

INDUSTRIAL CASE STUDY

Microwave Sterilization System

in Food Processing

Continuous Industrial-Scale 915 MHz Microwave-Assisted Thermal Sterilization (MATS) System — 1 Tonne Per Hour Capacity
Designed, Engineered & Validated by KERONE Engineering Solutions Limited

1 TPH PLANT CAPACITY RTE Pouch Input	915 MHz MICROWAVE FREQ. Industrial ISM Band	121-125 °C CORE STERIL. TEMP. Pressurized Hold	F0 ≥ 8 min LETHALITY VALUE 5-Log Spore Reduction	2.8 Yrs PAYBACK PERIOD At Export Market Premium
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PROJECT REFERENCE DETAIL

Field	Detail
Client Organisation	Nutrivia Foods Pvt. Ltd. — Leading Indian RTE / retort-pouch food manufacturer
KERONE Reference	KRDC/ICS/MWS/2025-02 Based on KRDC Lab Report 63/KRDC/LAB/22
Technology	Continuous Multi-Cavity 915 MHz Microwave-Assisted Thermal Sterilization (MATS) Tunnel with Pressurized Hot-Water Cascade
Feedstock	Retort-pouch Ready-to-Eat (RTE) curry — pre-cooked, pouch-sealed, 250 g fill weight
Product Output	Commercially sterile, shelf-stable RTE pouches — F0 ≥ 8, 5-log Clostridium botulinum spore reduction
Plant Location	Client facility (RTE food plant) — Inline with existing pouch filling & retort line
Document Date	June 2026 Validated on KRDC Lab Data — October 2025

Ready-to-Eat Foods | Retort Pouch Sterilization | Microwave-Assisted Thermal Processing | Aseptic & Extended Shelf-Life | Food Safety Engineering | Chemical / Food Processing

Executive Summary

Nutrivia Foods Pvt. Ltd., a fast-growing Indian manufacturer of retort-pouch ready-to-eat (RTE) meals, faced a commercially significant challenge: their conventional steam-retort sterilization process, while microbiologically safe, subjects pouched food to prolonged high-temperature exposure (45-60 minutes at 121°C core), causing substantial degradation of texture, colour, and heat-sensitive nutrients — limiting shelf appeal, export competitiveness, and premium positioning.

KERONE Engineering Solutions Limited was engaged to design, validate, and specify an industrial-scale continuous microwave-assisted thermal sterilization (MATS) system capable of achieving commercial sterility with substantially shorter thermal exposure — at a throughput of 1 Tonne Per Hour (1 TPH).

Following rigorous laboratory validation at KRDC (Kerone Research & Development Centre) using a single-mode 915 MHz applicator across multiple hold times (2, 4, 6 and 8 minutes at core), the optimal industrial process parameters were established. The KERONE continuous multi-cavity microwave sterilization tunnel — operating at 915 MHz with a pressurized hot-water cascade to 121-125°C core temperature and a 6-minute post-heating hold — delivers an F0 lethality value of 8.3 minutes (exceeding the 6.0-minute regulatory threshold for low-acid canned foods), while retaining 84% of vitamin C content versus 48% under conventional retort.

CHALLENGE	KERONE SOLUTION	OUTCOME ACHIEVED
Conventional retort sterilization degrades texture and nutrients (45-60 min at 121°C) — limiting premium and export-grade RTE positioning.	Continuous 1 TPH 915 MHz MATS tunnel with pressurized water cascade — validated from KRDC lab trials on client's own product.	F0 8.3 min sterility, 84% vitamin retention, ~70% shorter cycle time — commanding export/premium pricing.

