

EIR BOVIBIOME

Targeted Rumen-Protected Butyrate Delivery System for U.S. Cattle

Protect. Deliver. Balance. Perform.



RUMEN PROTECTED

Palm-stearin/GML matrix limits early water ingress.



BILE / LIPASE RELEASE

Intestinal emulsification and lipase-driven matrix erosion.



BUTYRATE + MICROBIAL SYNERGY

Mg/Ca salts + tributyrin pair with GML rebalancing.

BETTER GUT HEALTH. HIGHER ACTIVE DELIVERY. PRACTICAL SCALE.

A high-payload, enzyme-responsive system for modern cattle.



Scientist & Lead Formulator

Ido Eco Ofek

Multidisciplinary Scientist & Entrepreneur

MSc.Agr. Animal Science: Hebrew University of Jerusalem.

O-1A Extraordinary Ability Visa Recipient:

Recognized for sustained contributions in agricultural biotechnology.

25+ Years R&D: Specialized in delayed-release drug systems, antimicrobial protection, and bioactive formulations.

Leadership: Chief Scientist at GLA-ECO, Organix Innovations, and Agrometix Ltd.

Key Innovation: Lead inventor of STEMWORK flagship products and market-ready biocidal systems.



Simple product definition



EIR BOVIBIOME is a solid, homogeneous 1.0-1.4 mm melt-prilled particle for cattle feed.

The formula contains 60% butyrate carriers: 30% magnesium butyrate, 15% calcium butyrate, and 15% tributyrin.

GML is 15% of the product and is embedded in a 20% palm-stearin matrix structured with GMS and calcium stearate.

Release is not pH-triggered: low rumen water ingress is followed by bile-salt emulsification and lipase-driven erosion in the small intestine.

Reference inclusion is approximately 20 g/head/day in nutritionist-managed cattle programs.



Why the U.S. market is relevant



The United States has a large, technically sophisticated feedlot sector where small performance gains can have high economic leverage.



USDA NASS reported 11.6 million cattle and calves on feed in U.S. feedlots with capacity of 1,000+ head on April 1, 2026.



USDA notes that 1,000+ capacity feedlots represent about 85% of all fed cattle in the United States.



The main commercial targets are large feedlots, feed additive companies, nutrition consultants, integrated beef systems, and premix manufacturers.



The U.S. positioning should emphasize measurable feedlot economics: feed conversion, morbidity pressure, carcass consistency, and non-antibiotic gut-function support.

The production problem



High-concentrate finishing diets increase ruminal acid load and intestinal stress.



Subacute ruminal acidosis pressure can damage absorptive surfaces and increase barrier dysfunction.



Heat stress, transport stress, diet transitions, and long finishing cycles increase gut vulnerability.



A damaged epithelial interface wastes energy on inflammation, repair, and immune activation.



The producer needs a non-antibiotic nutritional tool that supports gut resilience without disrupting normal fermentation.



The butyrate delivery problem



Butyrate is biologically valuable, but free butyrate salts are not precision delivery systems.



In cattle, the rumen is a large fermentation and absorption compartment, not a passive transit chamber.



Free butyrate is exposed early to rumen fluid, rumen microbes, moisture, and absorption before it reaches post-ruminal targets.



The technical value is therefore determined by release kinetics: how much survives the rumen, where activation begins, and how much becomes available downstream.



The product proposition is: do not merely add butyrate; deliver it to the correct physiological window.



Target-site delivery map

Region	Dominant environment	Delivery implication	Desired product behavior
 Feed mixer / TMR	Mechanical shear, minerals, variable moisture	Product must resist abrasion, odor loss, and segregation.	Hard, free-flowing, low-dust flakes.
 Rumen / reticulum	Near-neutral fermentation chamber with intense microbial activity	Free butyrate is not targeted; early release reduces downstream payload.	Low water ingress and low early release.
 Abomasum	Acidic true stomach	Transit stage; acidity is not the release trigger.	Matrix remains coherent—no pH-dependent opening.
 Small intestine	Bile, lipase, absorptive epithelium	Primary activation: bile emulsification + lipase hydrolysis.	Major progressive release of butyrate payload + GML.
 Hindgut	Microbial fermentation and epithelial interface	Secondary target for residual controlled release.	Residual release without rapid bolus.

