The benefits of biosecurity in poultry farming

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Disease can be introduced on to a poultry farm in a number of ways. For example:

- The introduction of diseased stock.
- Introduction via personnel or vehicle movements.
- Migrating birds.
- Use of external equipment.

Instigating an appropriate biosecurity programme, using effective disinfectants, breaks this chain of disease transmission. While poultry producers must be vigilant regarding all aspects of disease transmission, did you know that disease spreading vectors can survive around us, and even on us, for a considerable time?

Table 1 shows how everyday materials can harbour infection for surprisingly long periods.

- **The recent outbreak of highly pathogenic avian influenza in South East Asia, resulting in the death of over 100 million birds, demonstrated the capacity for highly contagious diseases to devastate poultry production on an international scale.**
- **Poultry producers worldwide should now seriously consider taking steps to institute effective biosecurity programmes to exclude disease carrying vectors from entering the farm environment.**
- **In South East Asia it was seen that countries, such as Japan, where biosecurity practices are high and response to the outbreak very quick, were able to control the serious avian influenza challenge more effectively.**
- **This article will consider how biosecurity, using effective products, benefits modern poultry production.**

What is biosecurity?

Biosecurity is a set of management practices which, when followed, collectively reduce the potential for the introduction and spread of disease causing organisms onto, and between sites. To ensure that the most appropriate biosecurity programme is used in farming, various protocols have been developed.

Preventative biosecurity, otherwise known as bioexclusion, will help block disease carrying vectors from entering the farm environment and avert disease outbreaks.

As part of a preventative biosecurity programme, producers should action continuous biosecurity measures such as foot and wheel dips, hand hygiene, aerial and litter disinfection, water sanitisation and rodent control.

All-in, all-out production

Terminal biosecurity is part of an all-in, all-out production programme and involves thorough cleansing and disinfection of houses at turn around.

To prepare for a local outbreak of an emergency disease, such as avian influenza, production units should have an Emergency Disease Control (EDC) programme prepared before an outbreak occurs.

When an outbreak of an emergency disease occurs, EDC programmes must be immediately put into operation to create a barrier against infection from highly contagious diseases.

If an emergency disease (for example, an OIE list A disease such as Newcastle disease) does become established in the farm environment, full decontamination biosecurity, also known as biocontainment, must be used to remove pathogen challenge from infected premises.

The website of Antec International is the largest source of biosecurity information on the internet and contains details of all the biosecurity programmes mentioned here.

Farm personnel		Housing accessories		Other	
Cotton	4 days	Straw	2 days	Feathers	4 days
Hair	3 days	Wood	1 day	Feed	4 hours
Rubber	2 days	Shavings	8 hours		
Nose	1 day				

Table 1. Survival of Mycoplasma gallisepticum.

Look out for HACCP programmes that identify hazards, critical control points and are compliant for food safety.

Effective disinfection in biosecurity

Effective disinfectants are vital to the sucess of biosecurity programmes. When considering which disinfectants are most approriate, producers should consider:

- Efficacy against a range of target organisms. Selected disinfectants should be supported by independent testing data against virucidal, bacterial, sporicidal and fungical pathogens.
- Proven broad spectrum virucidal action. For example independent efficacy data against viruses causing avian influenza, chicken anaemia, Gumboro disease and Newcastle disease.
- Specific data against food safety pathogens, for example campylobacter and salmonella.
- Disinfectants must also be proven against virus families affecting man and animals, effective on porous wooden surfaces and, ideally, safe in drinking water and for aerial disinfection in the presence of stock.
- Effectiveness at a range of temperatures in realistic farming conditions. Farmers must be confident that their selected disinfectants will remain active

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in high and low temperatures. Some disinfectants lose significant activity in winter conditions – especially aldehydes, such as formaldehyde.

On the other hand, the decomposition of hypochlotite disinfectants (for example bleach) is accelerated by heat.

Disinfectants in the farm environment must also be able to penetrate organic materials such as soil, straw, blood and manure which can inactivate some disinfectants or protect micro-organisms from their effects.

Many disinfectants, such as those based on chlorine and citric acid, are less effective in the modern farm environment than modern disinfectants that have been formulated specifically for the job in hand.

Disease	Cost ($/bird)
Fowl cholera (turkeys)	0.59
Reovirus (breeders)	6.89
Avian influenza (chickens)	19.00
M. gallisepticum (layers)	1.72
Coronavirus (turkeys)	0.05

Table 2. Cost of endemic disease.