Key Performance Summary

KPI	Conventional Retort (Baseline)	After KERONE MW Sterilization (1 TPH Plant)	Improvement
Core Sterilization Time	45-60 min	12-15 min (incl. 6-min hold)	~70% reduction
F0 Lethality Value	6.0-6.5 min (minimum pass)	8.3 min	+30% safety margin
Vitamin C Retention	45-55%	82-88%	~1.6x improvement
Texture / Sensory Score (1-10 panel)	6.0	8.7	+45%
Colour Retention (ΔE vs fresh)	8-10	2-3	~3x improvement
Throughput	800 pouches/hr (batch avg.)	2,400 pouches/hr	3x increase
Energy Consumption	0.85 kWh/kg product	0.42 kWh/kg product	51% reduction

Industry Context & The Business Challenge

India's ready-to-eat (RTE) and retort-pouch food market is valued at over USD 700 million and is projected to grow at 15-18% CAGR through 2030, driven by urban convenience demand, defence and institutional catering, and rising exports to the Middle East, North America, and Southeast Asia. Retort processing — sterilizing sealed, flexible pouches under pressure and heat — remains the dominant shelf-stability technology, but conventional steam autoclaves apply heat slowly from the pouch surface inward, forcing long hold times to guarantee core sterility.

This prolonged thermal exposure is the central quality bottleneck: heat-sensitive vitamins, colour pigments, and texture-defining proteins degrade well before the geometric core of the pouch reaches lethal temperature. The critical barrier for Indian RTE processors targeting premium retail and export markets is that conventional retort output frequently falls short of the sensory and nutritional benchmarks required by discerning buyers, despite being microbiologically safe.

The Commercial Problem — Why Conventional Retort Limits Value

Quality Parameter	Conventional Retort (Nutrivia Baseline)	Market Requirement (Premium / Export RTE)	Gap
Vitamin C Retention	45-55%	> 75%	FAIL — up to 40 pts short
Texture / Sensory Score	6.0 / 10	> 8.0 / 10	FAIL — below premium threshold
Colour ΔE (vs fresh-cooked)	8-10	< 4	FAIL — 2x+ over limit
Process Cycle Time	45-60 min/batch	< 20 min (line-matched)	FAIL — throughput bottleneck
Market Price Realised	INR 90-120/pouch (mass retail)	INR 180-260/pouch (premium/export)	2x revenue gap

Table 1: Conventional retort quality parameters vs market specification for premium/export RTE | Source: KRDC Analysis & FSSAI / Codex Alimentarius Low-Acid Canned Food Guidelines

Revenue Opportunity — Upgrading an Existing Product Line

The Opportunity: At 1 TPH throughput (approx. 4,000 pouches/hr at 250 g fill) operating 300 days/year (7,200 hours), annual production volume is approximately 28.8 million pouches. At current mass-retail realisation of INR 100/pouch, this generates INR 28.8 Cr/year. Post-processing with KERONE's MATS system, the same volume repositioned into premium and export channels at an average INR 210/pouch generates INR 60.5 Cr/year — a revenue increase of over INR 31 Cr annually, from the same existing production line and feedstock.

About Nutrivia Foods Pvt. Ltd.

Nutrivia Foods Pvt. Ltd. is a growth-stage Indian RTE food manufacturer supplying modern retail, quick-commerce, and institutional/defence catering channels, with an existing retort-pouch production capacity exceeding 40,000 pouches/day. Their operations span curries, dals, biryanis, and plant-based meal formats — positioning them as an ideal anchor client for KERONE's microwave sterilization upgrade technology. The KRDC trial was conducted on Nutrivia's actual production RTE curry (120 pouches, dispatched 6 October 2025) to ensure industrial relevance of all process parameters.

Process Validation — From KRDC Lab to Industrial Scale

KERONE's engineering approach mandates laboratory-scale validation before any industrial system specification. The KRDC (Kerone Research & Development Centre) conducted a structured experimental programme on Nutrivia's actual RTE curry pouches over 7 days (1-7 October 2025), using a single-mode 915 MHz microwave applicator with pressurized water cascade to establish the process envelope that informs the 1 TPH industrial plant design.

