

EIROLITTER

Ido Eco Ofek
Scientific developer and formulator

Staged release litter acidifier

Technology for animal bedding

Scientific and commercial overview



EIROLITTER

The inspiration behind EIROLITTER

Inspired by the Norse goddess of healing

EIROLITTER draws inspiration from Eir, the Norse figure associated with the art of healing.

The formulation is intended to support healthier farm animals by improving their bedding environment.



Artist interpretation of Eir

Scientific development

Ido Eco Ofek

Scientist and lead formulator

M.Sc. in Agricultural Animal Science
Hebrew University of Jerusalem

Experience in delayed release systems,
antimicrobial protection and bioactive
formulations.



Development focus: formulation architecture, activation and distribution within bedding.

Technology overview

Moisture activates a mineral-supported formulation designed to make acidity available progressively within litter.

Acidity where it is needed

A staged reserve is designed to maintain local acid availability as fresh manure and moisture enter the bedding.

Contact throughout the substrate

Granule distribution and wetting connect the chemical mechanism with the litter microenvironment.

The litter microenvironment

Continuous chemical demand

Fresh manure and microbial activity renew nitrogen inputs and consume the available acid reserve.

Uneven moisture

Wet patches activate dissolution but also change transport and local contact.

A changing substrate

Temperature, litter age and buffering capacity influence how the formulation behaves.



Acidity across location and time

Total acid capacity is only one part of the design.

Location

Acid must contact the ammonia-releasing litter zones. Dissolved species can move with water.

Timing

The release profile should replenish available acidity as the substrate neutralizes earlier additions.

The design objective is useful local acid availability over time, rather than an initial pH response alone.

Mineral-supported acid reserve

Different fractions
Different dissolution
Progressive availability

Litter moisture makes
acidifying components
available around distributed
mineral particles.



Mineral particles combine acid-bearing fractions with different dissolution rates.

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Three overlapping release stages

01

Initial availability

A readily available fraction responds to wetting and starts local acidification.

02

Buffered reserve

An acid reserve supplies additional capacity as the litter consumes acidity and pH tends to rebound.

03

Slower replenishment

Less readily dissolving components provide a further source of acidity as moisture reaches them.

Stages can overlap. The final composition and litter conditions determine the actual release profile.

Moisture-driven activation

Water access

Moisture enters the particle environment and enables dissolved components to interact.

Dissolution and diffusion

Solubility, particle size and the mineral matrix influence how quickly components become locally available.

Consumption and replenishment

Manure and litter buffering consume acidity. Remaining solid fractions can supply additional capacity.

Moisture connects particle dissolution, local transport and acid availability.

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pH and acid reserve

pH

The acid-base condition of the local aqueous environment.

Acid reserve

The remaining capacity to neutralize incoming bases before the system loses its intended acidic condition.

pH describes the current condition. The acid reserve supports continued acidification.

Surface retention concept

A distributed solid reservoir

The design keeps an acid-bearing reserve near treated bedding zones while moisture releases soluble species.

Local supply and transport

Particle movement, mixing and liquid transport determine where the available acidity ultimately acts.



Surface retention and controlled dissolution connect local placement with progressive acid availability.

In situ organic-acid availability

Organic-acid salt + acidifying environment



Lower local pH increases the protonated, undissociated fraction of a weak organic acid. Litter moisture enables the acid-base interaction.

This is a speciation mechanism. Available acid depends on composition, pH and local buffering.

Ammonia and ammonium equilibrium



Lower pH favors ammonium

Protonation shifts dissolved ammonia toward ammonium, reducing the fraction available as volatile ammonia.

The bedding environment still matters

Temperature, moisture, air movement and renewed nitrogen inputs influence overall ammonia release.

Wetting and distribution

Contact is part of the formulation architecture.

Surfactant role

A suitable surfactant can lower surface tension and improve wetting of litter particles and local spreading.

Access to heterogeneous surfaces

Wetting facilitates access of soluble components to micro-areas within shavings and organic material.

Surfactant behavior connects acid compatibility, dilution and contact with organic material.

Granules and mineral carrier

Physical distribution

The carrier supports the placement of active components across the treated bedding area.

Dissolution behavior

Particle properties and component solubility help shape the release profile after wetting.

Handling design

Particle size, density and moisture sensitivity affect segregation, caking and dust generation.

Particle design integrates distribution, handling and storage stability.

Complementary biological mechanisms

Weak organic acids

Some undissociated acids can enter microbial cells and disturb intracellular acid-base balance. Responses vary by organism.

Wetting and terpenic components

Contact, dispersion and selected plant-derived components provide a rationale for complementary biological interactions.

An integrated formulation

The formulation combines acid availability, wetting and plant-derived components within one bedding matrix.

Sodium and nutrient stewardship

Lower sodium input is a formulation objective.

Material selection

The choice of acidifying salts determines sodium loading independently of total acid capacity.

Used litter as a resource

Nutrient content, salinity and receiving-soil conditions matter when bedding becomes a fertilizer input.

Technology comparison

Readily soluble acidifier

Rapid availability after wetting

Dissolved material follows local water movement

Persistence depends on the acid load and litter conditions

Staged release design

Fractions with different availability

A distributed solid acid reserve

Progressive replenishment as components dissolve

Staged release combines local acid reserves with progressive availability after wetting.

Production and handling concept

Manufacturing route

The supplied staged-release concept uses dry blending. A microgranular version requires a defined physical processing specification.

Quality attributes

Blend uniformity, particle distribution and moisture management determine consistency of the intended package.

Storage and spreading

Packaging and handling should preserve component distribution and limit premature moisture activation.

Poultry first, broader bedding potential

Initial application focus

Poultry litter provides a recurring bedding-management setting with changing moisture and nitrogen inputs.

Adaptation to other systems

Cattle, calf and equine bedding present different exposure, substrate and handling conditions. Application design reflects the bedding conditions of each system.



The platform connects release architecture with the bedding conditions of each livestock system.

Commercial differentiation

Release architecture is the central technology proposition.

Use of the acid reserve

Progressive availability offers a rationale for matching acid supply to continuing demand within the bedding.

Value at the point of use

Distribution, handling and local persistence connect formulation design with farm operations.

Technology stewardship

Protected disclosure

Non-confidential materials explain functional roles. Exact composition, grades and processing details belong in controlled technical files.

Technical documentation

Technical files describe functional components, manufacturing parameters and application guidance.



The technology is organized around formulation design, manufacturing specifications and application guidance.

Scientific basis

Supplied technology documents

The supplied staged release technical note and scientific-commercial article describe the formulation architecture.

Litter acidification

University of Georgia: Litter Quality and Broiler Performance. North Carolina State University: Poultry Litter Amendments.

Microbial acid stress

Understanding How Microorganisms Respond to Acid pH Is Central to Their Control and Successful Exploitation (2020).

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Progressive acid availability within the bedding environment

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Scientific basis and source references appear in the slide notes.