aegis®

LONG LASTING ANTIMICROBIAL SURFACE PROTECTION

COMMERCIAL POULTRY

Antimicrobial Applications Overview

Safe | Durable | Effective

Bactraban

PROTECT YOUR BUSINESS FROM INVASIVE MICROBES

SOLE DISTRIBUTOR OF AEGIS® IN SOUTH AFRICA

www.bactraban.com

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1 Introduction

Bactraban, as the master distributor of AEGIS Microbe Shield® in South Africa, has recently explored the need for a durable antimicrobial in the commercial poultry market in South Africa.

To date, in meetings with industry, associations, and farmers, it appears that there is a need and opportunity.

The use of broad-spectrum antibiotics is under scrutiny. There remains a significant threat within the industry that bio-security has become an important consideration and a top priority to farmers, associations, and industry suppliers. There are significant health and economic issues associated with bacteria and mould in the commercial poultry setting as well.

This document captures some of our learnings to date. We have prepared this as an introduction to AEGIS®, provide background information on mould, and outline the proposed antimicrobial applications for the poultry industry.

2 Value Proposition

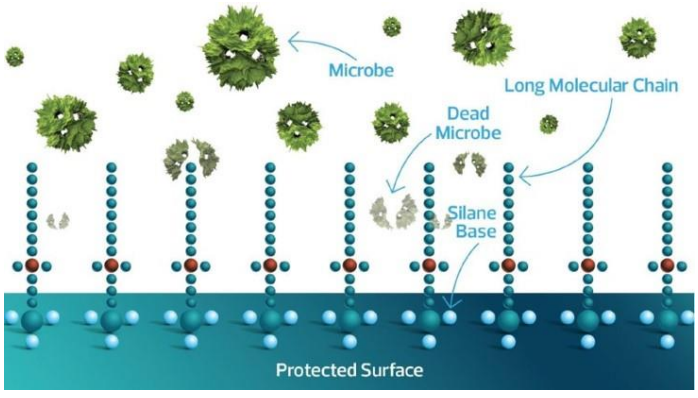
AEGIS® can protect the surfaces touched by the poultry to reduce exposure to bacteria and mould.

The use of the AEGIS Microbe Shield® in commercial poultry is rooted in the following:

- Poor indoor environmental quality – Many mould species release air-borne toxins that have been proven to cause illness in poultry. Bacteria thrive in damp or wet areas and can cause disease.
- Broilers, layers and hatchers face different challenges. Key surfaces can be addressed.
- HVAC system for air handling.

3 Technology Overview

AEGIS® (AEM 5700) is the world's most widely used antimicrobial surface coating. AEGIS® Microbe Shield is an enduring Antimicrobial Surface Protectant. It is combined with normal cleaning practices to provide residual surface protection against the growth of bacteria, mould, mildew, fungi, yeast and algae on surfaces.



AEGIS® forms a protective coating that can molecularly bond with surfaces upon application. Bacteria, moulds, and mildew are attracted to the coating's positive charge. When applied to surfaces, AEGIS® forms a colourless, odourless, positively charged barrier that attracts, then electrocutes and disrupts their negatively charged cell membranes. AEGIS® contributes to enduring clean surfaces by utilizing a charge disruption mode of action.

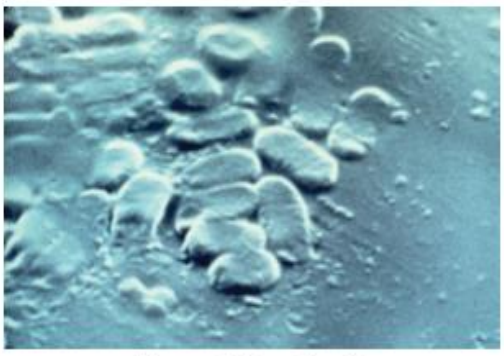
AEGIS® has a long history of delivering durable, long-lasting antimicrobial efficacy to protect treated surfaces.

