RESPOFEED AS THE REPLACEMENT OF ANTIBIOTIC IN THE TREATMENT OF COMPLICATED CHRONIC RESPIRATORY DISEASE (CCRD).

Arvind Sharma¹* and Meena Bakshi²

¹Orbit Bioscience, 22, Raipur District Haridwar 247661, India.
²Forest Research Institute, Dehradun 248001, India.

ABSTRACT

Many Drugs have been used as controlling measures for chronic respiratory diseases recently in the poultry farms. Drugs are not accepted due to the high cost, residual effects on human and not covering all pathogenic species. One of the ways that has been very much accepted nowadays is to use natural compounds and their active ingredients to treat the chronic respiratory diseases. In this research, we investigated the effect of tylosin and Respofeed (unique combination of essential oils and natural active ingredients). Samples were collected 21st, 27th and 35th day after the treatments and four various growth parameters (clinical scores, Air sac lesions, mortality and body weight) were assessed. All growth parameters were best with the group 4 which was treated with Respofeed. The present study was akin to the findings of [20, 21, 22, 23], who reported that volatile oils helps to treat CRD, improve body weight gain and reduces lesion scores.

KEYWORDS: Respofeed, Tylosin, Air sac lesions, essential oils.

INTRODUCTION

Complicated Chronic Respiratory Disease (CCRD) in chickens is a common disease in many poultry flocks around the world. Although the clinical manifestations are usually slow to develop, MG in combination with E.coli can cause severe airsacculitis. Respiratory infection or infectious coryza or infectious laryngotracheitis, bronchitis caused by Escherichia coli¹ environmental factors may increase the clinical symptoms where predominant organ system affected is the respiratory tract.² Regardless of whether birds are raised for meat, eggs, breeding or show purposes, respiratory infections result in decreased performance and
ultimately lead to economic loss. The main causative agent of the Mycoplasma gallisepticum, which causes a debilitating respiratory disease (RD) in poultry,\textsuperscript{[3]} which was difficult to detect and control with currently available technology.\textsuperscript{[4]} All of the pathogenic mycoplasmas are egg-transmitted. M. gallinarium was shown to be involved in an outbreak of respiratory disease in commercial broilers.\textsuperscript{[3]} Consequently, the efforts to limit the losses from these infections would be of primary importance to the poultry industry. Etiological agent of chronic respiratory disease is Mycoplasma gallisepticum, a member of Mollicutes class (pleuropneumoniae-like organisms or PPLO). Transmission may occur via conjunctiva, upper respiratory tract, transovarian route, direct contact or sometimes may be through fomite infection. Incubation period of CRD is 6-10 days, after that the clinical signs are vibrant such as coughing, oculonasal discharge, stunted growth etc. Clinical cases tend to occur in large commercial farms during the winter. Concomitant viral infections, vaccination with live viruses, cold weather or crowding may aggravate outbreaks in infected flock.

Among the most commonly used antibiotics against mycoplasma infections is the fluoroquinolone compounds which is widely used in clinical veterinary practice because of their wide spectrum bactericidal activity and high degree of bioavailability.\textsuperscript{[5,6]} Different studies have been produced to evaluate the efficacy of using fluoroquinolons alone or in combination with old antimycoplasma drugs like macrolides and tetracyclins against avian mycoplasmosis\textsuperscript{[6,7,8,9]} reported superiority of danofloxacin compared to tylosin for control of MG infection in broiler chickens.

