



Key points

- Bioproperties has co-developed three vaccines for chicken respiratory disease
- Vaccines reduce antibiotic use by 90 per cent
- Partnership with University's Asia Pacific Centre for Animal Health

Bioproperties

A niche player in live vaccines for global food animal industry

The outcome

Bioproperties Pty Ltd, a Melbourne-based manufacturer and supplier, has developed three live vaccines that target contagious respiratory diseases in chickens in partnership with the University of Melbourne's Asia Pacific Centre for Animal Health.

Two Bioproperties vaccines are commercially available in major international markets, including Australia, Europe, Japan, the USA, Canada, Mexico, Brazil and South Africa. They significantly increase chicken meat and egg production and are easier to use, safer and more effective than competing products. They have also reduced antibiotic use by more than 90 per cent, which benefits human health by limiting the emergence of antimicrobial-resistant bacteria.

The third vaccine, which is one of the first genetically modified vaccine for poultry in Australia, will be tested in field trials in 2018. Bioproperties has become a niche player in the manufacture and supply of live vaccines to the global food animal industry.

The need

Global meat consumption and production are steadily increasing, and chicken accounts for almost half of all meat consumed. More than 50 billion chickens are produced in the world each year, including more than 600 million in Australia.

Infectious respiratory diseases pose a significant threat to commercial chicken flocks. Outbreaks can lead to reduced body weight, poor egg quality and even death of the birds, ultimately decreasing meat and egg production.

Antibiotics reduce infection rates, but their widespread use can lead to drug-resistant bacteria that threaten human health. Inactivated vaccines can be weak and difficult to administer to large numbers of animals.

Poultry producers in many markets are seeking more effective methods to control infectious diseases while improving animal health and welfare.



Bioproperties vaccines for chicken respiratory diseases significantly increase egg and meat production. Picture: Shutterstock

The science

The research underpinning the poultry vaccines began in the 1980s, when veterinary science researchers at the University of Melbourne isolated strains of the bacteria *Mycoplasma gallisepticum* and *Mycoplasma synoviae*, and developed methods to reduce their pathogenicity. Safety studies confirmed that the strains no longer caused respiratory diseases in chickens and could be used effectively as live attenuated vaccines.

In 2003, researchers from the University's Asia Pacific Centre for Animal Health began working with Bioproperties to develop a live attenuated vaccine for infectious laryngotracheitis, a respiratory disease caused by *Gallid herpesvirus 1*. They identified the genes involved in virulence and deleted them to create a genetically modified strain of the virus that could elicit immunity.

Players, publications and patents

Company: Bioproperties Pty Ltd

Researchers: Professor Glenn Browning, Associate Professor Joanne Devlin

Patents and key publications: Morrow CJ et al. 1998. Production of temperature-sensitive clones of *Mycoplasma synoviae* for evaluation as live vaccines. *Avian Dis* 42(4):667-670
Whithear KG et al. 1990. Safety of temperature sensitive mutant *Mycoplasma gallisepticum* vaccine. *Aust Vet J* 67:159-165

Technology development history

Bioproperties and University veterinary science researchers developed vaccine strains and conducted animal trials to assess their efficacy in laying hens and breeding stock.

Vaxsafe MG (against *M. gallisepticum*) was released in Australia in 1990, and Vaxsafe MS (against *M. synoviae*) was released in 1995. The intellectual property remains with the University and is licensed to Bioproperties in return for a royalty.

Following the success of Vaxsafe MG and Vaxsafe MS, in 2003 Bioproperties started work with Professor Glenn Browning and Associate Professor Joanne Devlin, also of the Asia Pacific Centre for Animal Research, to develop Vaxsafe ILT, a poultry vaccine to combat infectious laryngotracheitis.

An Australian Research Council Linkage Project led to an attenuated strain of the pathogenic virus. After continued development of the product, in 2017 Bioproperties were authorised to conduct regulatory field trials of Vaxsafe ILT in Australia.

For each vaccine, Bioproperties has been responsible for vaccine registration, production, distribution and marketing. The company successfully met strict international requirements for importing live vaccines, enabling it to penetrate markets not currently served by some of its competitors. Vaxsafe products are now available in most major markets worldwide.

Bioproperties continues to collaborate with researchers in the Asia Pacific Centre for Animal Health. The two groups have also developed a vaccine against *Mycoplasma hyopneumoniae*, a highly contagious and chronic disease in pigs (Vaxsafe MHP).

In 2018, the company plans to launch to market a new vaccine for turkeys, developed with the University team, to prevent respiratory infection caused by *Mycoplasma gallisepticum*.



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