3.1 How Does AEGIS® Work?

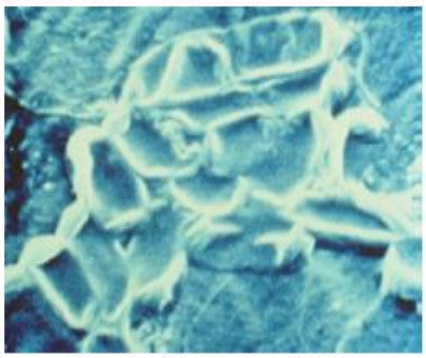
AEGIS® does not dissipate or leach, therefore, it is not absorbed by the organism, or by the chickens.

Think of AEGIS® as a microscopic sword and a treated surface acting like a bed of nails or swords. AEGIS® modifies treated surfaces creating an inhospitable environment for microbes including bacteria, fungi and mould – in other words – microbes cannot live on surfaces protected by AEGIS®. The positive nitrogen centre of the AEGIS® sword attracts microbes to it and the long carbon chain punctures the cell membrane destroying the microbe on contact.

This combination of stabbing and electrocution allows the technology to be fully effective as long as the surface remains intact.



Normal E. coli cells on untreated surface.



E. coli cells ruptured after contact with treated surface.

4 Approvals

AEGIS® is manufactured by AEGIS Environmental Management Inc. and owned by Microban. AEGIS® and AEGIS Microbe Shield® are trademarks of Microban International. PROTECT Technologies is the global master distributor of AEGIS Microbe Shield®. Bactraban is the master distributor in South Africa. The biocidal active components of AEGIS® are notified with the EU Biocidal Products Regulation (BPR) and registered with the US Environmental Protection Agency (EPA) and Health Canada Pest Management Regulatory Agency (PMRA).

- US Environmental Protection Agency: 64881-1 & 64881-7
- Health Canada: PCP# 15133
- European Union: AEGIS® is listed as PT-7 and PT-9 with the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) and as PT-2 in the United Kingdom.

5 Attributes of AEGIS Microbe Shield®

Some attributes of AEGIS Microbe Shield® include:

Non-toxic	No odour	No Volatile Organic Compounds
Non-leaching	No colour	Not triclosan-based
Non-transferring	No off-gassing	Cannot be felt by touch
Non-flammable	No heavy metals	Has hydrophobic qualities

6 Poultry Bacteria

As every chicken producer can attest, keeping the birds in optimal health is a finicky task, and failure can lead to serious losses. Poultry bacterial diseases are a significant concern in poultry farming, affecting the health and productivity of chickens. Bacterial infections in poultry can lead to severe health issues, decreased egg production, and high mortality rates if not managed effectively. Common bacterial pathogens include Escherichia coli, Salmonella, Mycoplasma, and Clostridium perfringens. These bacteria can cause diseases such as colibacillosis, salmonellosis, mycoplasmosis, and necrotic enteritis. Effective management involves good biosecurity practices, sanitation, vaccination, and, when necessary, appropriate use of antibiotics to control and prevent outbreaks, ensuring both animal welfare and food safety. This means that a meticulous biosecurity plan is a top priority.

6.1 Bacterial Diseases

- Escherichia Coli Infections
- Salmonellosis
- Paratyphoid Infections Fowl Cholera
- Riemerella Anatipestifer Infections
- Mycoplasma
- Necrotic Enteritis
- Cholangiohepatitis in Broiler Chickens
- Gangrenous Dermatitis
- Botulism
- Avian Tuberculosis

6.2 Mycoses and Mycotoxicoses

- Aspergillosis
- Aspergillus Granulomatous Dermatitis
- Aflatoxicosis
- Candidiasis
- Fusariotoxicosis

6.3 Sources of Infection

Diseases can be introduced to a commercial poultry flock by many different routes. The most common sources include:

- Contaminated vehicles and other farm equipment (e.g. manure trucks and spreaders, tractors, feed trucks) infected neighbouring flocks (commercial or backyard) and live bird markets.
- Contaminated people (e.g. hands, clothing, footwear, hair).
- Contaminated poultry equipment (e.g. hauling crates, catching equipment, feeders and waterers).

