



AmmoniQ

Technical Brief

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Technology Summary

AmmoniQ is a smart, affordable ammonia detection system designed to protect livestock, farmers, and farm workers from the harmful effects of ammonia exposure. Developed at IIT Ropar – Technology and Innovation Foundation (AWaDH), it uses a MEMS-based sensor and nRF52 microcontroller to continuously monitor air quality in livestock environments. The system includes a built-in alarm for real-time alerts and offers mobile/cloud integration for remote monitoring. With TRL-9 and in-market use, it delivers high impact at low cost and supports goals of animal welfare, regulatory compliance, and environmental sustainability.

Background

Ammonia emissions in dairy, poultry, and livestock farming pose significant health risks to animals and humans, contributing to respiratory illnesses, reduced milk yield, and premature livestock mortality. Regulatory pressure and rising awareness have created demand for continuous, real-time monitoring solutions. However, existing systems are often expensive, complex, or inaccessible to small and medium-scale farmers. AmmoniQ fills this gap by offering an affordable, real-time, alarm-enabled ammonia monitoring system suitable for both smallholders and commercial farms.

Technology Description

AmmoniQ uses a compact MEMS ammonia sensor integrated with an nRF52 microcontroller, which processes and transmits data wirelessly via Bluetooth. When ammonia levels exceed set thresholds, the device triggers an onboard audible/visual alarm and pushes alerts to the cloud or mobile app. The device supports low-power operation, making it ideal for remote or off-grid settings. It is suitable for standalone use or integration into precision livestock systems, ensuring continuous air quality monitoring.

Market Potential / Proposed Deployment

- Global Ammonia Sensor Market:
- USD163.27M (2024) → USD231.60M (2031) | CAGR ~6%
- Precision Livestock Farming Market:
- USD6.9B (2023) → USD11.2B (2028) | CAGR ~10.2%
- Livestock Monitoring Segment:
- USD1.65B (2025) → USD2.57B (2031) | CAGR ~7.7%
- Target Segments:
- Small to large-scale livestock farmers
- Dairy and poultry farms
- Agri-tech platforms and vet consultants
- Animal health NGOs and regulators

Applications

- Dairy Farms: Continuous ammonia monitoring to reduce animal stress and mortality.
- Poultry Farms: Prevent respiratory disorders and enhance compliance with air quality norms.
- Livestock IoT Integration: As a modular component within precision farming systems.
- Veterinary Use: As a diagnostic and preventive tool for monitoring barn conditions

Value Proposition

- Cost-Effective: Budget-friendly device with high-impact results.
- Real-Time Alerts: Instant notifications and alarms ensure timely action.
- Remote Monitoring: Cloud and app access for on-the-go tracking.
- Health & Safety Focused: Designed to prevent accidents and enhance animal welfare.
- Low Power & Reliable: Optimized for rural deployment with Bluetooth connectivity.

Technology Status

- Technology Readiness Level (TRL): 9 – In market use
- Testing: Self-tested and validated (no external/NABL certification yet)
- IP Status: No patent filed yet; open for licensing/collaboration
- Adoption: No pilots or partnerships yet, but field-ready for commercialization

