

## Evaluation of homeopathic and biotherapeutic treatments in a swine farm to control *Escherichia coli* infection: a long term study

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### ABSTRACT

**Background:** *Escherichia coli* is the most important etiological agent in neonatal diarrhea in swine, and Enterotoxigenic *Escherichia coli* (ETEC) is the most commonly isolated. Regarding to virulence factors, five main types of fimbriae were already described in swine samples: F4 (K88), F5 (K99), F6 (987P), F18 and F41. Thermolabile (LT) and thermostable enterotoxins (ST), as well as shiga-like toxin or verotoxin (Stx2) are also found in isolates of swine origin, related to diarrhoea process.

**Methods:** This long term study has been developed in a swine farm (Mato Grosso, Brazil), in which 93 piglets were studied and 184 fecal samples were evaluated in two steps, with the aim to search the presence of *Escherichia coli* and to prepare a specific biotherapeutic medicine. Each step had one year of interval each other. Concurrently, for each step, a detailed anamnesis was made for choosing the ideal homeopathic medication for each step (*Phosphorus* 30 CH and *Pulsatilla* 30 CH, respectively). In each step, four groups consisting of 11-12 piglets and the respective primiparous mother pig were formed, and the treatments happened simultaneously: control group (antimicrobial treatment, the same used in the swine farm), homeopathic medication, *E. coli* biotherapeutic and homeopathic medication associated to biotherapeutic. The medications were made according to the Brazilian Homeopathic Pharmacopeia and the treatment lasted 12 days. After 24 days, in the weaning, the weight gain of each bath was also evaluated. Considering both steps, the research of virulence factors and enterotoxins was carried out in 99 *Escherichia coli* colonies through Polymerase Chain Reaction - PCR.

**Results:** In both steps, the homeopathy treated groups passed from 75.0% of diarrhea incidence to 8.3% at the end of the treatment ( $p < 0.05$ ); the groups treated with homeopathy + biotherapeutic also presented significant reduction in the number of sick animals ( $p < 0.05$ ), passing from 68.2% to 27.2% at the end. Weight

gain in all groups taking homeopathic medicines was 15% higher than the control group. Only the F41 virulence factor was found in 10.0% of the studied animals.

**Conclusion:** Homeopathic medications seem to be an efficient alternative for controlling enteric disorders in swine, increasing the weight gain. However, further studies should be conducted to confirm if homeopathic medicines can interfere in the presence of virulence factors and enterotoxins in bacterial population.

**Keywords:** Biotherapeutic. *Escherichia coli*. Homeopathy. PCR. Swine.

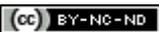
Table 1 - Number of animals with diarrhea at the beginning and the end of treatment.

<b>Group</b>	<b>Beginning (number of sick animals) (%)</b>	<b>End (number of sick animals) (%)</b>
<i>E. coli</i> biotherapeutic 30 CH	9 (37,5%)	0 (0%)*
Homeopathic medication + biotherapeutic 30 CH	15 (68,2%)	6 (27,2%)*
Homeopathic medication 30 CH	18(75,0%)	2 (8,3%)*
Control group	10 (43,5%)	4 (19,0%)
Total number of animals	93	91

\* Fischer's test  $p < 0,05$  regarding the first day.

Table 2 - Weight average at the beginning of treatment and weaning.

<b>Group</b>	<b>Beginning (Average weight/ number of animals)</b>	<b>Weaning (Average weight/ number of animals)</b>	<b>Average weight again</b>
<i>E. coli</i> biotherapeutic 30 CH	1525 (24)	6227 (21)	4702
Homeopathic medication + biotherapeutic 30 CH	1236 (22)	5945 (21)	4709
Homeopathic medication 30 CH	1625 (24)	6156 (21)	4531
Control group	1434 (23)	5449 (20)	4015
Total number of animals	93	83	

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