7 Microbial Management

Current microbial management in poultry farming emphasises prevention, monitoring, and targeted interventions to control harmful bacteria, reduce disease incidence, and enhance overall flock health. This approach combines biosecurity practices, vaccination, environmental management, and antibiotics for a balanced microbial environment. Here is an outline of the main strategies:

- Biosecurity Practices
- Vaccination Programs
- Probiotics and Prebiotics
- Antibiotic Stewardship
- Water and Feed Sanitation

- Environmental Control
- Routine Testing and Monitoring

These integrated management practices aim to enhance poultry health and productivity while reducing the risk of bacterial infections, antibiotic use, and zoonotic transmission. AEGIS® can add an extra layer of protection and enhance the bio-security.

7.1 Benefits of using AEGIS Microbe Shield

Using AEGIS Microbe Shield® in poultry farming is beneficial because it provides long-lasting, antimicrobial surface protection that helps reduce bacterial contamination without using chemicals that could affect the birds or lead to resistance. AEGIS Microbe Shield® is a non-leaching, bonded antimicrobial coating that can be applied to surfaces, forming a protective layer that disrupts microbes on contact. Here are some potential benefits of using it in poultry farming:

1. **Enhanced Biosecurity**: By applying AEGIS Microbe Shield® on surfaces within poultry facilities, such as walls, floors, feeders, and waterers, it can help to significantly reduce microbial contamination. This can lead to a cleaner environment and minimise the risk of disease transmission.
2. **Extended Protection**: Unlike traditional disinfectants, which work only when freshly applied, AEGIS® provides continuous microbial protection. This long-lasting action means fewer applications are needed, reducing labour and time spent on sanitising areas.
3. **Reduction in Pathogen Load**: AEGIS® can help in reducing the overall pathogen load in the poultry environment, including harmful bacteria such as *Salmonella* and *E. coli*, which are common in poultry farming.
4. **Antibiotic-Free Approach**: Using AEGIS® supports an antibiotic-free disease prevention strategy, which aligns with current industry goals to reduce antibiotic use due to the risk of resistance development. It provides an additional layer of protection that reduces reliance on antibiotics for microbial control.
5. **Improved Bird Health and Performance**: A cleaner, lower-pathogen environment helps reduce stress on the birds' immune systems, potentially leading to better growth rates, higher egg production, and overall improved flock health.
6. **Cost-Effectiveness**: With its durable, long-lasting application, AEGIS® can reduce the frequency of cleaning and sanitisation required, ultimately lowering maintenance costs over time.
7. **Environmental Safety**: AEGIS® is generally non-toxic and does not leach or release harmful chemicals, making it safer for workers, birds, and the surrounding environment compared to other traditional disinfectants that may contain harsh chemicals.

By offering a sustainable, chemical-free way to maintain a hygienic environment, AEGIS Microbe Shield® can enhance microbial management in poultry farming, supporting healthier flocks and potentially better productivity.

8 Where Should AEGIS be Applied?

The following sections outline some high-impact proposed applications for AEGIS® in the commercial poultry setting. AEGIS® is formulated to control and prevent microbial growth by destroying microbes on contact.

