

## **INCIDENCE AND EXTENSION OF LUNG LESIONS IN FATTENING PIGS SUBMITTED TO DIFFERENT MANAGEMENT CONDITIONS**

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### **Abstract**

Some pig farms with different characteristics have been worked with the objective of studying the relation between the incidence and extension of lung lesions in fattening pigs and some management factors such as: breeding methods, constructive aspect, floor space per pig and the use of different kinds of treatments against pig pneumonia in production conditions. Three experimental assays, where the aspects related above were taken into account, were carried out; using as methodology, from the anatomopathological point of view, a score method which allowed us to quantify the lesion extension degree found in the studied animals. In a first assay, four farms were studied considering the administration or not of treatments and the characteristics of rearing animals. There were two new assays, where a unit classified as an adequate management and sporadic treatments against pig pneumonia was studied, taking into account the constructive conditions and floor space per pig. The results of this work permitted to demonstrate that the incidence of lung lesions in fattening pigs is influenced by the use of adequate breeding methods and the simultaneous application of systematic preventive treatments against pig pneumonias. While the management treatments related to breeding methods, floor space per pig and the administration of different treatments against this disease are not directly co-related with the distribution and the extension degree of lung lesions.

*Key words:* incidence; extension; pig lesions; fattening pigs; management; pig pneumonia; anatomopathological; score methods; floor space per pig).

### **INTRODUCTION**

Lung inflammatory processes constitute the most frequent anatomopathological aspects in domestic species and the most common cause of disease in pigs. Their incidence vary according to the country where the study is carried out, the different used reference parameters and the considered etiopathogenic kind; constituting the respiratory disease a multifactor complex which involves multiple bacterial and viral causes (9, 19).

Environmental factors like: the production system, construction, floor space per pig, nutrition, management, stress, and others can increment the prevalence and incidence of pneumonia (7, 11, 13). Some of these factors act simultaneously in the infection maintenance (2, 6, 15). The objective of this work is to demonstrate the co-relation between the incidence and extension of lung lesions with some management factors associated to breeding methods, constructive aspects, floor space per pig and effects about the use of different kinds of treatments against pneumonia.

## MATERIALS AND METHODS

Three experimental assays were carried out, sampling a total of 362 slaughtered pigs.

### Assay I

*Aim: To establish the incidence and characteristics of lung lesions in slaughtered pigs in relation with different kinds of treatments and breeding methods.*

217 slaughtered pigs, from commercial breeds, were studied forming four animal groups.

#### Group I (19 pigs)

Animals, from a farm with bad management conditions, deficient feeding and without treatment were studied. Farm type 1 (FT-1).

#### Group II (46 pigs)

Animals, from a farm with bad management conditions, deficient feeding and sporadic preventive treatments were studied. Farm type 2 (FT-2).

#### Group III (64 pigs)

Animals, from a farm with good management conditions, adequate feeding and sporadic preventive treatments were studied. Farm type 3 (FT-3).

#### Group IV (85 pigs)

Animals, from a farm with good management conditions, adequate feeding and systematic preventive treatments were studied. Farm type 4 (FT-4).

The systematic preventive treatment consisted in the application of Tyamulin in concentrate, being administrated during 10 days after weanling, 10 days before fattening and 10 days previous to the slaughter, in a proportion of 100 ppm. (We did not slaughter animals for at least 30 days after the final treatment).

The sporadic preventive treatment was administrated during the fattening period, using antibiotics of wide spectrum and growth promoters.

In our study, the incidence and kinds of pneumonia present according to the exudate were evaluated.

### Assay II

*Aim: To study the effect of floor space per pig in relation with the daily mean gain, incidence and extension of lung lesions.*

95 animals, from the commercial breeds of L-35 males and Hampshire and Yorkland females, were studied. Their mean weight, at the beginning of fattening, was of 30 kg. The sacrifice was made when achieving  $103 \pm 3$  kg of final weight.

Pigs were divided into three groups according to the space per pig during the fattening period.

Group 1: 1,03 m<sup>2</sup> floor space per pig

Group 2: 1,44 m<sup>2</sup> floor space per pig

Group 3: 1,8 m<sup>2</sup> floor space per pig

Assay III

Aim: To study the influence of the **pen** localization in the fattening farm on the extension of lung lesions.

50 pigs, with similar genetic characteristics, mean weight at the beginning of fattening and mean weight at slaughter, were studied. They were divided into two groups of 25 animals each according to the localization of pens in the fattening farm.