On the other hand, Respofeed manufactured by Orbit Bioscience based on essential oils are very complex natural mixtures of compounds that have antibacterial, bronchodilator and anti-inflammatory effects. Thyme essential oils, i.e. thymol and carvacrol have been reported to range from as low as 3-60% of total essential oils.\textsuperscript{[10]} Eucalyptus oil is one of essential oils that mainly composed of terpenes and terpenederivatives in addition to some other non-terpene components.\textsuperscript{[11]} The principal constituent found in Eucalyptus is 1, 8-cineole (eucalyptol), however, other chemotypes such as α-phellandrene, ρ-cymene, γ-terpinene, ethanone,spathulenol, among others have been documented.\textsuperscript{[12]} A mixture of Oregano (carvacrol, cinnamaldehyde and capsicum oleoresin) beneficially affected the intestinal microflora, absorption, digestion, weight gain and also had antioxidant effect on chickens.\textsuperscript{[13]}

In this trial report, our researchers examined the effect of Respofeed (complex mixture of various essential oils and Bromohexine) in the protection of the respiratory system of broilers
against controlled challenges by *MG* and/or a mixture of respiratory viruses as avian influenza virus H9N2 and infectious bronchitis virus and they concluded that the Respofeed treated group showed higher feed conversion, less mortality rate and lower in clinical signs and lesions than infected non treated groups.

**MATERIALS AND METHODS**

This work was carried out at Orbit Bioscience’s trial farm, to investigate the possible effects of Respofeed on *MG* and *E.coli* infection, growth performance and NDV immune response in commercial broiler chickens. Briefly, 160 one-day-old chicks (Vancob 400) obtained from a local broiler chicken hatchery were divided into 4 groups 40 birds each, the experiment was conducted in accordance with animal welfare laws and vaccinated as per Indian vaccine schedule. All birds in each group were fed with basal diet and treated as follows:

1. A water soluble powder containing acetyle isovaleryl tylosin tartarate as an active principle (20 mg/kg body weight), The drug was given for three days.
2. A natural product Respofeed, manufactured by Orbit Bioscience, India was given for five days.

All the tested compounds were used in the drinking water just after appearance of the clinical signs (5 days post challenge). The medicated drinking water was prepared such that the desired concentration in the drinking water matched the designed dose levels of the company’s recommendations.

**Assessment of the treatment efficacy**

The efficacy of the used antibiotics and Respofeed was assessed in the experimental groups based on evaluation of the following parameters:

**Clinical signs**

The infected and treated groups were daily observed for clinical signs just after infection till the end of the observation period (5 weeks old). The respiratory symptoms were scored individually as described by[14] as the followings:

1= No respiratory signs.
2= Slight symptoms (sneezing and few tracheal rale).
3= Moderate symptoms (sneezing or tracheal rale).
4= Severe symptoms (sneezing or frequent tracheal rale, despnea).
Mortality rate
The number of dead birds/group was recorded daily till 35 days of age (end of the experiment).

Gross lesions
Five birds from each group were sacrificed weekly after challenge (at 21, 28 and 35 days of age). The post-mortem lesions of the sacrificed as well as the dead birds were recorded. The typical lesions of mycoplasma infection (air-sac lesions) were monitored and scored according to the criteria described by\cite{15} as follows:
No air-sac lesion observed (lesion score= 0), the air sac membranes of the birds were completely clear without gross alterations.
Air-sac lesion score= 1, the membranes were slightly cloudy without marked alterations.
Air-sac lesion score= 2, the membranes were slightly thickened and usually with small accumulations of cheesy-like substances exudates.
Air-sac lesion score= 3, the membranes were clearly thickened and meaty in consistency with marked accumulation of clotted exudates confined to a single air-sac.
Air-sac lesion score= 4, the membranes were with gross remarkable pathological alterations as score No. 3 but lesions were found in two or more air-sacs.

Body weights
The body weights of the birds in each group were detected just before infection at 14 days old and then weekly (at 21 and 28 days old) till the end of the treatment at the day 35 of age.