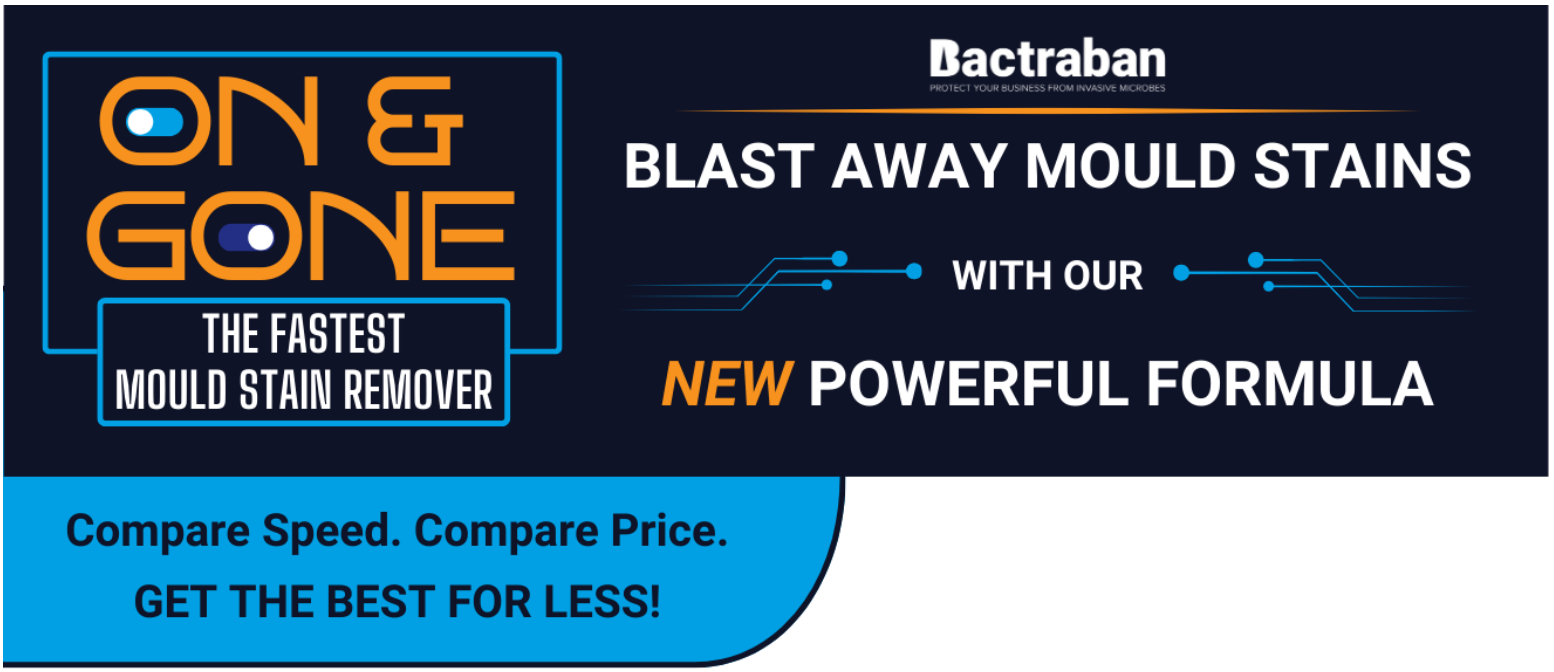
- Laying Cages
    - The entire barn would be sprayed at the annual clean-out. Cages, conveyors and rollers.
- Hatching Baskets
    - Eggs need a sanitary environment for proper development. Clean baskets prevent exposure to harmful microbes that could interfere with healthy growth and lead to birth defects or weak chicks.
- Broilers
    - The entire barn at cleanout.
    - The wood chips can be treated at the source.
- Ducting
    - The air ducts are the lungs of the building and one of the primary channels for mouldy air to be circulated throughout the space. Treating air ducts is always recommended for all forms of microbial control.

9 Conclusion

The commercial poultry market has an issue with bacteria, mould and related challenges. Antibiotics are a concern because of resistance and downstream impact. The poultry industry has significant risk and financial implications as a result. The physical kill and other properties of AEGIS® creating a durable antimicrobial effect hold great potential. AEGIS® is a proven means for controlling and preventing microbial growth.

