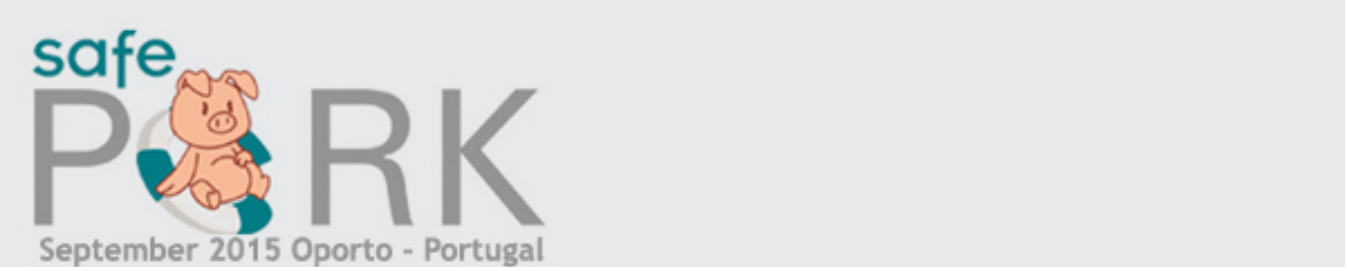

Impacts of colistin sulfate on fecal *Escherichia coli* resistance and on growth performance of piglets in a post-weaning diarrhea model

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Abstract

Colistin sulfate (CS) is used in Canada for the treatment of post weaning diarrhea (PWD), to overcome conventional therapeutic antibiotics failures. The aim of the present study was to determine the effect of a conventional oral regimen of CS for the treatment of PWD, on the development of *E. coli* CS resistance and to evaluate the effect of ETEC: F4 infection on CS intestinal absorption.

A total of 48 pigs were used, challenge was carried out by oral administration of 10^9CFU of a hemolytic ETEC: F4 strain resistant to nalidixic acid. CS was administered at a dose of 50.000 UI/kg twice a day for 5 days. Feces were examined clinically and bacteriologically before and after challenge to evaluate presence of diarrhea and *E. coli* fecal excretion. ETEC: F4 virulence factors were monitored and CS plasma concentrations were quantified by an HPLC-MS/MS.

From one until six days after CS administration, a significant reduction in the fecal excretion of ETEC: F4, total *E. coli*, ETEC: F4 virulence factors and in diarrhea scores was observed in the challenged treated group compared to the challenged untreated group ($p<0.0001$). No significant difference in growth performances was observed in treated compared to non-treated pigs ($p>0.71$). A significant selection pressure on *E. coli* total population was observed following CS treatment ($p<0.0001$). Challenge with ETEC: F4 resulted in an increase in intestinal absorption of CS in the challenged group compared to the non-challenged one.

Our study is the first to demonstrate in an experimental model of PWD, that CS at a dose of 50,000 IU/kg is effective in reducing fecal excretion of *E. coli*. However, this regimen was associated with a selection pressure on *E. coli* CS resistance, and did not improve growth performance in challenged pigs. Thus, the use of this antibiotic in pig should be revised.