set	Exact label / density / chelate information missing.
Thu: $MgSO_4 \cdot 7H_2O$	6.0 g	3.0 g	-50%; lower combined Mg and S.
Thu: MKP 00-52-34	5.0 g	1.5 g	-70%; lower P without assuming no P requirement.
Thu: ammonium sulphate	3.0 g	0.5 g*	-83.3%; lower NH4 share and acidifying load.
Thu: SOP 00-00-50	0	2.0 g	New; replace K removed with MKP, without N or P.

Element mg/L	New Monday	New Thursday
Total N	162.5	10.5
Elemental P	0.0	34.0
Elemental K	152.7	125.3
Calcium	95.0	0.0
Magnesium	28.5	29.4
Sulfur	0.0	87.0

At equal feed volumes: total N -1.9%, K +5.6%, P -70%, Ca +100%, Mg -33.7%, S -42%. *Omit ammonium sulphate if measured root pH is below about 5.8 or falling; then this nutrient table no longer applies unchanged. These exact changes have LOW local evidence despite clear arithmetic.

Grade caution: pure $Ca(NO_3)_2 \cdot 4H_2O$ is not the commercial 15.5% N double-salt grade. $MgSO_4$ heptahydrate, monohydrate and anhydrous material contain different Mg fractions. A 99% assay specifies purity of the named chemical, not nutrient percentage. Haifa SOP grades can differ from 00-00-50. Recalculate before substituting. [M1, M7, M8]

EXECUTION • SECTION 27

A repeatable week, with stop rules

27 Weekly schedule and growth-stage adjustments

Day	Routine
Monday morning	Check pot moisture, drain condition and weather. Prepare nitrate feed at the seasonal factor; record EC, pH and litres actually delivered.
Tuesday	Plain water only when required by measured demand.
Wednesday	Moisture-based plain water; fixed-sample thrips / mite scouting.
Thursday morning	The same pre-feed checks; prepare the sulphate / phosphate recipe, not the Monday mixture. Record actual volume.
Friday	Plain water as required; no automatic booster or tonic.
Saturday	Standardized drain pH/EC, emitter and growth records; scout pests again.
Sunday	No compulsory feeding or flushing. Review the week and correct irrigation defects.

Month-by-month factors: Jan 100%, Feb 100%, Mar 75%, Apr 75%, May 75%, Jun 50%, Jul 50%, Aug 50%, Sep 50%, Oct 75% rising to 100% only after recovery, Nov 100%, Dec 100%. See section 19 for climate and the Hinglish card for exact scaled weights. First two trial weeks use 75% or the lower seasonal factor.

These factors describe a starting concentration, not a guaranteed amount of weekly nutrition. Do not lower feed volume to a token drench if roots remain hungry, and do not increase water solely to deliver fertilizer into an already wet pot. Resolve irrigation and nutrition together.

Plant condition	Adjustment
Newly repotted / recovering roots	Resume at 25–50% when active uptake resumes; do not force-feed stalled or damaged roots.
Basal shoots, buds, heavy flowering	Use the base nutrient balance; monitor demand. Do not add a special high-P week solely because buds appear.
Post-flush / severe pruning	Reduce according to remaining foliage and water use; ramp back with healthy regrowth.
Miniature vs climber / different cultivars	Group by pot size, root volume and demand. Adjust delivery volume / zone, rather than invent 100 different recipes.

Skip during saturation, suspected root damage, very high EC or impending washout. Severely dry, wilted plants need the water/root problem addressed first. A missed feed is not permission for a double catch-up dose. The accompanying calendar contains all-day decision reminders, not commands to automatically run a dosing pump.

VALIDATION • SECTION 28

An eight-week trial for your collection

28 Controlled original-versus-candidate experiment

Use 12–20 matched pairs (24–40 plants) where feasible; six pairs is a modest screening minimum, not a statistically guaranteed sample size. Each pair should match cultivar, rootstock if known, age, plant size, pot size, medium and light. One plant of each of 100 different varieties cannot separate cultivar effects from fertilizer effects.

