RESEARCHES REGARDING RESISTANCE OF 
*A. PLEUROPNEUMONIAE* AT PHYSICAL FACTORS ACTION

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**Key words:** *A. pleuropneumoniae*, resistance, temperature, pH

**Abstract:** The paper’s purpose was to quantify the *A. pleuropneumoniae* strains resistance to temperature and pH variations. *A. pleuropneumoniae* strains maintained at various temperatures in dry conditions means losing strains viability. The wet condition ensures longer survival (between 24 hours and 6 days), while high temperature destroys instantaneous. Acid pH destroys bacteria in a short time (few hours) while alkaline pH allows survival for longer (days).

**INTRODUCTION**

*A. pleuropneumoniae* cause pleuropneumonia in pigs characterized by rapid evolution, fever and grave respiratory symptoms due the characteristic lesions – hemorrhagic and necrotic pneumonia or fibrinous pleuropneumoniae (2, 5, 6, 7).

The resistance of *A. pleuropneumoniae* at physical factors is considering being very low (1, 5, 8)

**MATERIAL AND METHOD**

These strains were isolate from pig pleuropneumonia outbreaks. *A. pleuropneumoniae* was isolate on Petri dishes with agar and sheep defibrinated blood 5% and streaked by *S. aureus*.

Dishes were incubated 24 hours at 37°C in aerobic conditions (3, 4).

The resistance of *A. pleuropneumoniae* at temperature variations was tested in two versions: exposure in wet condition and in dry condition at different temperature.

The primary colonies of *A. pleuropneumoniae* were cultured on blood agar 10% and incubate 24 hours at 37°C. After incubation the dishes were washed with one ml sterile physiological serum, the liquid aspirated representing the biological material tested.

*A. pleuropneumoniae* was recoveres on dry surface of clock glass, representing dry condition and from physiological serum, representing wet condition.

To emphasize *A. pleuropneumoniae* viability in wet condition (after exposure at various temperature) it takes off a drop from culture and growing on blood agar 10%. For dry condition, on clock glass surface was passing a sterile buffer wetting and growing on the same media.

Resistance of *A. pleuropneumoniae* was tested at temperature: -18°C, -4°C, +3°C, 11°C, 20°C, 37°C and 80°C. For each tested temperature were made growing the next after exposure, at 5, 10, 15, 30, 60 minutes; 6, 12, 24, 48 hours; 3, 4, 5, 6 days.
For testing the resistance of *A. pleuropneumoniae* at variation of pH it was obtained a 24 hours broth culture, one ml/tube for each pH value. These values were: 4.7; 5.5; 6.1; 7.6; 8.0; 9.0.

Acid pH was obtained by adding of HCl N/10 in broth and alkaline pH was obtained by adding NaOH N/10.

The tubes with broth were keeping at room temperature (21°C).

To emphasize *A. pleuropneumoniae* viability of culture were growing on blood agar 10% at intervals: 30 min., 2, 4, 7, 22, 24, 48, 72, 96 hours and 6 days.

**RESULTS AND DISCUSSIONS**

The results about resistance of *A. pleuropneumoniae* at temperature action were presented in table 1.

<table>
<thead>
<tr>
<th>Temperatures</th>
<th>Wet condition</th>
<th>Dry condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>80°C</td>
<td>Instantaneous destroyed</td>
<td>Instantaneous destroyed</td>
</tr>
<tr>
<td>37°C</td>
<td>12 hours</td>
<td>30 min.</td>
</tr>
<tr>
<td>20°C</td>
<td>24 hours</td>
<td>60 min.</td>
</tr>
<tr>
<td>11°C</td>
<td>5 hours</td>
<td>60 min.</td>
</tr>
<tr>
<td>3°C</td>
<td>6 days</td>
<td>12 hours</td>
</tr>
<tr>
<td>-4°C</td>
<td>24 hours</td>
<td>30 min.</td>
</tr>
<tr>
<td>-18°C</td>
<td>3 days</td>
<td>30 min.</td>
</tr>
</tbody>
</table>

These results revealed that *A. pleuropneumoniae* could be recover after different time intervals after exposure at the same temperature in dry and wet conditions.

As it could be see *A. pleuropneumoniae* survival longer in wet conditions than in dry condition even the temperature is the same. Our data is concerning with another data from literature (1, 3, 5).

The obtained results demonstrate that *A. pleuropneumoniae* resistance at physical factors is very low. This is owned due the comensal status on respiratory surface in pigs. In work conditions presented at materials and methods *A. pleuropneumoniae* proved a lower resistance beside knows data (5, 8) in which are present *A. pleuropneumoniae* resistance in culture (not in liquid that was used). It is know that *A. pleuropneumoniae* not survive in culture (broth with NAD 0.1%; blood agar 10%) at room temperature longer than 10 days, after 5-7 days it must be culture to recover bacteria (5).

The results of resistance at different pH are presented in table 2.

Analyzing the data from table 2 find that values of acid pH destroyed *A. pleuropneumoniae* quickly so, at pH 5.5 bacteria could be recover till 7 hours after exposure, while at pH 4.7 duration of survival is less than 15 minutes.
### Table 2

Survival limits of *A. pleuropneumoniae* at various pH

<table>
<thead>
<tr>
<th>pH</th>
<th>minutes</th>
<th>hours</th>
<th>days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 10 15</td>
<td>2 4 7</td>
<td>22 24</td>
</tr>
<tr>
<td>4.7</td>
<td>++ + ± - - - - - - - - - - - -</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td></td>
</tr>
<tr>
<td>5.5</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td></td>
</tr>
<tr>
<td>6.1</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td></td>
</tr>
<tr>
<td>7.6</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td></td>
</tr>
<tr>
<td>8.0</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td></td>
</tr>
<tr>
<td>9.0</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td>++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++ ++</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:** ++ growing in abundance; + isolate colonies; ± no colonies ≤ 6; absence of colonies

Survival *A. pleuropneumoniae* in broth at alkaline pH is longer than in acid pH. For the tested values of pH, *A. pleuropneumoniae* resist till 96 hours, and at pH 7.6 bacteria resist 6 days.

**CONCLUSIONS**

These obtained data allow formulating the next conclusions:

- To maintain *A. pleuropneumoniae* strains in dry conditions at various temperature means losing strains viability.
- Generally, the wet condition ensures longer survival (between 24 hours and 6 days), while high temperature destroy instantaneous or allow survival for a short time.
- Acid pH destroys bacteria in a short time (from 15 min. to 7 hours) while alkaline pH allows survival for longer (days).

**BIBLIOGRAPHY**


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