Functional architecture

Functional family		Role in the system	Why it matters
	Magnesium butyrate	30% high-density mineral carrier	Maximizes butyrate-equivalent payload.
	Calcium butyrate	15% robust mineral carrier	Adds salt stability and payload diversity.
	Tributyrin	15% lipase-responsive pro-butyrate	Releases butyrate through intestinal hydrolysis.
	GML / monolaurin	15% low-solubility monoglyceride	Adds matrix structure and microbial rebalancing.
	Palm stearin	20% hydrophobic kinetic gate	Limits rumen ingress; emulsifies in intestinal bile.
	GMS + calcium stearate	4.5% wetting / hardness control	Tunes prill integrity, erosion, and anti-tack.
	Silicon dioxide	0.5% flow and processing aid	Supports dispersion and manufacturing consistency.

The Innovation

Triple-Action Synergy Strategy



Technology concept: one homogeneous prill, not a dry blend



The active system is embedded in a continuous lipid matrix—not mixed as separate powders.



Each prill contains magnesium/calcium butyrate, tributyrin, GML, palm stearin, and processing aids.



A dry blend risks segregation by density, particle size, and flow behavior.



Melt-prilling reduces odor, dust, local concentration errors, and handling problems.



The field-friendly form supports TMR, premix, or controlled top-dress use.



Stage 1: rumen protection

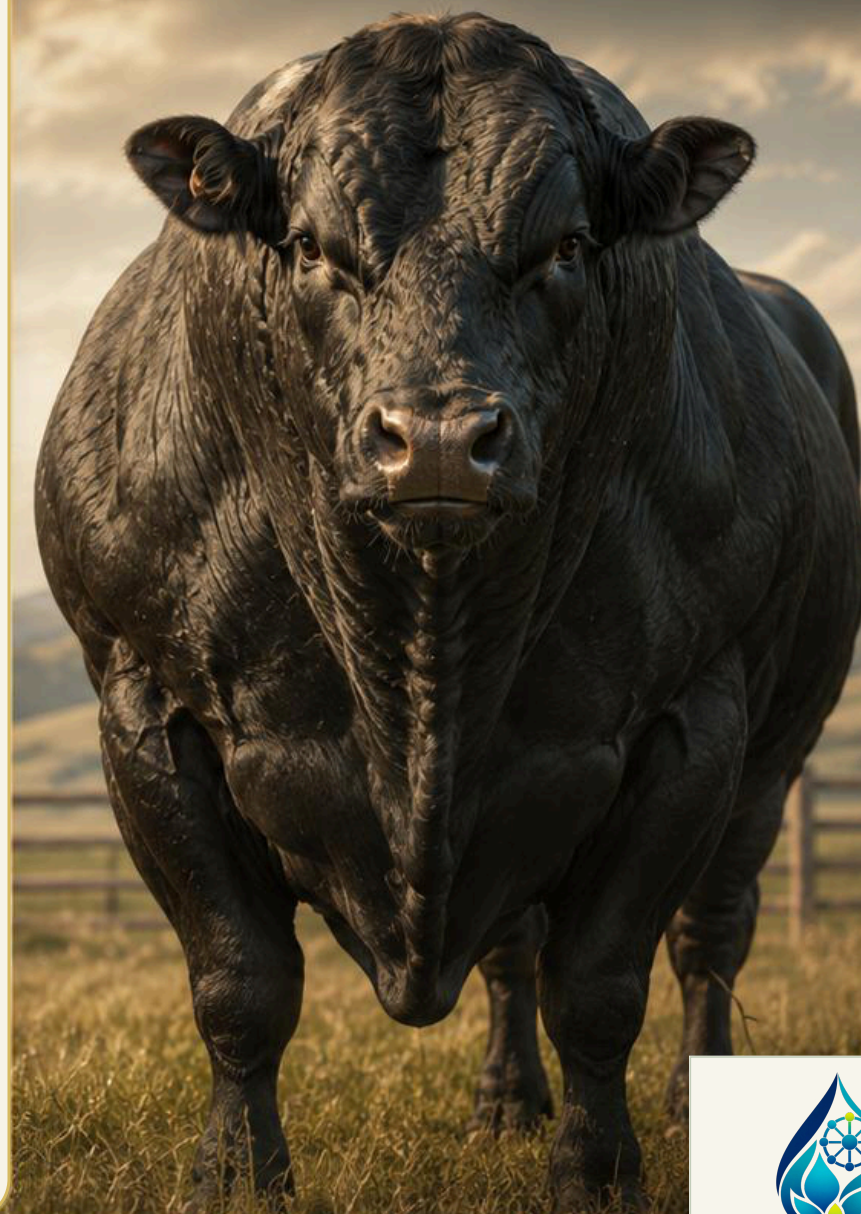
The palm-stearin/GML matrix is hydrophobic and remains solid near 39°C.