KRDC Experimental Programme — Key Findings

Test Condition	Hold Time (post-heat)	F0 Value (min)	Vitamin C Retention	Assessment
Control (no hold)	0 min	2.1	96%	Insufficient — fails sterility spec
Short hold	2 min	4.6	93%	Insufficient — below F0 6.0 threshold
Standard hold	4 min	6.4	89%	Meets minimum — general RTE grade
OPTIMAL	6 min	8.3	84%	Optimal for premium / export RTE
Extended hold	8 min	10.1	77%	Over-processed — diminishing returns

Table 2: KRDC Laboratory Results — 915 MHz single-mode applicator trials on Nutrivia RTE curry | KRDC Test Report 63/KRDC/LAB/22 | F0 measured per validated thermocouple core-temperature logging; vitamin C per AOAC 967.21

Scale-Up Methodology — Lab to 1 TPH

KERONE's scale-up process follows a structured engineering framework where laboratory parameters are translated to industrial equipment specifications using validated electromagnetic and thermal models. The key translation factors for this project are:

Parameter	KRDC Lab (Single-Mode Applicator)	Industrial Plant (1 TPH Multi-Cavity Tunnel)	Scale-Up Factor
Microwave Frequency	915 MHz	915 MHz	1:1 (direct)
Core Temperature Target	121-125°C	121-125°C	1:1 (direct)
Optimal Hold Time	6 min (post-heat)	6 min (pressurized hold zone)	1:1 (direct)
Throughput	~12 pouches/run (batch)	~4,000 pouches/hr (250 g)	~330:1
Pressurization	Static autoclave chamber	Continuous pressurized water cascade	Configuration change
Heating Mode	Single applicator (batch)	Multi-cavity travelling-wave tunnel (6 zones)	Configuration change
Cooling	Ambient air (in-chamber)	Chilled water cascade cooling	Enhanced

Industrial Plant Design — 1 TPH Continuous Processing System

The KERONE continuous microwave sterilization line moves sealed, filled pouches through six linked process stages — pouch infeed and orientation, pressurized pre-heating, multi-cavity 915 MHz microwave sterilization, pressurized hold for F0 accumulation, staged cooling, and final quality verification and casing — all under a single PLC/SCADA-controlled pressure envelope that maintains pouch integrity throughout.

Continuous Process Flow

Pouch Infeed & Orientation → Pressurized Pre-Heat (water cascade) → 915 MHz Multi-Cavity Microwave Tunnel → Pressurized Hold Zone (F0 accumulation) → Staged Chilled-Water Cooling → Quality Verification (F0 / core temp audit) → Drying & Casing → Palletised Output

System Architecture — Major Process Units

Unit / Section	Equipment	Design Parameters	Function
U-01: Pouch Infeed	Rotary infeed carousel + metal detector	4,200 pouches/hr rated 250 g fill	Orient and singulate sealed pouches; reject metal contamination
U-02: Pre-Heating	Pressurized hot-water cascade chamber	95°C water 1.8 bar(g)	Bring pouch surface to near-boil before microwave entry; equalise pressure
U-03: Microwave Sterilization Tunnel (Primary Process Unit)	KERONE Multi-Cavity 915 MHz Applicator Tunnel	1,000 kg/hr 121-125°C core 6 heating cavities pressurized water-loaded	Core thermal processing — rapid volumetric core heating for sterility with minimal quality loss
U-04: Pressurization System	Steam-air overpressure control skid	1.8-2.2 bar(g) ±0.05 bar control	Maintain pouch-integrity overpressure throughout heat and cool zones
U-05: Hold Zone	Insulated pressurized hold tunnel	6 min residence 121-125°C maintained	Accumulate F0 lethality after peak core temperature is reached
U-06: Cooling Zone	Staged chilled-water cascade cooler	Inlet: 121°C Outlet: <35°C 3 stages	Rapidly cool sterilized pouches; halt further thermal degradation
U-07: Quality Verification	In-line F0 / core-temperature audit station + metal detector	100% pouch weight check statistical thermocouple audit	Confirm sterility assurance and pouch integrity before release
U-08: Product Handling	Drying tunnel + carton casing + palletiser	1,000 kg/hr auto case-pack	Dry pouch surfaces, case-pack, and palletise finished product
U-09: Process Control	PLC/SCADA Control Panel	Siemens S7 / Allen Bradley 21 CFR Part 11 audit trail	Automated power, pressure, temperature and F0 control; full batch data logging

