



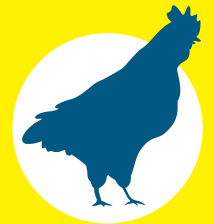
Eimeriavax 4m



FOR ANIMAL TREATMENT ONLY
EIMERIAVAX 4m
(Strains: *E.acervulina*, *E.tenella*,
E.necatrix, *E.maxima*)
1000 doses
For eye application
READ THE ENCLOSED LEAFLET BEFORE USE.
IPVMA 55495V
BIOPROPERTIES

Features of Eimeriavax 4m - Live Coccidiosis Vaccine

- Simple, single dose, eye-drop or oral application
- Safe in chickens from day-old
- Immunity induced within 10 days against the four major species of Eimeria (*E. acervulina*, *E. maxima*, *E. necatrix*, and *E. tenella*)
- Effective in broiler breeders, broilers, free range and barn lay flocks
- Supplied ready to use
- Simple storage requirements in the refrigerator (4 - 8°C)
- No anticoccidial medications are required
- Provides productivity improvements



Product development

Three of the four precocious Eimeria strains used in EIMERIAVAX 4m were developed by the Animal Research Institute, a division of the Department of Primary Industry and Fisheries, Queensland, with funding support from the Rural Industries Research and Development Corporation. The fourth strain (*E. necatrix*) was developed by a team led by Dr Grant Richards through his company, Medichick Pty Ltd. Medichick and BIOPROPERTIES combined resources in 1996, and established Eimeria Pty Ltd to develop the strains into commercial products. In 2003, EIMERIAVAX 4m became the first live coccidiosis vaccine registered for use in poultry in Australia. The finished product, containing a suspension of live oocysts of the four coccidial species is presented in plastic bottles, each containing 1000 doses. An eyedropper tip is provided for easy vaccine administration. One dose of EIMERIAVAX 4m contains a minimum of 400 oocysts. Safety and efficacy have been confirmed by a number of laboratory scale and field use studies.

Special features

Seven species of the coccidial parasite, *Eimeria*, occur in poultry in Australia. The four most significant are represented in EIMERIAVAX 4m: *Eimeria acervulina*, *E. maxima*, *E. necatrix* and *E. tenella*. Field strains with low levels of pathogenicity were identified and attenuated for precocious replication, thereby further reducing the ability of each strain to produce clinical disease. The vaccine strains have been selected for their antigenicity, sensitivity to anticoccidial agents, fecundity and safety. Vaccination with these precocious strains generates a life-long protective immune response.

Efficacy studies

Small scale studies with the four vaccine strains of EIMERIAVAX 4m have demonstrated that onset of an immune response can be detected within 10 days of vaccination, with the maximum protective immune response being reached within 21 days post-vaccination. These findings have been confirmed in extensive field use of EIMERIAVAX 4m under Australian condition.

Vaccination with EIMERIAVAX 4m confers life-long protection against the four important coccidia to broiler breeders, broilers, free range and barn lay flocks.



How immunity to EIMERIAVAX 4m vaccination develops

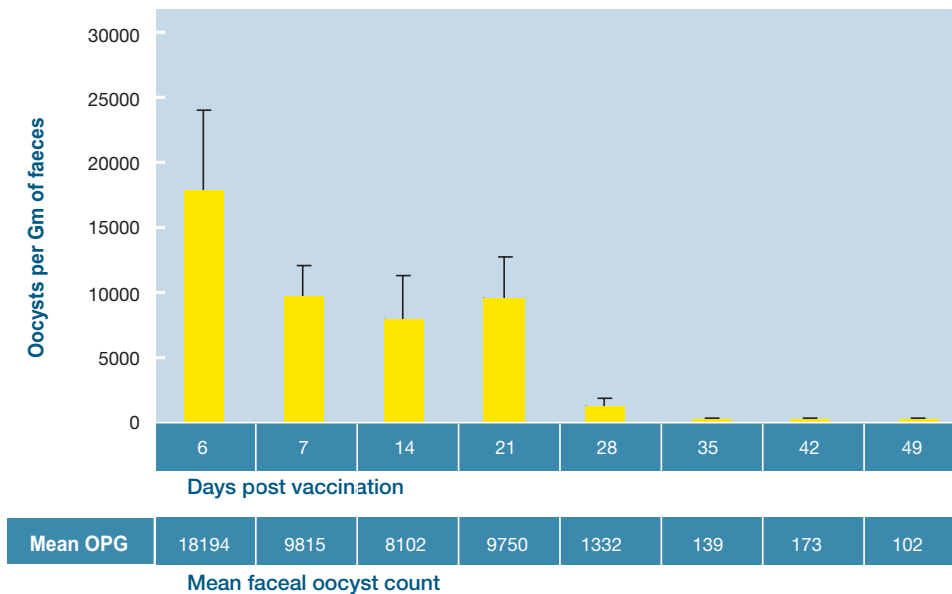
EIMERIAVAX 4m is a suspension of live sporulated *Eimeria* oocysts in saline. The oocyst has an outer shell that protects and contains the 8 infective elements of the parasite, called sporozoites.