The activity of some disinfectants can be reduced or destroyed by hard water. The UK DEFRA test method for disinfectants is arguably the best as it accounts for low temperatures, organic challenge and hard water.

- Safety and ease of use. The best disinfectant will fail if incorrectly applied. The safety of users, stock and consumers is a vital concern when selecting appropriate disinfectants. A number of unformulated, basic chemicals are highly corrosive and unpleasant to handle.

Dangerous disinfectants may well not be applied correctly as operators are concerned about their own safety.

Ensure that users are regularly trained and that biosecurity programmes are audited to ensure that disinfectants are applied at the correct dilution rate. Keep record sheets to record the dates and extent of biosecurity activity.

Poultry producers should consider all the above issues when selecting the cleansers and disinfectants suitable for their production unit.

Antec International's range of cleansers and disinfectants have been formulated for broad spectrum usage and are independently tested in realistic farm conditions, at a range of temperatures and in the face of organic challenge to ensure that farmers can be confident of their effectiveness in modern poulty farming.

In an emergency disease situation, Virkon S is the disinfectant of choice of governments worldwide.

It is the only branded disinfectant referred to in the AUSVETPLAN, the emergency disease control plan of the Australian and New Zealand governments, which is probably the most comprehensive and best regarded reference source for emergency disease control.

The expectations of biosecurity

By reducing the risk of endemic, highly contagious diseases from entering the farm environment producer's expectations of effective biosecurity include:

- Reduced mortality.
- Increased productivity.

At the same time, effective biosecurity will reduce contamination with agents of public health significance and eliminate background immunosuppressive agents that leave livestock more susceptible to other diseases.

While the cost of endemic disease is significant (see Table 2) the cost of subclinical disease must not be ignored.

Challenged by disease that is not apparent, birds will show reduced performance and productivity.

This will be seen in increased background mortality and culling, reduced weight gain and increased downgrading at processing.

For example, following diminished

	Medication ($/bird)	Disinfection ($/bird)	Total spend ($/bird)
Traditional biosecurity	0.753	0.041	0.794
Antec biosecurity	0.337	0.057	0.394
Difference	0.416	-0.016	0.400
Extra disinfection spend/bird		0.016	
Medication saving/bird		0.416	
REO/bird	$0.4	**REO ratio**	**24.4:1**

Table 3. Return on extra outlay (REO) evaluation of Italian breeder trial.

immunosuppressive response from subclinically challenged birds, a 15% suppression in growth was seen after exposure of commercial poultry to microflora under conventional conditions, compared to 'germ free' birds.

In the McIlroy study, an 11% improvement in income per 1,000 birds was seen in farms with unaffected flocks over farms with evidence of acute Gumboro infection.

Moreover, a 14% improvement in income per 1,000 birds was seen in unaffected flocks compared to farms with evidence of chronic Gumboro infection.

The economic benefits

Simple procedures that cost next to nothing, such as keeping outside vehicles away from poultry houses, locking each poultry house and ensuring that outsiders stay off the farm, immediately provide economic benefit.

Vigilance also pays off. For example, consider the health status of incoming birds, provide a gate at the entrance to the farm and a fence around the premises.

Provide wash stations for vehicles that have to enter the farm environment, institute an all-in, all-out production cycle with terminal disinfection between each flock and remove litter after each flock (composting before removal).

The economic benefit of many of these procedures will immediately provide a two or three fold increase in profitability.

A trial was carried out on 100,000 Italian broiler breeders to assess the economic benefit of biosecurity using effective products. The estimated impact on business of disease, mainly Gumboro, E. coli, mycoplasma and respiratory disease, was about 5% of total production costs. A biosecurity programme was instituted based on the full range of Antec products including HD3, Farm Fluid S and Virkon S.

These effective biosecurity measures paid off and, as a result, the total veterinary bill was reduced by US$11,901.98 (see Table 3).

What is more, the return on extra outlay ratio was a significant 24.4:1 proving that appropriate biosecurity, using effective products provides vital economic benefits in modern poulty farming.

It is a fact of life that in modern intensively reared poultry production, disease causing pathogens are easily transmitted and can cause mortality and reduced productivity within a flock.

Disease prevention is always less expensive than treatment and the cost of implementing appropriate biosecurity systems is small when compared to the financial profit that can be made from increased production.

The use of effective disinfectants is vital in biosecurity to ensure that disease carrying vectors are eliminated before they infect valuable stock. ■