GMS and calcium stearate tune wetting, hardness, and abrasion resistance without a pH trigger.

Design target: retain $\geq 60\%$ of active payload after 24 h simulated rumen exposure; avoid a “zero release” claim.

Protection preserves Mg/Ca butyrate, tributyrin, and GML for downstream activation.

TMR abrasion testing confirms 1.0–1.4 mm prills remain intact through feed handling.



Stage 2: intestinal activation

The abomasum is a transit stage; acidic exposure is not the release trigger.

In the small intestine, bile salts emulsify the TAG-rich palm-stearin/GML surface.

Pancreatic lipase hydrolyzes matrix lipids and tributyrin, increasing pore formation and payload release.

Mineral butyrates dissolve as the matrix erodes; GML enters the same post-ruminal window.

Development target: release $\geq 85\%$ of retained payload within 6 h under bile/lipase conditions (preferred $\geq 90\%$).



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Butyrate contribution

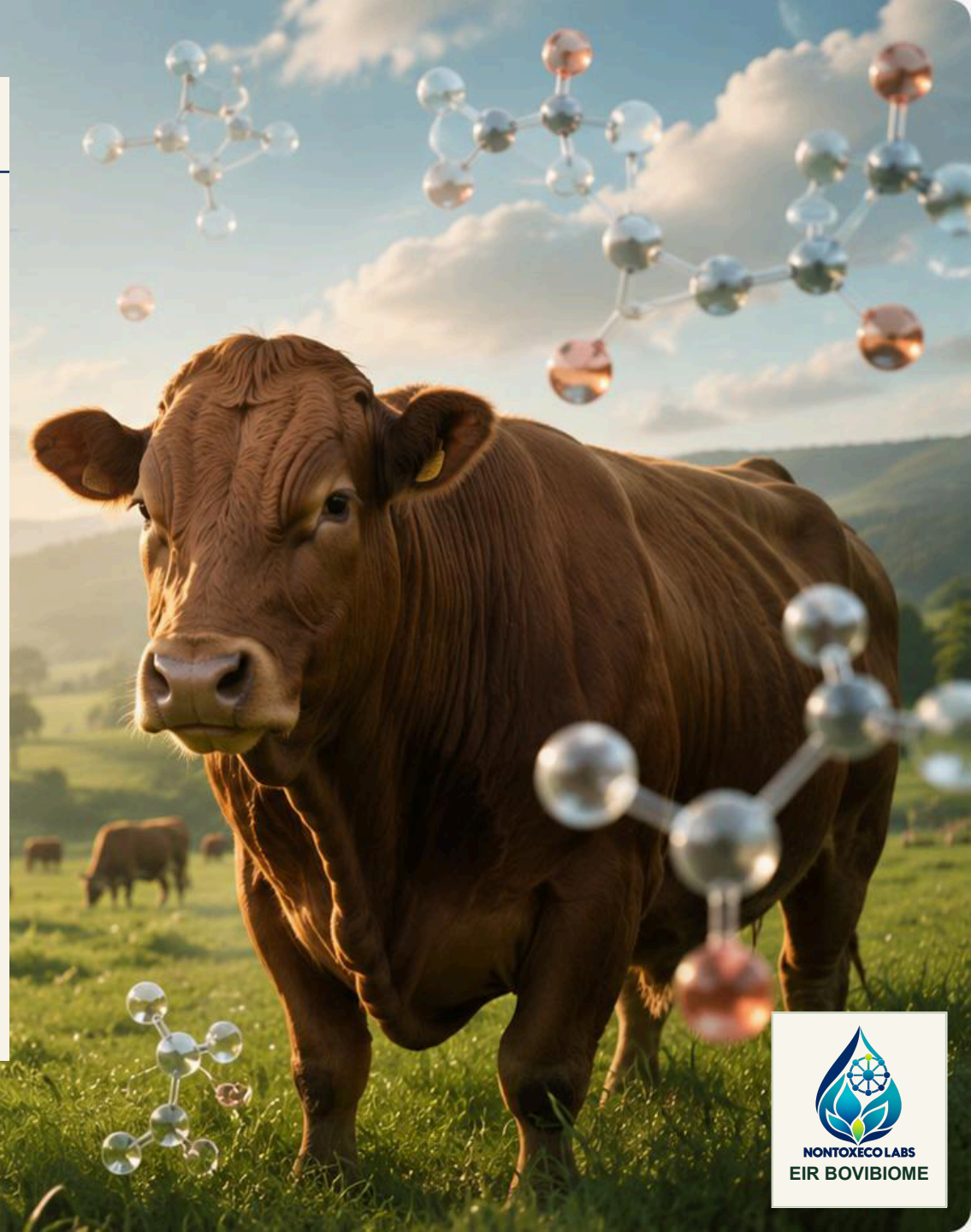
The formula devotes 60% of mass to three carriers: 30% magnesium butyrate, 15% calcium butyrate, and 15% tributyrin.

