

CONTROL OF MYCOPLASMA CAN MINIMIZE THE EFFECT OF ALL RESPIRATORY INFECTIONS AND GREATLY REDUCE ANTIBIOTIC DEPENDENCE

CHRIS MORROW

Global Technical Manager, Bioproperties, Australia
Corresponding author: Chris.morrow@bioproperties.com.au

ABSTRACT

The potentiating effect of MG and MS infections on the impact of respiratory viruses (NDV, APMV and AIV) and bacterial respiratory diseases (Coryza, EPEC, ORT and Fowl Cholera) is well recognized. Effective control of mycoplasma infections offers chicken and egg producers great advantages in decreasing the need for antibiotics and the impact of these infections. Although antibiotics are (initially) effective at controlling mycoplasma and bacterial respiratory diseases in poultry the development of resistance means that this is not sustainable even in the medium term. The best long term strategies for mycoplasma control are live vaccines that are safe and prevent vertical transmission. It is important to have criteria for success for mycoplasma control programme and realize that vaccination must take into account antibiotic interventions and other interactions. These criteria will include biological and economic parameters.

Keywords: Avian mycoplasma, antibiotic reduction, potentiation of respiratory infections

INTRODUCTION

Synergistic effects of mycoplasma infections with other "simple/uncomplicated" infections has been long recognised but perhaps forgotten. The chronic nature of mycoplasma infections in chickens and their propensity to make infections with NDV, IBV, AIV (especially H9) and APMV virus have been demonstrated in laboratories, indeed it is very hard in the laboratory to produce respiratory disease with *Mycoplasma synoviae* without adding respiratory viruses or vaccines. Bacterial infections of the respiratory tract in chickens have also been potentiated by mycoplasma infections. Indeed in the field often many potential pathogens are present and can be identified but their role in respiratory disease is difficult to ascertain. For example in broilers in Germany Cheesy broilers (airsacculitis in the slaughter house) have been considered to be ORT for a long time but the potentiating effect of MS has recently been considered. The observation that MS may be triggering *E. coli* peritonitis at the beginning of lay (Raviv *et al.* 2007) in the USA and Europe may be due to MS infection being acquired at the time of transfer to a multiage layer site. It is easier to see if the effect of LaSota NDV in broilers in the field. This vaccine cannot be used in broilers after one day of age if those broilers are mycoplasma positive without the use of antibiotics to dampen down post vaccinal reactions. Commonly the use of LaSota at 10 days will need antibiotic administration at 18 days in mycoplasma positive chicks. This has been seen with lentogenic/apathogenic strains of NDV (VG/GA, V4, Ulster etc) used in broilers in some areas. Obviously here the antibiotics are not affecting the viral infection. Similarly coryza and fowl cholera is more chronic in mycoplasma infected birds (usually older than broilers). This effect is seen with MG and/or MS. Antibiotics can certainly help control bacterial diseases and maybe reduce infections but the emergence of resistance strains can limit the long term usefulness of this strategy. Contamination of poultry products with

antibiotic residues and antibiotic resistance determinants (genes, plasmids etc) are also public health issues.

MATERIALS AND METHODS

MG and MS field strain freedom has been successfully achieved by biosecurity in many areas including UK, USA, NZ. Some places have only effectively controlled MG including Israel, Iran, Brazil, Germany, France, the Netherlands and individual integrators. Indeed the MS status of many places is hard to tell because of antibiotic usage in lay. In some areas they have controlled MG by ts-11 vaccination of breeders (best if they are MG free as DOC) in Australia, South Africa, Lebanon (see Barbour *et al.* 2000) and China. MG and MS control by combined vaccination has been used in Australia, Philippines and Indonesia. This later strategy is particularly attractive as both mycoplasma infections have the same control strategy (antibiotics for MS may be incompatible with live vaccination for MG). F strain vaccination has not been used for breeders in the USA although ts-11 has been used for MG control in the face of MG epidemics. Where F strain has been used overseas vertical transmission and residual pathogenicity in vaccinated birds and their progeny is sometimes seen (where antibiotics are not used).

RESULTS AND DISCUSSION

In Australia the vaccines ts-11 (MG) and MSH (MS) have been used extensively in layers and breeders in Australia for the last twenty years and now most chickens (layers, breeders or broilers never have antibiotic in their whole lives. Concurrently, we were able to largely effectively control *Coryza* with a vaccine although this is no longer available and coryza has not re-emerged as a problem. Fowl cholera is still a problem on some sites especially those with earthen floors (layers and breeders) and free range layers. Some other problems are emerging in free range layers including AIV (mostly H7) and erysipelas. Mycoplasma free broilers do not need routine antibiotics at 18-22 days; horizontal infection is not a big problem during the short life of a broiler. As people decrease antibiotic usage sometimes some previously unidentified problems can emerge. Most commonly *Brachyspira* infection (Avian intestinal spirochaetosis) may emerge as a problem – repeated egg production drops that respond to antibiotics including penicillins, diarrhoea (collapsing manure cones and caramel stained eggs), no increase in mortality. In fact until a country reports *Brachyspira* in chickens it seems they have not seriously tried to decrease antibiotic usage (acidification of water may control). Antibiotics may also be controlling *Salmonella* infection including SG (not present in Australia), SE (not present in Australia), other invasive and non invasive *Salmonella* (present in Australia - control at egg and breeders with vaccination) and *E. coli*.

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