10 Appendix A: ON & GONE – Mould Stain Remover

Meet our New Ultimate Mould Stain Remover, On & Gone! Use On & Gone to effectively remove mould stains – fast! Apply On & Gone to remove mould stains and complement this cleaning process by applying AEGIS Microbe Shield® afterwards for long-lasting mould prevention.



LIGHTER:

Only stain remover with a fresh scent to reduce chlorine odour.
Happy Homeowners!

FASTER:

Two powerful ingredients to destroy stains, FAST. Nothing is faster!
Fastest stain remover on the market!

STRONGER:

Special ingredients to penetrate deeper into substrate to lift dark stains.
Easily lifts deep, dark stains. Fast!

On & Gone uses the active ingredient of Sodium Hypochlorite combined with an effective mixture of surfactants and stabilisers to produce a modified surface tension such that it has the penetration capability and dwell time to truly remove mould stains.

On & Gone removes mould, mildew, and algae stains and is used to deodorize wood. It can be used for ceilings, walls, roofs, tiles, grout, concrete, wood, drains, toilet bowls, baths, and showers. On & Gone can also be used on solution-dyed acrylic fabrics.

On & Gone will discolour and possibly damage metals such as copper, steel, aluminium, silverware, and mechanicals as well as natural fibres such as cotton, wool, silk, and leather – Do not apply to these surfaces. Do not mix with other chemical products.

11 Appendix B: Partial List of Susceptible Organisms

AEGIS® has been tested to be effective at controlling and preventing the growth of a wide variety of micro-organisms including the following. The microorganisms listed should be viewed as representative of the types of organisms against which AEGIS® technology is effective, rather than as a comprehensive list. Commonly requested microorganisms are highlighted.

Bacteria
Micrococcus sp.
Staphylococcus epidermidis1
Enterobacter agglomerans1
Acinetobacter calcoaceticus1
Methicillin-resistant staphylococcus aureus (MRSA)
Staphylococcus aureus(pigmented)1
Staphylococcus aureus (nonpigmented)1
Klebsiella pneumoniae ATCC 4352
Pseudomonas aeruginosa
Pseudomonas aeruginosa PRD-10
Strepticoccus faecalis
Pseudomonas aeruginosa1
Escherichia coli ATCC 23266
Escherichia coli1
Proteus mirabilis
Citrobacter diversus1
Salmonella typhosa
Proteus mirabilis1
Salmonella choleraesuis
Corynebacterium bovis
Mycobacterium smegmatis
Mycobacterium tuberculosis

Bacteria Continued
Bruncella cania
Brucella abortus
Brucella suis
Streptococcus mutans
Bacillus subtilis
Bacillus cereus
Clostridium perfringens (C. Diff.)
Haemopilus influenzae
Haemophilus suis
Lactobacillus casei
Leuconostoc lactis
Listeria monocytogenes
Propionbacterium acnes
Proteus vulgaris
Pseudomonas cepacia
Pseudomonas filluorescens
Xanthomonas campestris

Fungi
Aspergillus niger
Aspergillus fumigatus
Aspergillus versicolor
Aspergillus flavus
Aspergillus terreus
Penicillium chrysogenum
Penicillium albicans
Penicillium citrinum
Penicillium elegans
Penicillium funiculosum

Fungi Continued
Penicillium humicola
Penicillium notatum
Penicillium variabile
Mucor sp.
Tricophyton mentagrophytes
Tricophyton interdigitalie
Trichoderma flavus
Chaetomium globusum
Rhizopus nigricans
Cladosporium herbarum
Aureobasidium pullulans
Fusarium nigrum
Fusarium solani
Gliocladium roseum
Oosopa lactis
Stachybotrys chartarum

Algae
Oscillatoria borneti LB143
Anabaena cylindrica B-1446-1C
Selenastrum gracile B-325
Pleurococcus sp. LB11
Schenedesmus quadricauda
Gonium sp. LB 9c
Volvox sp. LB 9
Chlorella vulgarus

Yeast
Saccharomyces cerevisiae
Candida albicans