Theoretical butyrate-equivalent density is ~51.5% of product mass—about 10.30 g in a 20 g daily dose.

Illustrative design model: 61.9% retained after 24 h in rumen conditions $\times$ 90% intestinal release = ~5.73 g delivered post-ruminally.

Butyrate supports epithelial energy metabolism, barrier function, and host–microbe signaling.

Performance claims still require controlled cattle trials and validated release assays.



Monolaurin/GML contribution

GML (monolaurin) is 15% of the formula—3.0 g in a 20 g daily dose.

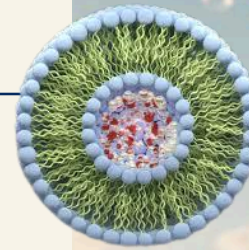
Low aqueous solubility helps structure the rumen-stable lipid matrix and limits rapid washout.

Under intestinal bile/lipase conditions, GML is co-released with the butyrate carriers.

GML applies membrane-active pressure more strongly to many Gram-positive and enveloped targets while supporting microbial rebalancing—not blanket sterilization.

Human-milk lipid biology provides a useful precedent: glycerol monolaurate can favor commensal resilience while suppressing selected pathogens.

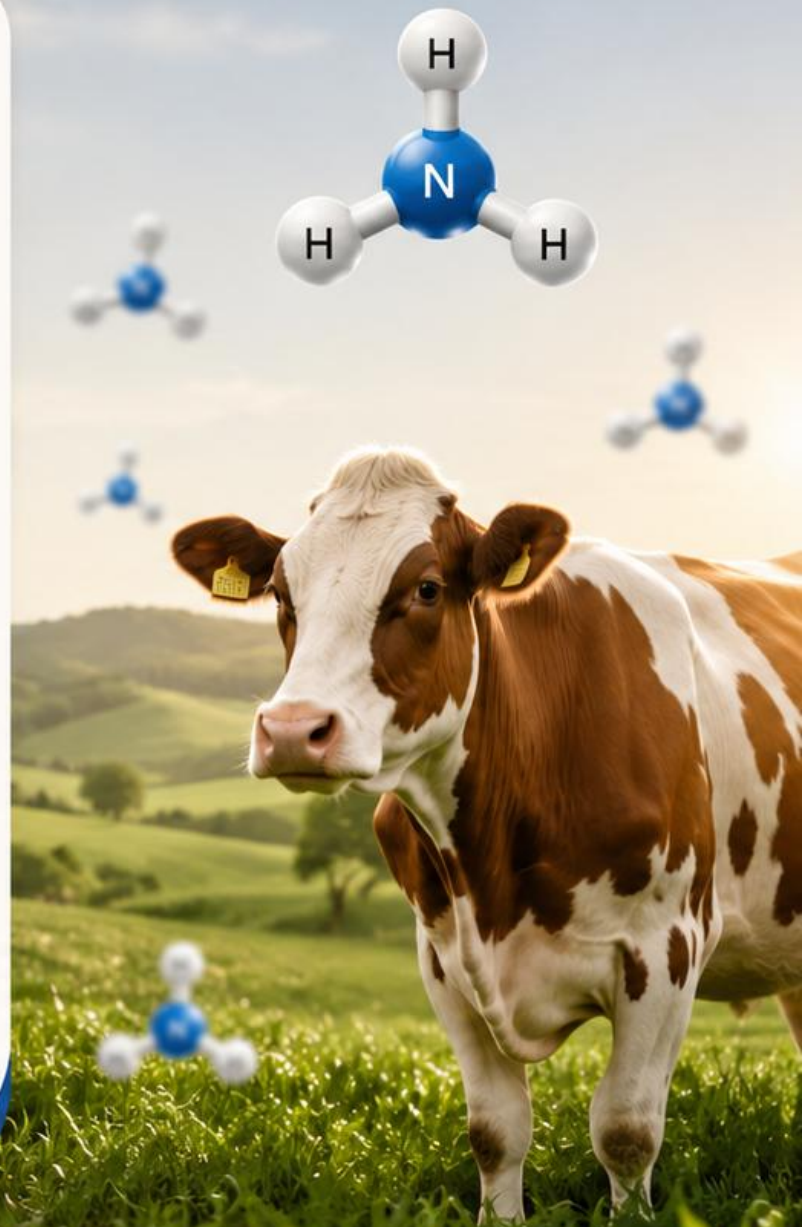
Microbial rebalancing plus butyrate mucosal support is the central competitive advantage.





Tributyrin contribution