Table 3: Process Unit Descriptions — KERONE 1 TPH Continuous Microwave Sterilization Plant | U-03 (Microwave Tunnel) is the primary process unit; all others are ancillary

Core Equipment Specification — KERONE Microwave Sterilization Tunnel

The KERONE Multi-Cavity 915 MHz Microwave Sterilization Tunnel is the heart of the continuous line. Designed and manufactured in-house at KERONE's Ambernath facility, it directly scales the validated laboratory parameters from KRDC trial 63/KRDC/LAB/22 to industrial throughput while maintaining the identical thermal profile, hold time, and pressurization that produced the 8.3-minute F0 result.

Parameter	Specification
Design Throughput	1,000 kg/hr (approx. 4,000 pouches/hr at 250 g)
Microwave Frequency	915 MHz (industrial ISM band)
Core Sterilization Temperature	121-125°C (max design: 135°C)
Hold Time	6 min (adjustable 2-10 min via line speed)
Number of Cavities	6 independent travelling-wave applicator cavities
Magnetron Configuration	24 x 6 kW solid-state / magnetron modules (144 kW installed RF)
Operating Pressure	1.8-2.2 bar(g) steam-air overpressure
Tunnel Dimensions	L 14,500 mm x W 1,400 mm x H 2,100 mm (SS 316L chamber)
Drive System	Servo-controlled mesh-belt conveyor, variable speed
Installed Power	~210 kW (total connected load)
Shell Material	SS 316L pressure vessel, food-grade finish
Sealing	Rotary pressure locks at infeed/outfeed, food-grade gaskets

KERONE Microwave Sterilization Tunnel — industrial unit scaled from KRDC single-mode laboratory applicator

Utilities & Ancillary Requirements

Utility	Specification	Consumption (at 1 TPH)	Source
Electrical Power (RF + Drives)	415V, 3-phase, 50Hz	~210 kW connected ~165 kW avg demand	Site utility
Process Water	Potable, softened	18 m3/hr (cascade, closed loop)	Site utility + RO plant
Chilled Water (Cooling)	7°C supply closed loop	22 m3/hr 14°C return	Chiller plant
Compressed Air	6 bar dry instrument grade	20 Nm3/hr	Air compressor (site)
Steam (pressurization assist)	3 bar(g) saturated	150 kg/hr	Site boiler or electric steam generator
Space Requirement	Building / covered area	L 22m x W 6m x H 4m	Existing bay or new shed

Sterility & Compliance Assurance

Compliance Point	Parameter	Expected Level	Regulatory Benchmark	Status
Core Lethality	F0 Value	8.3 min	≥ 6.0 min (FSSAI / Codex LACF)	COMPLIANT

Compliance Point	Parameter	Expected Level	Regulatory Benchmark	Status
Microbial Validation	C. botulinum spore log reduction	5.4-log	≥ 5-log (commercial sterility)	COMPLIANT
Pouch Integrity	Seal strength post-process	> 95% of pre-process baseline	No visible seal distortion	COMPLIANT
Shelf Stability	Ambient incubation (35°C / 14 days)	Zero swell / spoilage in trial batch	Zero-defect requirement	COMPLIANT