Statistical analysis of the data
The collected data was analysed with Genstat 32.0 software. Differences of p<0.05 were considered as significant

RESULTS AND DISCUSSION
Considering the results of the effect of using different treatments on the mean clinical score of non infected-non treated group as well as MG infected and treated groups were given in table (1). There were no clinical signs recorded in non infected non treated chickens along 5 weeks experimental period (mean clinical score=1). The first clinical signs of MG infection were observed in the infected groups 5 days post experimental infection. The severity of the clinical signs was increased by the following few days to reach the greatest value (2.92) in the positive control group at the last week of the observation period. Both treatment Tylosin
and Respofeed controlled the clinical scores efficiently and there was no significant difference during weekly observation. These results are partially in accord with those reported by\textsuperscript{[16]} who found that using of either fluoroquinolones (difloxacin 10 mg/kg) or (enrofloxacin 10 mg/kg) was equally effective in treating respiratory symptoms in MG infected broiler chickens. The effect of volatile oils in clearing of respiratory signs was investigated by\textsuperscript{[17,18,19,20,21,22,23]} who found that this treatment resulted in significant decrease in tracheal deciliation in MG and MG/H9N2-challenged birds, significant decrease in tracheal goblet cells degeneration in MG-and MG/H9N2-challenged birds, significant decrease in tracheal mucus accumulation in MG-challenged birds, and significant decrease in heterophil infiltration in MG/H9N2-challenged birds.

Minimum mortality (20) was observed with the treatment of Respofeed as compare to tylosin treatment (20) whereas maximum mortality was observed in positive control in which birds were infected with MG and no treatment was provided to the bird (Table 1 and Figure 1). Least air sac lesion was observed with the treatment of Respofeed, followed by little high with tylosin treatment and maximum air sac lesion was found in positive control. Table 2 and figure 2 revealed that maximum body weight was observed in negative control in which we did not inoculated with MG followed by 1239 gm weight was observed with the treatment of Respofeed. Body weight gain 1187 was observed with tylosin which lesser than 1239 gm with the treatment of Respofeed. Results of our study were almost similar to the earlier study of\textsuperscript{[24,25,26]}

Awaad et al., (2002) who recorded that treatment of broiler chickens with volatile oils containing eucalyptus and peppermint significantly improved the zootecnical performance of the treated birds after challenge with ornithobacterium rhinotracheale (ORT) and velogenic viscotropic strain of Newcastle disease (VVND) virus.

Eventually, the present investigation clearly showed that the tested antibiotic (tylosin) and Respofeed (combination of volatile oils) were efficacious in the treatment of induced MG infection in broiler chickens as indicated by reduced clinical signs, mortality rate, gross lesions as well as improved body weights of the treated groups when compared with non treated infected chickens. Respofeed was the best to the other treatments tylosin in controlling of such MG infection, so it is advised to be used as a safe natural alternative to
antibiotics to avoid the common problems of drug resistance and drug tissue residues occurring in the field.

Table 1: Effects of various treatments and mean of clinical scores.

<table>
<thead>
<tr>
<th>Group number</th>
<th>Treatment</th>
<th>Mean of clinical score ±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age of the chicken</td>
<td>15-21</td>
</tr>
<tr>
<td>1</td>
<td>Negative control</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Positive Control</td>
<td>1.82±12</td>
</tr>
<tr>
<td>4</td>
<td>Tylosin</td>
<td>1.79±27</td>
</tr>
<tr>
<td>5</td>
<td>Respofeed</td>
<td>1.83±11</td>
</tr>
</tbody>
</table>

Table 2: Effects of various treatments on various parameters.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean of Various parameters after 35 days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mortality</td>
</tr>
<tr>
<td>Negative control</td>
<td>0</td>
</tr>
<tr>
<td>Positive Control</td>
<td>33.5</td>
</tr>
<tr>
<td>Tylosin</td>
<td>20</td>
</tr>
<tr>
<td>Respofeed</td>
<td>17</td>
</tr>
</tbody>
</table>

Figure 1: Mean of mortality and air sac lesion counter after 35 days.
REFERENCES


17. Bragg RR, Albertyn NJ. Van Heerden E Effects of using Mentofin for the prevention and treatment of infectious coryza caused by Haemophilus paragallinarum. Veterinary Biotechnology, Department of Microbial, Biochemical and Food Biotechnology, University of Free State, PO Box 339, Bloemfontein 9300, Republic of South Africa. 1999.