- ✓ Tributyrin represents 15% of the formula—3.0 g in a 20 g dose.
- ✓ It is a triacylglycerol carrying three esterified butyrate groups.
- ✓ Its theoretical butyrate-equivalent fraction is ~86.4% by mass.
- ✓ Lipase-dependent hydrolysis couples butyrate release to intestinal digestion.
- ✓ QC should quantify intact tributyrin, free butyrate, recovery, and oil bleed.



Differentiation versus common product classes

 Product class	 Typical design	 Main limitation	 EIR BOVIBIOME difference
 Free butyrate salts	Directly soluble sodium/calcium butyrate	Odor and early rumen exposure.	Three-carrier payload inside a protected lipid-matrix prill.
 Simple fat-coated butyrate	External lipid layer	Erosion-dependent and vulnerable to mixing damage.	Homogeneous internal matrix—not only an external coating.
 Matrix-coated butyrate	Gradual release lipid carrier	Usually single-active payload.	Mg/Ca salts + tributyrin + GML in one prill.
 Tributyrin / esterified butyrate	Butyric-acid glyceride chemistry	Not necessarily cattle-specific rumen bypass flake.	Tributyrin integrated into a bile/lipase-responsive cattle system.
 Standalone monoglycerides	Medium-chain lipid antimicrobials	No butyrate epithelial payload.	GML paired with quantified post-ruminal butyrate delivery.

