

Pneumonia is a major cause of death in feeder pigs and pneumonia lesions are found in a significant proportion of slaughter pigs. In a report from Taiwan ROC, 27.3% losses of 538 growing pigs were caused by respiratory diseases, while 41.7% losses of 614 fattening pigs were caused by respiratory diseases. In an analysis of lesions in pigs reported in Taiwan ROC, 87% of the 100 pneumonic lungs collected from slaughter-weight pigs had gross and microscopic lesions typical those of *Mycoplasma pneumoniae* (MP).

Tiamulin has been shown to be active against numerous gram positive and gram negative pathogens that cause disease in livestock, but is particularly active against *M. hyopneumoniae* in vitro and in vivo and *Treponema hyodysenteriae*. This study is intended to evaluate the efficacy of tiamulin injectable as a compound for treatment of bacterial pneumonia in Taiwan ROC swine.

About mid April of 1981, gross examination of lungs was performed on the market pigs being sent to the abattoir from the trial herd at the Animal Industry Research Institute (AIRI) of Taiwan Sugar Corporation (TSC) to detect the presence of pneumonic lesions. Lungs were examined after removal from the carcass and lesions recorded for each one of the seven lobes. Mycoplasmal pneumonia (MP) was graded as 0, 1, 2, 3, 4, 5, 6 and 7 represent various severity of MP lesions from normal to the most severe lesions, respectively. All lungs with macroscopical lesions suggestive of pneumonia were collected for microbiological and histopathological examinations.

Bacteriological examination was carried out within three hours of collection of samples. Portions of pneumonic lungs were taken and ground in a tissue grinder. *M. hyopneumoniae* was isolated using the procedures proposed by Friis. *Haemophilus* (H) *pleuropneumoniae*, *Pasteurella* spp, *Salmonella* spp, and other microorganisms were isolated by the Shorter Bergey's Manual of Determinative bacteriology.

Portions of tissue adjacent to those which were taken for culture were placed in buffered neutral 10% formalin solution for histopathological examination.

Thirty Landrace X Large White crossbred male castrated pigs, approximately 60 days of age, were obtained from the swine herds of AIRI-TSC where enzootic pneumonia was a constant problem. The animals were randomly assigned to 3 treatment groups on the basis of weight and litter origins. One formulation of basal ration was prepared at the AIRI according to standard specifications for growing pigs except that it was devoid of antibiotics or chemotherapeutic agents. Pigs were housed in treatment groups of 5 for each pen. Tiamulin was administered intramuscularly at 12.5 mg/Kg per day for pigs in group 1 and 10 mg/kg per day for pigs in group 2. Medication was continuous for 5 days (day 0-5) and swine were continuously on test for a 23 day further observation period after the medication.

Pigs were examined daily for evidence of disease, including general appearance, cough, nasal discharge, diarrhea and body weights. The effect of tiamulin on growth and feed efficiency of swine during the 28 day trial period (days 0-28) were evaluated. The weights of each pig on day zero, days 14 and 28 were recorded. Feed consumption was recorded on a pen basis for days 0-14 and 14-28. A statistical analysis was performed on body weight gains and feed conversion using one-way analysis of variance and least significant difference procedures.

#### Results

An Abattoir Survey of the Incidence of Pneumonia - Of the 55 representative pigs examined, 45 (81.8%) had gross lesions of pneumonia. A total of 52 representative lungs (one for each); 38 (73%) had histopathological lesions of pneumonia. Of these, MP was the pneumonia most commonly seen (48.1%), followed by MP combined with bronchopneumonia (BP, 9.6%) and *haemophilus pleuropneumonia* (HP, 9.6%).

A total of 29 pneumonic lungs (one for each pig) were collected for microbiological examination. Of the 29 lung samples, 14 with typical lesion of MP were submitted for isolation of *M. hyopneumoniae*; whereas the remaining 15 pigs with other kinds of pneumonia including severe MP in 5 pigs, MP plus BP in 5 pigs and HP in 5 pigs, were submitted for isolation of *Pasteurella* spp, *Salmonella* spp, *H. pleuropneumoniae*, etc. Of the 14 pneumonic lungs submitted for isolation of *M. hyopneumoniae*, 8 (57.1%) had *M. hyopneumoniae* and 7 (50%) had *M. hyorhinis*. Of the 15 pigs with other kinds of pneumonia, 6 (40%) had *Streptococcus* spp, 5 (33.3%) had *H. pleuropneumoniae*, 4 (26.7%) had *E. coli* and 3 (20.0%) *Staphylococcus* spp and 2 (13.3%) had *Klebsilla* spp, respectively.

Tiamulin Injectable Trial- The general appearance of the pigs in Groups 1 and 2 improved by day-5, while the pigs in Group 3 still had poor appearance by day 28. The coughing, nasal discharge and diarrhea were absent by day 5 in all pigs in Group 1, while the pigs in Group 2 and 3 still had signs of coughing, nasal discharge and diarrhea, but pigs in Group 2 had milder and less frequent signs than as those mentioned above. The pigs medicated with tiamulin injectable at 12.5 mg/kg per day for 5 days (Group 1) during the initial 14 days (days 0-14) gained weight faster ( $P < .05$ ) and required 34.1% less feed than did the nonmedicated pigs (Group 3). During the days 14 to 28, the nonmedicated pigs gained 7.2 and 10.1% respectively, faster than those pigs receiving tiamulin at 12.5 mg/kg (Group 1) and 10 mg/kg (Group 2). For the entire experiment (days 0 to 28) pigs receiving tiamulin injectable at 12.5 mg/kg per day improved weight gains by 8% and improved feed efficiency by 4.6% over the nonmedicated pigs. Those receiving tiamulin injectable at 10 mg/kg had no more improvement in weight gain and feed efficiency than did the nonmedicated pigs. Pneumonic lesions were found in one of 3 pigs necropsied prior to initiation of treatment. *M. hyopneumoniae* was isolated from the pneumonic lungs.

#### Conclusion

The present study demonstrated the safety of tiamulin injectable when given intramuscularly at 12.5 mg/kg and 10 mg/kg per day for 5 days in the treatment of swine bacterial pneumonia. No adverse drug reactions were noted in individual pigs. This trial demonstrated the efficacy of tiamulin to alleviate the clinical symptoms of pneumonia as demonstrated by improvement in general appearance, decreased coughing and nasal discharge when compared to the nontreated controls. In addition, pigs receiving tiamulin injectable at 12.5 mg/kg improved weight gains by 8% and improved feed efficiency by 4.8% over the nonmedicated pigs. Tiamulin injectable at 10 mg/kg had no more improvement in weight gain and feed efficiency than did the nonmedicated controls. Of 52 market pigs examined, 38 (73%) had pathological lesions in pneumonia. Of these, MP was the pneumonia most commonly seen (48.1%) followed by MP combined with BP (9.6%) and HP (9.6%).

Selected references: Brassine, M. Dewaele A: *Ann. Med. Vet.* 1976, 120:477; Brown et al: *Intl Pig Vet. Soc. Ames, Iowa*, 1976, B6; Friis, NF: *Nord Vet. Med.* 1975, 27:337; Hsu, F.S. et al; *Ann. Res. Rept. of Anim. Ind. Res. Inst. TSC*, 1981; Liu G.I.: *Taiwan J. Vet. Med. Anim. Husb.* 1972, 20:18; Osborne A.D. et al: *Can. Vet. J.* 1981 22:82.