

Oral vaccine carrot to protect against ETEC diarrhea in piglet

LEE, Haung-Keun · LEE, Young-Sun · HWANG, Cheol-Ho*

School of Bioresource Sciences, Dankook University

Objectives

In order to test the efficiency of immunization of the animals by oral administration of the transgenic carrot expressing an antigen, the pilin protein of pathogen, mice and piglet were fed with the carrot vaccine and measured various clinical responses after challenge with ETEC K88 strains.

Materials and Methods

1. Materials

- Mouse (56 old, SPF BALB/c - Daehan Biolink), piglet (21 old, Durocor × Yorkshire × Landrace), mice feedstuff (Samyangoilfeed), swine feedstuff make feeding standard NRC (1998), feedstuff additive (transgenic carrot: Y19-22 low expression plant, M1-17 high expression plant).

2. Methods

- Mouse: feeding of the transgenic carrots (Y19-22, M1-17) were performed weekly for 4 times and the blood sample were estimated for the amounts of the antigen by ELISA.

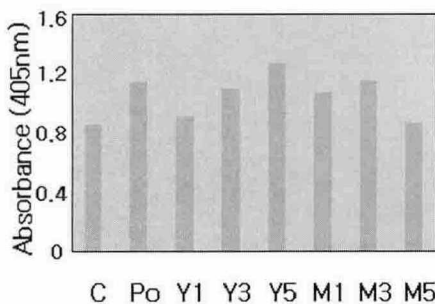


Figure 1. ELISA, to measure the amounts of pili antibody from the serum of mice at 28 days after Feeding with the transgenic oral vaccine carrot

- piglet: piglets were fed for 14 days with transgenic carrot and challenged with K88ac at 5×10^9 cfu/ml and did ELISA assay as mouse experiment.

Results and discussion

1. Mice fed with the transgenic carrot showed the similar level of antigen produced compared to one with nontransgenic carrot added with $10 \mu\text{g}$ of recombinant pilin protein.
2. By oral administration with K88ac to piglets with prior feedings the transgenic carrot for 14 days, a diarrhea and Fecal score were measured according to Sherman (1983). It appeared that no diarrhea was observed from the piglet fed with the transgenic carrots but a case of diarrhea was observed with the piglet fed with the control carrots.
3. When the increases in weight of the piglets were measured during 14 days including the feeding of vaccine carrot and challenging with the pathogen and the piglet with the transgenic carrot showed a higher level compared to one with the control carrot.

Table 1. Clinical response of 36 days old pigs after challenge with ETEC K88 strains^a.

Item ²	No. of pigs	No. of pigs with diarrhea on	
		2 days	4 days
----- Fecal score ² -----			
Commercial carrot	5	1 (3)	1 (3)
Recombinant carrot	5	0 (0)	0 (0)
Pure E-coli	5	0 (0)	0 (0)

¹At Day 15 after the onset of the experiment, all pigs were challenged orally with ETEC K88 at a dose of 5×10^9 cfu/ml.

²Fecal score is the mean fecal consistency score: 0, normal; 1, soft feces; 2, mild diarrhea; 3, severe diarrhea. Values in brackets represent mean fecal score.