Manufacturing SOP summary

1. Qualify feed-grade inputs: identity, moisture, assay, salt hydration, GML/tributyrin purity, palm-stearin SFP, and silica.
2. Dry/sieve Mg/Ca butyrates; target D90 below 200–250 μm .
3. Melt palm stearin + GML + GMS at 68–75°C.
4. Cool to 62–68°C; add tributyrin, calcium stearate, and silica; then disperse mineral salts.
5. Homogenize 6–12 min; avoid air entrainment and overheating.
6. Pastillate/prill at 58–66°C to a target size of 1.0–1.4 mm.
7. Rapid-cool core to $\leq 25^\circ\text{C}$; condition 24–48 h, sieve/classify, and package.



Recommended use protocol

Parameter	Recommended U.S. protocol
 Target animals	Finishing cattle; transition-stressed cattle; feedlot programs requiring gut-barrier and feed-efficiency support.
 Daily inclusion	Approximately 20 g/head/day; adjust only after nutritionist review and trial data.
 Administration	TMR inclusion, premix integration, or controlled top-dress. Avoid uneven hand mixing.
 Feeding phase	Typically last 60–120 days of finishing; strongest commercial logic around a 100-day feedlot cycle.
 Adaptation	Introduce gradually over 3–5 days in sensitive or high-risk animals.
 Ration integration	Account for total Mg/Ca, dietary fat, mineral balance, and concurrent additives; adjust only after trial data.
 Storage	Cool, dry, moisture-barrier packaging; avoid heat that may soften or polymorphically alter lipid prills.

Development and QC targets

Test area	Why it matters	Development target
Butyrate assay	Confirms carrier payload and label consistency.	Quantify Mg/Ca salts, tributyrin, and total butyrate equivalent.
GML assay	Confirms microbial-rebalancing component.	Quantify GML plus relevant degradation products.
Tributyrin assay	Confirms enzyme-responsive carrier.	Measure intact TAG, free butyrate, and recovery.
Sequential release	Measures protection and availability.	≤40% rumen loss at 24 h; ≥85% retained-payload release in 6 h bile/lipase.
TMR abrasion	Confirms field robustness.	Minimal fines and stable release after simulated mixing.
Shelf stability	Confirms physical and chemical stability.	No oil bleed/caking/polymorph shift; release profile retained.
Palatability/tolerance	Protects adoption and animal safety.	No feed refusal and no adverse tolerance signal.

U.S. regulatory path

Regulatory strategy must be confirmed by U.S. feed-regulatory counsel and FDA/CVM pre-submission consultation.

Pathway / workstream	Practical meaning for EIR BOVIBIOME	Indicative timing
Ingredient status review	Confirm that each ingredient family and intended use is lawful for cattle feed and state distribution.	1–2 months
Claim strategy	Use feed-additive language: gut function, microbial balance, nutrient utilization, rumen-protected delivery.	1 month
GRAS assessment / notice	If conditions of use can be supported as generally recognized as safe, prepare expert safety dossier and consider FDA notification.	6–18+ months
AFIC consultation	FDA consultation route for animal food ingredients after the AAFCO MOU transition; useful for predictability.	Variable
Food Additive Petition	Needed if the substance/use is not GRAS and requires premarket approval.	18–36+ months
State feed registration	Coordinate label and ingredient status across target states after federal strategy is defined.	Parallel / launch prep



Launch plan and claim boundaries

Phase 1: protect IP, complete FTO/market search, and confirm U.S. ingredient/claim strategy.

Phase 2: produce pilot batches and run carrier/GML assays, TMR abrasion, shelf stability, and sequential rumen→bile/lipase release testing.

Phase 3: run palatability/tolerance and controlled feedlot performance trials against negative control and a relevant commercial benchmark.

Phase 4: complete GRAS/AFIC/FAP strategy and state feed registration workflow.

Preferred claims: supports gut barrier function, microbial rebalancing, rumen-protected butyrate delivery, enzyme-responsive intestinal release, and resilience under stress.

Avoid unsupported claims: treats disease, prevents liver abscesses, kills pathogens in vivo, replaces antibiotics, guarantees ADG/FCR, or provides 100% rumen bypass.



Questions & Discussion

Thank you for your attention.

Ido Eco Ofek | multidisciplinary scientist

econuvation@gmail.com



Phone (TH): +66 61 296 2109 | Phone (IL): +972 51 504 2377