Mass Balance & Energy Analysis — 1 TPH Operation

Detailed Mass Balance — Per Hour at Full Load

Stream	Material	Flow Rate (kg/hr)	Notes
Feed (IN)	Filled, sealed RTE pouches (as-received)	1,000	250 g fill, pre-cooked curry, ambient temp
Process Water Uptake	Surface condensation / cascade contact	~4 (surface only)	No product mass loss — sealed pouch process
Product (OUT)	Commercially sterile RTE pouches	~996	F0 ≥ 8; pouch-sealed, no ingress
Rejects (QC / seal defects)	Off-spec pouches	~4 (0.4%)	Diverted at U-07 quality station
Condensate / Blowdown	Process water discharge	~120 L/hr	Recirculated via closed-loop treatment

Table 4: Mass balance — 1 TPH continuous microwave sterilization plant | Sealed-pouch process; product mass is materially unchanged, unlike open thermal processes

Energy Consumption Estimates

Energy Category	Equipment / Unit	Power (kW)	Load Factor	Consumption (kWh/tonne product)
RF Generation (Sterilization)	Solid-state / magnetron modules (6 cavities)	144	78%	~112
Pressurization & Pumps	Water cascade pumps, steam assist	28	80%	~22
Cooling System	Chilled water pumps + chiller interface	18	85%	~15
Conveyor & Drive Systems	Mesh-belt conveyor, servo drives	10	80%	~8
Casing & Drying	Air-knife dryer, case packer, palletiser	6	70%	~4
Utilities & Controls	PLC/SCADA, lighting, misc.	4	60%	~2
TOTAL		~210 kW		~163 kWh/tonne

Table 5: Energy consumption estimate — 1 TPH microwave sterilization plant | Based on KERONE engineering estimates; actual values to be confirmed during detailed engineering

Product Quality Specification & Market Applications

Expected Product Specification — KERONE Processed RTE Pouches

Parameter	Test Method	Conventional Retort (Baseline)	MW-Processed (4-min hold)	MW-Processed (6-min hold)	Fresh-Cooked (Reference)
F0 Lethality Value	Thermocouple core-temp log	6.2 min	6.4 min	8.3 min	N/A
Vitamin C Retention	AOAC 967.21	~50%	89%	84%	100%
Texture / Sensory Score	9-point trained panel	6.0 / 10	8.2 / 10	8.7 / 10	9.5 / 10
Colour ΔE (vs fresh)	CIE Lab colourimetry	8-10	3.4	2.6	0 (reference)
Shelf Life (ambient)	Accelerated + real-time trial	12 months	12 months	12 months	N/A
Product Classification	Internal grading	Mass-retail grade	Premium grade	Premium / export grade	Fresh

Table 6: Product quality specification — conventional retort vs KERONE MW-processed RTE curry vs fresh-cooked reference / 6-min hold column recommended for premium / export applications

Market Applications for MW-Sterilized RTE Products

- **Premium Retail RTE Meals** — Premium retail RTE curries, dals, and biryanis at 8.0+ sensory scores, positioned above mass-market retort products in modern trade and quick-commerce channels.
- **Export-Grade Shelf-Stable Meals** — F0 8.3-compliant, ambient-stable pouches suitable for FSSAI, USFDA, and EU food-safety export documentation, opening premium export lanes to the Gulf, North America, and Southeast Asia.
- **Plant-Based & Meat-Analog RTE** — High vitamin and colour retention supports plant-based and meat-analog RTE formats, where conventional retort heat damage is especially visible in texture and appearance.
- **Baby Food & Nutrition-Sensitive SKUs** — Shorter thermal exposure preserves micronutrient content critical for infant and toddler feeding formulations subject to strict nutritional labelling claims.
- **Defence & Institutional Field Rations** — Ambient shelf-stability with superior sensory quality meets defence, paramilitary, and institutional field-ration specifications where soldiers and personnel prioritise palatability alongside safety.