Randomly assign A or B within each pair. Block by location / sun exposure, and avoid drainage from one treatment reaching another. Keep the same approved, label-resolved trace program and existing pest program in both groups. Exclude severely stressed plants; do not continue an injurious original treatment merely for experimental purity.

Week 0: record baseline, calibrate emitters and meters, and confirm matched feed-water volumes. Weeks 1–2: both arms at the same 75% or lower seasonal factor. Weeks 3–8: maintain the chosen factor unless a safety trigger requires change; document every deviation. Fertilizer carryover from before the trial can obscure early differences.

Record field	How to record
Identification	Date, pair ID, plant ID, cultivar/rootstock, treatment, pot/medium, location.
Growth / flowers	New flowers counted once, buds, total new shoots, basal shoots; measure up to 3 representative stems and flower diameters consistently.
Health	Leaf color, burn and leaf drop with the same 0–3 severity scale; notes/photos from the same position.
Nutrition / water	Grams actually mixed, dilution factor, feed EC/pH, feed L/plant, total water L/week, drain volume and EC/pH with method.
Pests / weather	Fixed-sample thrips/mites, rain exposure, heat/cloud notes and any crop-protection changes.

Suggested table header: **Date | Pair | Plant | Cultivar | A/B | Factor | Feed L | Total water L | Feed EC | Drain EC | Drain pH | New flowers | Buds | Basal shoots | Stem cm | Flower cm | Burn 0–3 | Pest score | Notes**.

Compare within-pair change from baseline, then summarize across pairs. Look for equal or better plant health / flowering with less P/S input and no emerging micronutrient or salinity issue. Report spread across cultivars, not only the average. Eight weeks screens a formula; seasonal nutrient accumulation and long-term flowering require later checks.

Success is not “the greener plant after seven days.” Success is sustained root health, acceptable shoots and flowers, stable root-zone chemistry and no compensating deficiency. Stop any treatment causing persistent burn, root decline or rapidly worsening EC/pH.

BEFORE WIDER ROLLOUT • SECTIONS 29–30

The measurements that change the answer

29 Essential versus optional tests

Priority	Information / test	Why it matters
Essential	All raw fertilizer labels + hydration state; Fe / trace guaranteed percentages and chelate; liquid density if dosing mL	Without these, grams do not define elemental nutrients.
Essential	Water EC, pH, total alkalinity / bicarbonate, Ca, Mg, Na, Cl, B	Separates useful background nutrition from salinity / pH risks; determines whether acid or more Ca/Mg is warranted.
Essential	Actual emitter flow, feed L/plant/event, total irrigation L/week; rain exposure	Turns concentration into delivered mass and tests whether two weekly feeds can be sufficient.
Essential	Current cinder origin / mixture, root-medium pH/EC with named method, drainage behavior	Establishes buffering, salt trend and likely irrigation constraints.
High value	Root-medium nutrient analysis: nitrate, P, K, Ca, Mg and relevant trace elements	Distinguishes accumulation / shortage from a misleading recipe-only inference.
High value	Consistently sampled leaf tissue through a horticultural lab	Tests actual plant status; use comparable cultivar / leaf age and follow laboratory instructions.
Conditional	Cinder contaminant screen; physical retention / air-porosity characterization; source nitrate/S	Useful if industrial origin, unexpected symptoms, saline water, or pure-cinder behavior raises concern.

30 Information still missing and confidence

I do not yet have the exact current Fe / micronutrient labels, hydrated chemical grades, present medium recipe, water alkalinity / ion composition, actual feeding volumes, drainage chemistry or confirmed meaning of “23 hours.” These omissions prevent a high-confidence complete fertilizer prescription.

High arithmetic confidence: the reported elemental concentrations and percentage changes, conditional on the analyses shown. **Moderate physiological confidence:** respecting root aeration, avoiding indiscriminate high-P / high-ammonium feeding, and accounting for all water and nutrient inputs. **Low local confidence:** exact new grams, 9.25% ammonium choice, monthly percentages and once-weekly Ca sufficiency. **Speculative:** guaranteed extra flowers, basal shoots or pest suppression from an optional tonic.

