Monitoring of bursa size after vaccination against Gumboro Disease

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### Available vaccines against IBD for use in broilers

*(Sesti, 2011)*

<table>
<thead>
<tr>
<th></th>
<th>Conventional live virus</th>
<th>Immune Complex</th>
<th>Recombinant / Vectored</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contains live IBDV</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Effective <em>in ovo</em> or DO</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>One dose only</td>
<td>YES/NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>No field vaccination</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Depends on replication of other virus</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Lateral transmission</td>
<td>Depends on vac. strain</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Field challenge supported</td>
<td>Depends on vac. strain</td>
<td>Greater</td>
<td>Smaller</td>
</tr>
</tbody>
</table>
Objective

To compare biological characteristics of vaccine take and productive performance in broilers vaccinated against IBD with either an immune complex (ICX) or vector (VEC) vaccine.
IBD vaccines

**Immune complex (ICX) vaccine**
(Cevac Transmune IBD)
Composed by a live intermediate plus IBDV vaccine strain (Winterfield 2512) complexed with specific Ab against it.

**Vector (VEC) vaccine**
Composed by a live recombinant Marek’s HVT vaccine strain expressing the VP2 of a classical IBDV strain (rHVT-IBD).
Field trial 1
TUNISIAN REPUBLIC - 2011

- Largest poultry company (40 million / year)
- Medium to high IBDV field challenge

M. Bouzouaia
O. Abbes
H. Nasri
C. Cazaban
B. Le-Tallec
E. Allagui
Materials & Methods

5 broiler flocks (2 farms)
139,000 birds

15 broiler flocks (6 farms)
188,000 birds

ICX vaccine
Day one - SQ

VEC vaccine
Day one - SQ

Sampling done at slaughter age (40-42 days):
✓ Bursa of Fabricius (BF)
  o Weight (10 BF)
  o Histopathology (5 BF)
  o RT-PCR / RFLP (5 BF)
Broiler performance

- Mortality (%): ICX 4.6, VEC 5.7
- FCR: ICX 1.92, VEC 2.01
- Production Index: ICX 224, VEC 211
Individual Bursa Weight

ICX average = 1.1 g

VEC average = 3.1 g
## RT-PCR/RFLP results

<table>
<thead>
<tr>
<th>VACCINE</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ICX</td>
<td>4 flocks</td>
<td>100 % positive W2512 strain</td>
</tr>
<tr>
<td>VEC</td>
<td>6 flocks</td>
<td>50 % positive W2512 strain</td>
</tr>
</tbody>
</table>
Field trial 2
Brazil - 2010

- Medium size cooperative (10 million broilers / month)
- Medium to low biosecurity
- Medium vvIBDV field challenge
Materials & Methods

10 broiler flocks 113,200 birds

ICX vaccine
Day one - SQ

10 broiler flocks 113,600 birds

VEC vaccine
Day one - SQ

Sampling done between 32-35 days of age:

✓ Blood (Elisa serology – 25 samples per flock)
✓ Bursa of Fabricius (BF; 10 per flock)
  ◦ Weight (10 BF)
  ◦ Histopathology (5 BF)
  ◦ RT-PCR / RFLP (5 BF)
Broiler performance

**Slaughter Age (days)**
- ICX: 42.6 days
- VEC: 42.4 days

**Average Weight (kg)**
- ICX: 2.59 kg
- VEC: 2.57 kg

**Feed Conversion (kg/kg)**
- ICX: 1.74 kg/kg
- VEC: 1.72 kg/kg
Broiler performance

Mortality (%; p<0.10)
- A: 2.56
- B: 3.14

Daily Weight Gain (g)
- A: 61
- B: 60.4

Production Index
- A: 340.4
- A: 341
Individual Bursa Weight

ICX average = 1.3 g

VEC average = 2.3 g / 39% > 2 g / 61% 1-2 g

Individual BF weight (g)
BRAZIL

Individual Bursa Weight

ICX average = 1.3 g

Vector average = 2.3 g / 39% > 2 g / 61% ≤ 2 g

TUNISIA

Individual Bursa Weight

ICX average = 1.1 g

Vector average = 3.1 g

Individual BF weight (g)
Bursa histopathology

BFs’ lymphoid depletion score

<table>
<thead>
<tr>
<th>Lymphoid depletion score in BF (Dr. Fred Hoerr)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25%</td>
<td>1</td>
</tr>
<tr>
<td>26-50%</td>
<td>2</td>
</tr>
<tr>
<td>51-80%</td>
<td>3</td>
</tr>
<tr>
<td>&gt;81%</td>
<td>4</td>
</tr>
</tbody>
</table>

ICX = 2.9

VEC = 2.4
Elisa Serology (Idexx IBD classic)

ICX = 2428

VEC = 1698

GMT
### RT-PCR / RFLP results

<table>
<thead>
<tr>
<th></th>
<th>Flocks positive to G3 (W2512) = 80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICX</td>
<td></td>
</tr>
<tr>
<td>VEC</td>
<td>Flocks positive to G9</td>
</tr>
<tr>
<td></td>
<td>(Faragher’s VP2 in rHVT) = 80%</td>
</tr>
</tbody>
</table>

RFLP results ➔

ICX flocks = W2512 and G15 strains

VEC flocks = Faragher’s VP2 and G15 strains
Comments

• Vaccination take of both vaccines can be clearly monitored in the field.
• Broilers vaccinated with the ICX vaccine presented more uniform characteristics of vaccine take.
• Broiler performance was slightly better for ICX vaccinated broilers in both surveys as normally seen in large data banks in the field.
• Bursa weight, histopathology, serology and molecular results clearly indicate that VEC vaccinated broilers are not fully protected against IBDV strains present in the environment (field and/or vaccine strains).
• These data deny the concept that broilers with larger BFs will perform better and confirm what has been observed in the field worldwide.
• The use of an immune complex vaccine containing an intermediate plus vaccine strain is absolutely safe and presents a greater possibility of allowing better broiler performance than vector vaccines against Gumboro Disease (i.e., better protection against subclinical challenge).
COMPANY 1
as hatched (44,7 days)
Medium to low field vvIBDV challenge

ICX → 19 million broilers
VEC → 6 million broilers

Daily Weight Gain (g)

Mortality (%)

Unthrifty birds (%)

Production Factor
COMPANY 2
males (43 days)
low field vvIBDV challenge

ICX $\rightarrow$ 20.3 million broilers
VEC $\rightarrow$ 4.7 million broilers

Extra gain $\rightarrow$
2.75 euros / 1000 broilers
- 56 000 euros -
IBD Immunity Development

Vector vaccine - hatchery

- 3-4 wk
  - Full protection against vvIBDV
  - Progressive protection

Immune Complex - hatchery

- Bird susceptible to the W2512 strain
- Less than 48 hours
- 100 % protection against all IBDV strains

Induction of a quick and full protection
Thanks so much!

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