Coprophagous behavior of rabbit pups affects dynamic of implantation of microbiota and improves health status

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- High frequency of digestive trouble in rabbit rearing units leads to important antimicrobial agent use
- Microbiota plays important key roles in the development of the gastrointestinal tract, angiogenesis, maturation of the immune system and acts in health as a barrier against pathogens

We postulated

Objectives
1. to quantify both behaviors maternal hard faeces excretion and pups’ hard faeces ingestion
2. to evaluate the effect of hard faeces ingestion on caecal microbiota implantation process and rabbit health
3. to modulate the caecal microbiota implantation process using hard faeces from foreign does

Material and Methods

<table>
<thead>
<tr>
<th>FM group</th>
<th>Natural behaviour</th>
<th>24 litters</th>
</tr>
</thead>
<tbody>
<tr>
<td>NF group</td>
<td>No faeces ingestion</td>
<td>28 litters</td>
</tr>
<tr>
<td>FF group</td>
<td>Ingestion of foreign faeces</td>
<td>28 litters</td>
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</tbody>
</table>

Nursing was controlled
Maternal excretion and pups' ingestion of faeces in the nest were measured daily from 2 to 20 d
Mortality was measured daily from 1 – 80 d

Results and discussion

- The maternal excretion of hard faeces in the nest, and their ingestion by pups is involved in the microbiota implantation
- The hard faeces would be an efficient tool to modulate microbiota establishment and health of the young rabbit

Table 1. Hard faeces excretion of does in the nest, faeces ingestion and mortality of pups

<table>
<thead>
<tr>
<th></th>
<th>NF</th>
<th>FF</th>
<th>FM</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of faeces excreted by does (2 - 20d)</td>
<td>15.4</td>
<td>18.8</td>
<td>11.8</td>
<td>0.20</td>
</tr>
<tr>
<td>No of faeces ingested by pups (2 - 20d)</td>
<td>-</td>
<td>35.6</td>
<td>9.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mortality % (1 – 80d)</td>
<td>22.8</td>
<td>9.3</td>
<td>15.5</td>
<td>0.03</td>
</tr>
</tbody>
</table>

- Ingestion of faeces by pups was 3 times greater in FF than in FM group, and could be thus modulated
- Pup mortality was lower (9.3%) in FF group and higher (22.8%) in NF group compared to FM group (15.5 %)

At age 14 d the caecal bacterial community was dominated by Bacteroidaceae family (63%). At 80 d Lachnospiraceae and Ruminococcaceae families became the dominant taxa (44% and 37%, resp.)

Impairment of faeces ingestion delayed the ecological succession, with greater and lower relative abundance of Bacteroidaceae and Ruminococcaceae respectively in NF than in the two other groups at age 35 d (p < 0.05).

The coprophagous behavior of suckling rabbits is implicated in the maturation of caecal bacterial microbiota. Stimulation of this natural behavior improved the health status of animals and could be used to limit the use of antibiotics.