Financial Analysis & Return on Investment

Break-even is projected at approximately 2.8 years, based on an assumed blended average selling price uplift from mass-retail (INR 100/pouch) to a premium/export blend (INR 210/pouch average), against the incremental CAPEX and operating cost of the microwave sterilization line.

CAPEX Estimate — 1 TPH Plant

Cost Head	Scope	Estimated Cost (INR Lakhs)	Notes
Microwave Sterilization Tunnel (Primary Equipment)	KERONE supply, factory tested	62-75	FOT Ambarnath; includes RF modules, applicators, controls
Pressurization System	Steam-air overpressure skid	8-10	Instrumented, PLC-linked
Hold & Cooling Sections	Insulated hold tunnel + chilled cascade cooler	10-13	SS 316L construction
Quality Verification Station	F0 audit + metal detector + reject system	5-7	In-line, statistically validated
Pouch Handling & Casing	Infeed carousel, dryer, case packer, palletiser	6-8	Automated, food-grade contact parts
Electrical & Instrumentation	MCC panel, SCADA, cabling, transformer	9-11	21 CFR Part 11-capable data logging
Civil & Structural	Foundation, shed, utilities connections	5-6	Client scope; KERONE to provide layout drawing
Commissioning, Training & Startup	KERONE commissioning team, 15-day site support	3-4	Includes operator training and performance test
TOTAL CAPEX		INR 108-134 Lakhs	Approx. range; detailed quote on enquiry

Revenue & OPEX Model — Annual Basis (7,200 hr/yr operation)

Item	Basis	INR/Year (Lakhs)	Remarks
Premium/Export Pouch Sales	4,000 pouches/hr x 7,200 hr x INR 210/pouch (blended)	INR 6,048 Lakhs	Blended premium/export realisation; incremental over mass-retail baseline
Electricity	163 kWh/t x 7,200 t/yr x INR 8/kWh	INR 94 Lakhs	Based on INR 8/kWh industrial tariff
Steam / Pressurization Fuel	150 kg/hr steam equiv. x 7,200 hr x INR 3.5/kg	INR 38 Lakhs	Can substitute with electric steam generator
Water & Chilling	Process + chilled water, treatment	INR 12 Lakhs	Closed-loop, minimal make-up

Item	Basis	INR/Year (Lakhs)	Remarks
Labour (Operations)	4 operators/shift x 3 shifts x 12 months	INR 24 Lakhs	At INR 25,000/operator/month CTC
Maintenance & Spares	3% of CAPEX per annum	INR 3.5 Lakhs	Annual maintenance provision
Miscellaneous & Overheads	QC testing, consumables, admin	INR 10 Lakhs	

Note: Revenue figures above represent gross sales of processed output; the incremental revenue attributable to the microwave sterilization upgrade (over the existing conventional-retort baseline) is the relevant basis for payback calculation, consistent with the ~2.8-year break-even shown in the cumulative cash-flow projection.

Project Execution & KERONE Scope of Supply

Implementation Timeline

Phase	Activity	Duration	KERONE Deliverable
Phase 0 — Pre-Order	Technical consultation, site visit, process design freeze, commercial negotiation	4-6 Weeks	Process Design Basis (PDB), GA drawing, utility list, commercial offer
Phase 1 — Engineering	Detailed engineering: RF, mechanical, electrical, civil layout, P&ID finalization	8-10 Weeks	Complete engineering package, vendor drawings, DFM approval
Phase 2 — Procurement	Long-lead items: RF modules, pressure vessel plate, drives, control systems	10-12 Weeks	Material test certificates, QC inspection reports, FAT invitation
Phase 3 — Fabrication	Tunnel fabrication, applicator assembly, hold/cooling sections, SCADA panel	12-14 Weeks	Factory Acceptance Test (FAT) at KERONE Ambarnath; client witness invited
Phase 4 — Installation	Equipment erection at client site; piping, electrical, instrument hook-up	5-6 Weeks	KERONE site supervision; civil and electrical by client as per KERONE drawings
Phase 5 — Commissioning	Cold trials, hot trials with client product, performance guarantee test, operator training	3-4 Weeks	Commissioning report, performance test certificate, O&M manual, training records
TOTAL PROJECT TIMELINE	Order to commercial production	~42-52 Weeks	From purchase order to first commercial output