The fattening farm was built with four lanes of pens, divided by a central hall which determines the existence of two internal and external lanes.

Internal lanes: Group named "central"

External lanes: Group named "peripheral"

In all the assays, a macroscopic study at slaughter of sampled pig lungs was carried out, considering color changes and the qualitative extension of lesions, the presence or not of exudates, the consistency and presence of adherences between lobes and with the rib cage. In the two first assays, an analysis of affectation per lobes in the different studied groups was included.

In the assays II and III, a quantitative study of the extension of lung lesions per groups and lobes was carried out, using the score method established by Rueda *et al.* (14). Some samples were taken for the histopathological and bacteriologic study. For this bacteriologic study, the 66,7% of the samples was processed.

For the statistical analysis, proportion comparison test and Duncan's were carried out for the incidence of lung lesions according to exudate per groups. Variance analysis and Duncan's were also carried out for the determination of lesion extension, the fattening time and the daily mean gain.

**RESULT AND DISCUSSION**

Assay I

We appreciated a high incidence of pneumonia in all the groups, except in the animals proceeding from FT-4, observing significant differences ( $p < 0,001$ ) (Table I). All this evidences the beneficial effect of applying the best possible comfort to the herd and the use of systematic preventive treatments using Tyamulin. This coincides with Ballarini (1) and Diaz (4), who consider very effective the use of this drug in preventing the Porcine Respiratory Complex (PRC).

**Table I.** Total of pneumonic pigs in relation to the total pigs, sampled per each group.

Group of examined pigs	Number of sampled pigs	Number of pneumonic pigs	%	Statistical signification
Group I	19	18 a	94,7	NS
Group II	46	46 a	100	NS
Group III	64	64 a	100	NS
Group IV	85	49 b	57,6	***

Legend: Different letters differ in the same column.  $P < 0,001$

Assay II

We could appreciate in the second assay that the time, necessary for achieving the slaughter weight and the daily mean gain were influenced by the spectrum of the floor space per pig, showing that in the way this floor space per pig is bigger, we obtain better results (Table 2). This coincides with Olmeda (12, 13) and Fukutomi (7) who refer that pneumonia prevalence and incidence could be incremented by environmental factors such as: production system, construction, animal density, nutrition, management, stress and some others.

**Table 2.** Behavior of the daily mean gain and the time, necessary for achieving the sacrifice weight, taking into account the floor space per pig. (N=15)

Groups	Initial weight (Kg)	Final weight (Kg)	D.M.G.	Mean time (days)
I	27,5	106,4	0,690 b	114 a
II	33,3	100,5	0,779 ab	85,6 b
III	28,3	103,7	0,894 a	82,8 b

Legend: Different letters differ in the same column. P < 0,05

In this sense, we can establish a co-relation between these productive parameters and the degree of lung lesions; though it was not so significant, it shows a tendency of presenting a greater extension of pneumonic lesions in group I.

There was not a significant influence of the floor space per pig that the animals were submitted on the qualitative and quantitative presentation of the different pneumonic processes observed in the experiment.

Assay III

In this assay, it was demonstrated that the “central” animals had a significant increment of the extension percent of lung lesions in relation to the “peripheral” ones (Table 3). In this sense, we consider that the lack of ventilation in central pens produces a bad air quality, increasing animal susceptibility to pneumonic processes. This coincides with Suárez (17).

**Table 3.** Extension of lesions by catarrhal pneumonia, taking into consideration the localization of pens (N=25).

Groups	Extension of lesions (%)	Statistical signification
Peripheral	18,2 a	**
Central	26,4 b	

Legend: Different letters differ in the same column. P < 0,02

In all the carried out assays, there was a predominance of catarrhal pneumonia, coinciding with the reports of Grest *et al.* (8) and with a lesional picture, similar to the one described by Davis *et al.* (3). There was a greater affectation of the anterior lobes in respect to the posterior ones, independently the studied group. In relation to this explanation, we coincide with Jubb *et al.* (10) who considers the high frequency when the atelectic process is in its development initial phase, determined for being the inhalation of pathogen agents (bronchogenic via) the main transmission via of respiratory diseases.

Though we could only isolate *Pasteurella multocida*, it is demonstrated the presence of the agents, commonly appear in these processes (5, 16). This corroborates the bronchogenic and multifactor via of infection.

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