Following vaccination with EIMERIAVAX 4m by eyedrop, the vaccine oocysts are washed down the lacrimal (or tear) duct to the back of throat, ensuring that they are swallowed. The oocysts are then disrupted in the gizzard enabling the sporozoites to be released on contact with the digestive enzymes in the upper intestine. Several days later, secondary oocysts appear in faeces. These must spend a day or so, on the litter of the shed, before becoming infectious (sporulated) following several cycles of asexual then sexual replication, a process that is optimised by the presence of moisture, temperature and air.

EIMERIAVAX 4m stimulates immunity by a two-stage process. Firstly, the replication of the vaccine strains after administration by eyedrop sensitises the immune system. The ingestion and replication of secondary sporulated oocysts then stimulates greater levels of immune response and longer lasting protection. Although subsequent replication cycles of the vaccine strains occur, the levels of oocyst production decline significantly as the bird becomes strongly immune. By 28 days after vaccination, very few oocysts are shed.

This phenomenon is demonstrated in Figure 1. Faecal oocyst production from vaccination of a shed of broilers was followed over a period of 49 days. Faecal oocyst counts reached their maximum levels around 6 days post vaccination. After this time they decreased quickly to very low levels at day 28, and were almost undetectable by 35 days post-vaccination.

Figure 1. Development of immunity following vaccination with EIMERIAVAX 4m:



OPG = Oocysts per gram

Maintaining conditions that favour vaccine spread

The presence of secondary oocysts in the shed litter is an important part of the development of the immune response and thus disease control. Very dry litter conditions do not favour this process, as the oocysts tend to become desiccated and of reduced viability. Temperatures above 41°C can kill oocysts, and this temperature is easily reached in working litter.

Various bird husbandry practices may reduce the efficacy of the vaccination program. For example, if birds are moved from rearing sheds to production sheds, the vaccine strain oocysts may not be transferred in the process.

This circumstance may interfere with the ordinarily anticipated immune response induced by the vaccination process. To improve vaccine management our research has shown that reintroducing chickens to oocysts by a further vaccination can ensure the immune response remains at protective levels whenever shed conditions or management indicates that immunity is less than optimal. Such a strategy, if required, should only be employed when there are clinical signs of disease. EIMERIAVAX 4m has been shown to be safe when administered by repeat dosing.



Vaccine Use

A full description of the storage, handling and method of administration of EIMERIAVAX 4m is described in the product leaflet that accompanies the vaccine.

Vaccine Presentation

EIMERIAVAX 4m is supplied in a plastic peel-top 30 mL eyedropper bottle with a rubber stopper and aluminium seal. Each bottle is supplied with a dropper teat and contains 1000 doses.

Vaccine Administration

Comprehensive details about EIMERIAVAX 4m are contained in the product leaflet. As oocysts are heavier than the suspension solution they tend to sink to the bottom of the vial. Therefore, prior to administration, the vial containing the vaccine should be gently shaken. DO NOT shake the suspension vigorously as this may rupture the oocysts. It is also important to keep the vaccine bottle gently agitated during administration. If, during vaccination, an operator is unsure that a dose was administered into the eye, a repeat dose should be given. EIMERIAVAX 4m is tested for safety to a 10 times dose. EIMERIAVAX 4m is administered by placing a single drop onto the cornea of the chicken's eye.



Vaccine storage

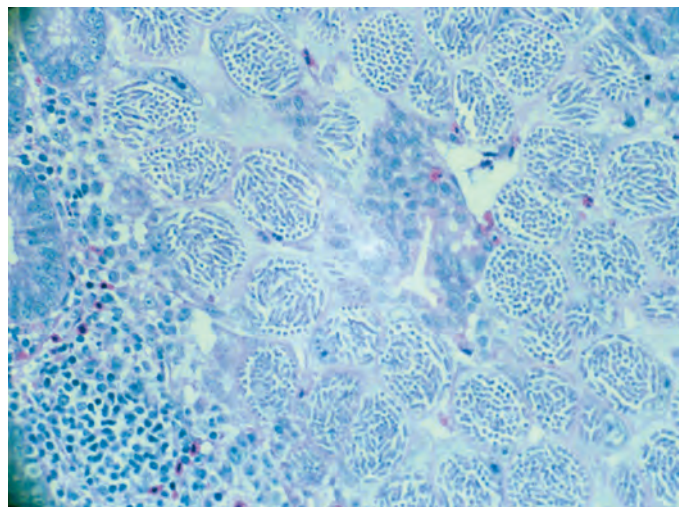
Maintaining storage temperatures and correct stock rotation are critical factors to guarantee vaccine quality. Oocysts will not survive freezing. Therefore refrigeration must maintain a temperature of between 4°C and 8°C and must never be allowed to go below 4°C. Provided that product is within its prescribed shelf life, always use the oldest vaccine first. EIMERIAVAX 4m is formulated to ensure sufficient oocysts are present over the shelf life of the product.

Vaccine program

USE ALL PRODUCT WITHIN 24 HOURS OF OPENING

Chickens from day-old can be vaccinated with EIMERIAVAX 4m. With individual bird administration, it is critical each bird receives a correct dose. Operators should administer a repeat drop if the first is not fully absorbed by the eye. It is recommended all chickens be vaccinated prior to 18 weeks of age. The most appropriate age to vaccinate may be determined from knowledge of the challenge conditions applicable to the flocks concerned.

The effect of EIMERIAVAX 4m vaccination during lay has not been assessed.



Above: a schizont of *E. necatrix* under x400. The size and number of schizonts decreases as the bird develops an immune response.



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