KERONE Scope of Supply & Services

Category	KERONE Scope (INCLUDED)	Client Scope (EXCLUDED from KERONE supply)
Process Design	Process design basis, mass balance, F0/lethality validation, P&ID	Feedstock/product formulation guarantee; plant operating schedule
Primary Equipment	Microwave tunnel (complete), pressurization skid, hold/cooling sections, product handling	Upstream pouch filling/sealing line (unless included in enquiry scope)
Quality Systems	In-line F0 audit station, metal detector, reject system	Third-party microbiological validation and regulatory filing
Controls	PLC/SCADA, MCC panel, all instruments and field wiring, 21 CFR Part 11 logging	DG set, main power supply connection, transformer
Civil & Structural	Foundation load drawings, GA layout, anchor bolt drawings	All civil work, sheds, platforms, ladders, drains
Commissioning	FAT, site commissioning, performance test, operator training (15 days)	Consumables (water, steam) for commissioning; feedstock for trials
Documentation	P&ID, GA drawings, O&M manual, spares list, test certificates	Client-side approvals, regulatory consents, insurance

Conclusions & Why KERONE

The KERONE-designed 1 TPH Continuous Microwave Sterilization System represents a proven, commercially validated solution to one of the most significant value-unlock opportunities in India's ready-to-eat food industry. The process is built on rigorous KRDC laboratory data — not theoretical projections — and the industrial design directly replicates the exact process conditions that produced measurable, certified results on Nutrivia Foods' actual production RTE curry.

- **Proven Technology** — Every process parameter in the 1 TPH plant — 915 MHz, 121-125°C core, 6-minute hold — is directly derived from KRDC lab trial 63/KRDC/LAB/22 on client's actual feedstock. No extrapolation; no assumptions.
- **Quantified Outcome** — F0 lethality improvement from 6.2 to 8.3 minutes, and vitamin C retention improvement from ~50% to 84%, are measurable, validated results — not marketing claims.
- **Commercial Clarity** — The financial model demonstrates a payback period of approximately 2.8 years at conservative premium/export pricing, converting an existing production line into a substantially higher-value revenue stream.
- **Full Ownership** — KERONE designs, manufactures, supplies, installs, and commissions the complete plant from a single point of accountability — eliminating multi-vendor coordination risk.
- **Scalable Platform** — The multi-cavity tunnel platform is scalable. A 1 TPH system validated at Nutrivia Foods creates the reference installation for 2, 5, and 10 TPH systems for other RTE and retort-pouch manufacturers across India and internationally.
- **Compliance-Ready** — Sterility assurance and quality verification are integral to the KERONE supply scope — the system is designed to FSSAI / Codex LACF norms, not retrofitted for compliance after the fact.

ENQUIRE ABOUT YOUR MICROWAVE STERILIZATION PROJECT

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To initiate a project discussion, please share: product/feedstock quality report + daily/annual pouch tonnage + site location + target market/certification (FSSAI, USFDA, EU) required

ISO 9001:2015 | ISO 14001:2015 | ISO 45001:2018 | CRISIL Rated Company | AIMCAL Member | IHEA Member | EMItech Certified | 50+ Years of Engineering Excellence

DISCLAIMER: All financial projections are indicative and based on prevailing market conditions as of June 2026. Process performance figures are derived from KRDC laboratory data (Report 63/KRDC/LAB/22) conducted on Nutriviva Foods Pvt. Ltd. feedstock. Actual industrial performance may vary. This document is intended for discussion purposes; a formal quotation will be issued following detailed enquiry.