Research gaps are explicit: no controlled trial of your exact Monday/Thursday recipes in your specific Ratnagiri cinder was found; no authenticated same-grade, locally stocked complete low-P CalMag solution was established; and current bottle composition cannot be inferred from brand or black color. The practical response is a documented pilot, not a “perfect recipe” claim.

EVIDENCE LIBRARY • SECTION 31

Scientific and technical references

31 References and access limitations

[R] research • [G] general technical guidance • [C] official climate • [M] product specification / availability • [U] user source. Accessed or checked for this report on 26 September 2026. Abstract-only access is not presented as a full-paper appraisal. Web links are clickable.

[U1] User-supplied Pasted text.txt, 874 lines, supplied in this conversation. Recipes lines 48–80; interpretation lines 42–101; requested outputs lines 806–840. Current message adds cinder, automation and Naval website.

[R1] Feigin A, Ginzburg C, Gilead S, Ackerman A (1986). Effect of NH4/NO3 ratio in nutrient solution on growth and yield of greenhouse roses. Acta Horticulturae 189. DOI: 10.17660/ActaHortic.1986.189.15. Publisher abstract reviewed. Open source.

[R2] Cabrera RI, Evans RY, Paul JL (1996). The uptake of nitrate and ammonium by greenhouse roses. Acta Horticulturae 424. DOI: 10.17660/ActaHortic.1996.424.7. Publisher abstract reviewed. Open source.

[R3] Cabrera RI, Evans RY, Paul JL (1996). Enhancement of short-term nitrogen uptake by greenhouse roses under intermittent N-deprivation. Plant and Soil 179:73–79. DOI: 10.1007/BF00011644. Abstract reviewed. Open source.

[R4] Mattson N, Lieth H (2008). "Kardinal" Rose Exhibits Growth Plasticity and Enhanced Nutrient Absorption Kinetics Following Nitrate, Phosphate, and Potassium Deprivation. JASHS 133(3):341–350. University-hosted full text and experimental tables reviewed. Open source.

[R5] Yu WJ, Imaida K, Suzuki R, Li LH, Fukui H (2007). Effect of phosphorus concentration on growth and phosphorus absorption of potted miniature roses grown in a recirculating [publisher title truncated]. Acta Horticulturae 751. DOI: 10.17660/ActaHortic.2007.751.13. Abstract reviewed. Open source.

[R6] Franco-Hermida JJ, Quintero MF, Cabrera RI, Guzman JM (2017). Determination of diagnostic standards on saturated soil extracts for cut roses grown in greenhouses. PLOS ONE 12:e0178500. DOI: 10.1371/journal.pone.0178500. Open article; observational diagnostic context. Open source.

[R7] Barbosa JG and colleagues (2007). Quality and commercial grade of rose yields as affected by potassium applications through drip irrigation. Acta Horticulturae 751. DOI: 10.17660/ActaHortic.2007.751.8. Abstract reviewed; no pot-dose conversion made. Open source.

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[R9] Evans RY, Hansen J, Dodge LL (2009). Growth of rose roots and shoots is highly sensitive to anaerobic or hypoxic regions of container substrates. Scientia Horticulturae 119:286–291. DOI: 10.1016/j.scienta.2008.07.033. Abstract / results excerpt reviewed. Open source.

[R10] White PJ, Broadley MR (2003). Calcium in Plants. Annals of Botany 92:487–511. DOI: 10.1093/aob/mcg164. General plant physiology review; indirect for exact rose dosing. Open source.

[R11] Chow A, Chau A, Heinz KM (2009). Reducing fertilization for cut roses: effect on crop productivity and twospotted spider mite abundance, distribution, and management. Journal of Economic Entomology 102:1896–1907. DOI: 10.1603/029.102.0521. Abstract reviewed. Open source.

