Prevalence of \textit{Lawsonia intracellularis} Infections in Pig Herds from the Western Romania

Corina Pascu\textsuperscript{a}, Lumini\c{t}a Costinar\textsuperscript{a}, Ioana Mernea\textsuperscript{a}, Daniel Tătar\textsuperscript{a}, Viorel Herman\textsuperscript{a}*

\textsuperscript{a}Faculty of Veterinary Medicine, 119 Aradului Street, Timi\c{s}oara 300645, Romania

\textbf{Abstract}

Porcine proliferative enteritis (PPE) is an important enteric disease and is widespread in intensive pig production. It is caused by \textit{Lawsonia intracellularis}, intracellular bacteria which affect more frequently postweaned pigs between 6 and 20 weeks of age. The aim of the study described in this paper was to obtain data on the prevalence of \textit{Lawsonia intracellularis} infections in Romanian pig herds. To realize this we used "\textit{Lawsonia FIRST test™} kit (MicroCoat Biotechnologie GmbH), a qualitative single-use test designed to be used for the detection of \textit{Lawsonia intracellularis} in porcine feces.

The samples were collected from four wean-to-finish herds from the west part of Romania, 15 samples / herd, from pigs with ages between 90 and 140 days. These herds were from different counties as it follows: Timis – 2 herds, Bihor and Hunedoara – one herd from each one. This study showed that \textit{Lawsonia intracellularis} infection percent is different between herds, varying between 0\% (herd 1 from Timis county) and 80\% (herd 2 from Timis county). In herds from Bihor and Hunedoara counties the infection percent was 60, respectively 46.6\%. The results indicate that infection with \textit{Lawsonia intracellularis} is very widespread in investigated pig herds–46.6\% of samples were positive – and it occurs in herds with digestive disorders and in herds without clinical symptoms.

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* Corresponding author. Tel.:+04-0256-277-198; fax: +04-0256-277-118.
\textit{E-mail address:} viorel.herman@fmvt.ro
1. Introduction

Proliferative enteropathies (ileitis) are a group of acute and chronic conditions of widely differing clinical sings but with a common underlying pathological change visible at necropsy: a thickening of the mucosa of the small intestine and colon (McOrist et al., 2006:727; Guedes, 2004:134). Porcine proliferative enteritis is a common diarrheal disease of growing-finishing and young breeding pigs characterized by hyperplasia and inflammation of the ileum and colon. It often is mild and self-limiting but sometimes causes persistent diarrhea, severe necrotic enteritis, or hemorrhagic enteritis with high mortality (Chouet et al., 2003:14).

Porcine proliferative enteritis (PPE) occurs worldwide. Disease is categorized pathologically as a severe acute form (proliferative hemorrhagic enteropathy or PHE) that is more common in young adults, and a chronic or necrotic form which occurs much more frequently, usually during the grower phase.

The disease occurs primarily in growing/finishing pigs but may also occur in pigs as young as 3 weeks, in market weight hogs and adult swine. Disease often appears to be more severe with, and occurs at an increased incidence in, age-segregated herds. Similar signs and lesions occur in other mammals (hamsters, ferrets, guinea pigs, foxes, horses, lambs, rabbits, rats, dogs, white-tailed deer, emus) with no detectable differences in the genotype of the causative organism. Hamsters have been used in research and are readily infected by the porcine organism (Jacobson et al., 2010:317).

Clinically there is a difference between the acute and the chronic forms of the disease. The acute form causes sudden death and haemorrhagic diarrhea in older finishing pigs and in gilts. The chronic form include daily weight gain, diarrhea etc.

Farm prevalence studies in several countries in Europe, Asia and Northern America indicated that 24 to 47% of pig farms had a serious incidence with PE in the past years. Herd prevalence for finishing pigs in other EU countries has been estimated to range between 88 and 100% (Paradis et al., 2007:57; Hardge et el, 2006:77; Reiner et al., 2010:131). Because of this we considered interesting to determine the \textit{L. intracellularis} infection prevalence in Romanian pig herds, especially in herds where have had registered digestive disorders for efficient control methods.

2. Research methods

In study was used a qualitative single-use test - "Lawsonia FIRSTtest™" kit (MicroCoat Biotechnologie GmbH), which is designed to be used for the detection of \textit{Lawsonia intracellularis} in porcine feces. Samples were represents by feces from four wean-to-finish herds from the western Romania from Timis (two herds), Bihor (one herd) and Hunedoara (one herd) counties. It had been collected a number of 60 feces samples, 15 samples per farm. The samples were collected randomly at each farm from pigs with 90-140 days old. Samples were from pigs with and without diarrhea.

FIRSTtest™ established the existence of \textit{Lawsonia} bacteria. The test can detect both viable and non-viable bacteria and may produce a positive result even after treatment.

Interpretation of the results is based on appearance of a blue color in positive samples. A sample is negative if the intensity of the color is the same or less than negative control. The positive results might be mildly or strongly, depend on intensity of the blue color.

3. Results and Discussions

The results obtained after testing shows that infection with \textit{Lawsonia intracellularis} can be different between herds. The infection percent was between 0 (herd 1 from Timis county) and 80 (herd 2 from Timis county). In the herd from Bihor county was obtained 9 positive samples (60%) and in Hunedoara county 7 positive samples (46.6%).

In the next table and graphic are present the results from the all farms.
Table 1. Results of testing for *Lawsonia intracellularis* in four herds from the west part of Romania

<table>
<thead>
<tr>
<th>Farm</th>
<th>Number of positive samples / total samples</th>
<th>Infection percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM 1</td>
<td>0 / 15</td>
<td>0</td>
</tr>
<tr>
<td>TM 2</td>
<td>12 / 15</td>
<td>80</td>
</tr>
<tr>
<td>HD</td>
<td>7 / 15</td>
<td>46.6</td>
</tr>
<tr>
<td>BH</td>
<td>9 / 15</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>28 / 60</td>
<td>46.6</td>
</tr>
</tbody>
</table>

In TM 1 farm all samples were negative. This aspect can be correlated with the absence of digestive disorders in this farm and with a previous efficient treatment against *Lawsonia intracellularis*.

Things are quite different in farm TM 2. Samples from this farm were from pigs with diarrhea (9) and from pigs without diarrhea (6). All diarrheal samples were positive at *Lawsonia intracellularis* and only 3 normal samples were positive.

Samples from HD farm were all diarrheic samples, but only 7 were positive at *Lawsonia intracellularis*. It is possible that in this farm exist digestive disorders with polifactorial etiology and requires other investigations.

Samples from BH farm were all un-diarrheal samples. After testing, 9 of these samples were positive at *Lawsonia intracellularis*.

The results indicate that infection with *Lawsonia intracellularis* is very widespread in investigated pig herds – 46.6% of samples were positive – and it occurs in herds with digestive disorders and in herds without clinical symptoms.

Similar results were obtained in other studies in herds with diarrheal problems (Costinar et al., 2009:696). Wendt and col. (2006:230), has obtained similar results in herds with clinical symptoms of proliferative entheropathy and in herds free from clinical symptoms.

4. Conclusions

The results indicate that infection with *L. intracellularis* is fairly widespread in pig herds from the west part of Romania (three farms positive from four tested) and occurs both in diarrhea and unthriftiness problems and in herds without clinical signs. Accordingly, specific diagnostic tests are required to exclude other pathogens involved in digestive disorders.

FIRSTtest™ kit can be used in farms with digestive disorders, giving rapid results. To determine the real status of *L. intracellularis* infection in a herd specific diagnostic tests are therefore required.
References


**** FIRSTest™ instruction to use.