Environment investigating phages. *Salmonella*-phage model in animal systems from Chile.

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Salmonella is the most important foodborne pathogen in the world.

Phages are viruses that specifically lyse bacteria and can be used to recognize their presence and eliminate them.

http://upsetkitten.com/phages/
The objectives of this work were

• Evaluate the presence of *Salmonella* phages in different animal production systems (Intensive and non-intensive systems)

• Investigate if phages isolated from different production systems show differences attributed to each system of origin.
We isolated *Salmonella* phages, from fecal swab. This included:

i) **backyard poultry and pigs** (n=35)
ii) **industrial pigs** (n=36)
iii) **backyard cattle** (n=47)
iv) **industrial cattle** (n=160)
v) **wild bird in peri– urban locations** (n=49)
vi) **wild bird – wetland** (n=271)
vii) **South American camelids** (n=49)

Rivera et al, 2015
### Main Results

**Salmonella phage isolated**

<table>
<thead>
<tr>
<th>Animal system</th>
<th>The total samples analyzed was</th>
<th>Total phages</th>
<th>Salmonella Heidelberg</th>
<th>Salmonella Infantis</th>
<th>Salmonella Typhimurium</th>
<th>Salmonella Enteritidis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backyard poultry and pigs</td>
<td>35</td>
<td>63</td>
<td>9</td>
<td>15</td>
<td>0</td>
<td>43</td>
</tr>
<tr>
<td>Industrial cattle</td>
<td>160</td>
<td>72</td>
<td>3</td>
<td>9</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>Industrial pigs</td>
<td>36</td>
<td>27</td>
<td>0</td>
<td>5</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Wild birds periurban</td>
<td>49</td>
<td>45</td>
<td>11</td>
<td>0</td>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td>Wild birds wetlands</td>
<td>271</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>South American Camelids</td>
<td>49</td>
<td>35</td>
<td>0</td>
<td>13</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Backyard Cattle</td>
<td>47</td>
<td>90</td>
<td>1</td>
<td>4</td>
<td>10</td>
<td>75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>675</strong></td>
<td><strong>359</strong></td>
<td><strong>25</strong></td>
<td><strong>48</strong></td>
<td><strong>24</strong></td>
<td><strong>250</strong></td>
</tr>
</tbody>
</table>

Four *Salmonella* serovars were used to isolate phages (Infantis, Typhimurium, Heidelberg, Enteritidis)

The most important host was Salmonella Enteritidis
Main Results

The lysis profile analysis by host range showed:

Cluster A: Wide Host Range phages, wild bird – wetland

Cluster B: Wide and narrow host range in non-intensive and intensive systems

Cluster C: Narrow host Range in intensive systems

Lysed phage

Non Lysed phage

Phages

Javiana, Dublin, Enteritidis

Salmonella serovars
Impact and prospectum

This was the first approach to the compression of the divergence of *Salmonella* in animal production systems in Chile.

It is important to understand the role of *Salmonella* phages dynamics in the different animal systems.

A common lysis profile was found (Enteritidis Dublin and Javiana) except Wild birds wetlands and Backyard Cattle.

Due phages specificity for their hosts could be used as screening tool and could be used for the treatment diseases.
Thanks to the project:
Strengthening internationalization for the integration, consolidation and development of forestry, veterinary, aquaculture, nutrition and food sciences: pillars of the three Doctorate programs of the South Campus (UCH 1566).
FONDECYT

Thank You

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