[R12] Chow A, Chau A, Heinz KM (2012). Reducing fertilization: a management tactic against western flower thrips on roses. Journal of Applied Entomology 136:520–529. DOI: 10.1111/j.1439-0418.2011.01674.x. Original abstract reproduced by US EPA HERO reviewed. Open source.

[R13] Cabrera RI, Solis-Perez AR, Sloan JJ (2009). Greenhouse Rose Yield and Ion Accumulation Responses to Salt Stress as Modulated by Rootstock Selection. HortScience 44(7):2000–2008. Abstract / introductory excerpt reviewed; no universal drain-EC threshold inferred. Open source.

[R14] Zahid A and colleagues (2021). Plant growth regulators modulate the growth, physiology, and flower quality in rose (Rosa hybirda; title spelling as published). Journal of King Saud University - Science 33:101526. DOI: 10.1016/j.jksus.2021.101526. Small open trial; used as limited evidence, not a dose prescription. Open source.

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[C1] India Meteorological Department. Ratnagiri climatological table, period 1981–2010. Monthly temperature / rainfall normals; accessed 26 September 2026. Not a current forecast. Open source.

[C2] Government of Maharashtra, Ratnagiri Gazetteer, Climate. Meteorological Department-supplied historical description. Humidity / cloudiness used qualitatively, not as current monthly measurements. Open source.

[G1] UMass Amherst, Greenhouse & Floriculture. How to Use pH and EC “Pens” to Monitor Greenhouse Crop Nutrition. University guidance, especially method-specific media EC interpretation. Open source.

[G2] UMass Amherst, Greenhouse & Floriculture. How to Prevent Iron Deficiency in Iron-Inefficient Greenhouse Crops; and greenhouse update, 20 March 2014. General greenhouse Fe-chelate / pH guidance, not exact rose-micro optima. Open source.

[G3] Nutrien eKonomics. Fertilizer Compatibility: What You Should Know. Manufacturer agronomic chemistry discussion of hygroscopic compatibility / critical relative humidity. Used only for handling principles, not rose efficacy. Open source.

[M1] Yara India, YaraTera Calcinit product page; Yara global Calcinit technical sheet. India analysis is 15.5% N / 18.8% Ca. Global sheet identifies nitrate and ammonium fractions. Official composition / compatibility only. Open source.

[M2] Yara India, YaraTera Krista K product page. Official India grade 13-0-45; not the 13-0-46 assumption in the generic calculation. Open source.

[M3] Yara India, YaraTera Deltaspray 19-19-19 product page. Official listing; no independent flowering or purity superiority inferred. Open source.

[M4] ICL, Peters Excel CalMag Grower 15-5-15 + 7CaO + 3MgO + TE. Official guaranteed analysis and application ranges, reviewed 26 September 2026. Exact authorized India stock not verified. Open source.

[M5] Haifa Group, Poly-Feed Drip 14-7-21+2MgO. Official N forms and trace composition. Not evidence of rose performance. Open source.

[M6] Krishi Bazaar, Haifa NPK 14-07-21 +2MgO, 25 kg listing. Availability indication only; live stock, authenticity and authorized-dealer status not confirmed. Open source.

[M7] Haifa Group, MKP, Mag (magnesium nitrate hexahydrate), and SOP Bio technical/product pages. Grades differ across products; SOP Bio lists 52% K2O / 18% S, not the assumed 50% K2O. Open source.

[M8] K+S, Epsom Salt pure technical. Magnesium sulfate heptahydrate specification illustrates water of crystallization versus impurities. Open source.

[M9] Naval Agribiotech India. Naval Takat official product page. Qualitative component claims; no usable complete nutrient assay verified. Open source.

[M10] Naval Agribiotech India. Naval Super Micro 7 official product page. Mass-percentage composition; actual bottle and density require confirmation. Open source.

[M11] Naval Agribiotech India. Naval Kittysil official product page. SiO2 / K2O declaration, not elemental Si. Open source.

[M12] Naval Agribiotech India. Naval Amico Gold official product page. Nitrogen and amino-chelated copper declaration. Open source.