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Veterinary epidemiology

HYGIENE MONITORING IN LIVESTOCK FARMING: METHODS, CHALLENGES, AND RECOMMENDATIONS

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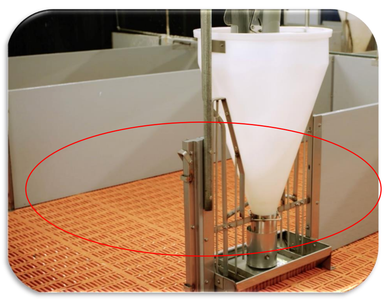
Introduction

Farm hygiene

Cleaning → Disinfection

Monitoring — Evaluation



Controlling the efficacy of cleaning and disinfection (C&D) on farms is frequently compromised due to time constraints, limited method awareness, and insufficient understanding of potential unseen threats.

Objective: To identify **applicable methods** for **monitoring hygiene** in animal houses.

Methodology

Literature review

WEB OF SCIENCE
PubMed
Scopus

102 papers

Inclusion criteria

- Studies from 2000-2023
- Peer-reviewed literature
- English language
- Demonstrating possible methods for evaluation hygiene & efficacy of C&D in farm stables

Target question for methods

How easy? | How quick? | How reliable? | How quantitative? | How cheap? | How sensitive? | For which surfaces? | What can be detected?

Key findings

Visual Inspection | Protein rapid tests | UV fluorescent markers | ATP bioluminescence testing | Agar contact plates (ACP) | Swabs samples | Molecular methods | Hygiene indicators

No	Method	How cheap?	How quick?	How easy to do?	How reliable?	How sensitive?	How quantitative?	For which surfaces are applicable?	What can be detected? Organic material	What can be detected? Microorganism
NONMICROBIOLOGICAL SAMPLING		+ + +	+++	+++	– –	– – –	+/-	**For surfaces and equipment**	+ +	+/-
1	**Visual inspection**	+ + +	+ + +	+ + +	– – –	– – –	–	Any surfaces and equipment available for visual assessment	+ +	–
2	**Protein rapid tests**	–	+	–	+	+	–	Particular areas of concern, high-risk surfaces, or critical control points	+	–
3	**UV fluorescent markers**	+ +	+ + +	+ + +	– –	– – –	–	Any areas potentially missed during the cleaning process	+	–
4	**ATP bioluminescence testing**	++	++	+ +	+	+	++	Specific areas of concern, high-touch surfaces, or critical control points more prone to contamination	+	+
MICROBIOLOGICAL SAMPLING		– – –	+/-	– –	+ + +	+ + +	+++	**For surfaces, equipment, and environments (water, dust, fecal)**	–	+ + +
1	**Agar contact plates (ACP)**	– –	– – –	+	++	+	+	Flat surfaces in different settings such as floors, walls, feed hoppers, and drinking water systems	–	+ +
2	**Swabs samples**	–	– –	+	+ +	+	+++	Any surfaces, useful for challenging areas, like inside artificial teats or pipes	–	+ +
3	**Molecular methods**	– – –	++	–	+ + +	+ + +	+ + +	Various surfaces in stables	–	+ + +
4	**Hygiene indicators**	– –	– –	– –	+ +	+	+/-	Various surfaces in stables	–	+ + +

Conclusions

In conclusion, a singularly "optimal" method for evaluating the efficacy of hygiene doesn't exist, necessitating the integration of various methodologies within a comprehensive protocol. For a judicious combination of these methods, a comprehensive understanding of their strengths and limitations is imperative.

Recommendation

We recommend the utilization of cost-effective rapid tests in locations with lower disease transmission risks, while locations bearing a higher risk profile should prioritize the adoption of more objective and dependable testing modalities.

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