

IN VIVO EFFECT OF SODIUM BUTYRATE ON SALMONELLA INFECTED CHICKEN.

STUDY REPORT

DEPARTMENT OF PHARMACOLOGY AND TOXICOLOGY

FACULTY OF VETERINARY SCIENCES

SZENT ISTVÁN UNIVERSITY

2010

1. Aim of the study

The aim of our study was to investigate the beneficial effect of sodium butyrate against *Salmonella* Enteritidis and *Salmonella* Typhimurium infection in chicken.

2. Materials and methods

2.1. In Vivo Trial

Experimental animals used in this study were conventional **broiler chickens** (breed: Arbor acres broiler, Bábolna, Hungary, number of animals: 20 (+ 2 substitute), gender: mMixed, age: 2 weeks old /as on 14th of Septemeber 2010/, hygiene status: conventional, feed and water supply: ad libitum, free from any medication). Three days before *Salmonella* inoculation the experimental animals were randomly assigned to two groups (equal for the control group and equal for the treatment / VFA C4/ Butirex C4 (sodium butyrate) 1.5g/kg feed/ group).

2.2. *Salmonella* strain involved in this study

Salmonella enterica serovar *enterica* type *Salmonella* Enteritidis 147 (*S. Enteritidis* 147) was supplied by Central Veterinary Institute of Hungarian Academy of Sciences, Budapest, Hungary. *Salmonella* . One colony of *S. Enteritidis* 147 grew on Mueller-Hinton (MH,

Biolab, Hungary) agar was inoculated into 10 ml MH broth. The inoculums were then grown overnight (16 h) with shaking (200 rpm) at 37°C. Bacterium cultures were pelleted by centrifugation (3000 g 10 min 5°C, Universal 320R Centrifuge, Hettich Zentrifugen) and resuspended in sterile phosphate buffered saline (PBS) solution. The titers were 10⁸ colony forming units (CFU)/ml of *S. Enteritidis*. Chicken were challenged on day 0 by inoculating orally 10⁸ CFU /ml of *S. Enteritidis*.

2.3. Body weight measurements

The body weight of the animals were measured on different days of age.

2.4. Salmonella counts in cloacal samples

At day 0 (before inoculation), chicken were confirmed being negative for *Salmonella*. Cloacal and rectal samples were taken from chicken from the two groups on days 2, 7, 14, 21, 28, 35 and 42 to monitor infection levels.

Sterilized peptone-watered moistened swabs were used to take cloacal samples. From each animal two samples were taken. One of the samples was directly inoculated onto brilliant green agar (BGA, Becton, Dickinson and Company, USA) plates and incubated overnight at 37°C. For the enrichment procedure the other cloacal sample was taken to 10 ml Mueller Kauffmann Tetrathionate Novobiocin broth (Merck, Germany) and incubated at 37°C during 48 h. After incubation, 100 µl of each sample was plated on BGA and incubated overnight to obtain the final results. Pink coloured bacterial colonies were assessed as positive samples.

3. Results

3.1. Body weight measurements

Tables show the body weight of the animals on different days of age. Values indicate mean body weight \pm SEM. It can be seen that butyrate treatment increased slightly the body weight compared the non-treated control.

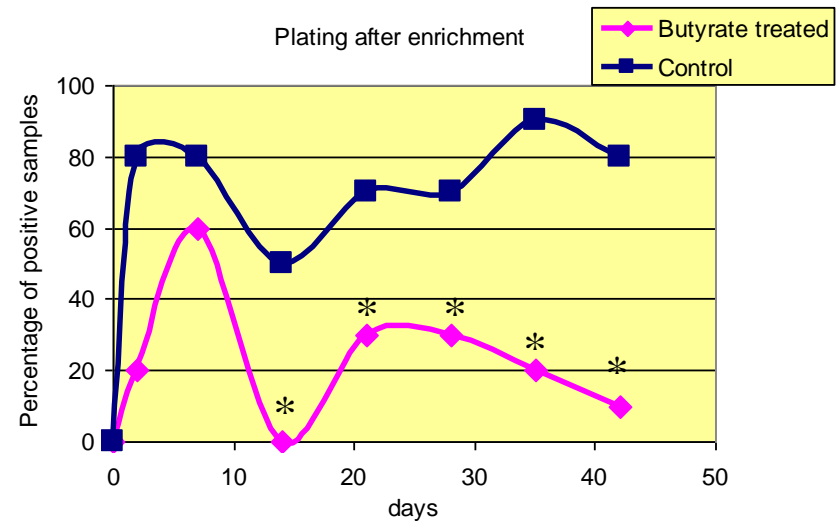
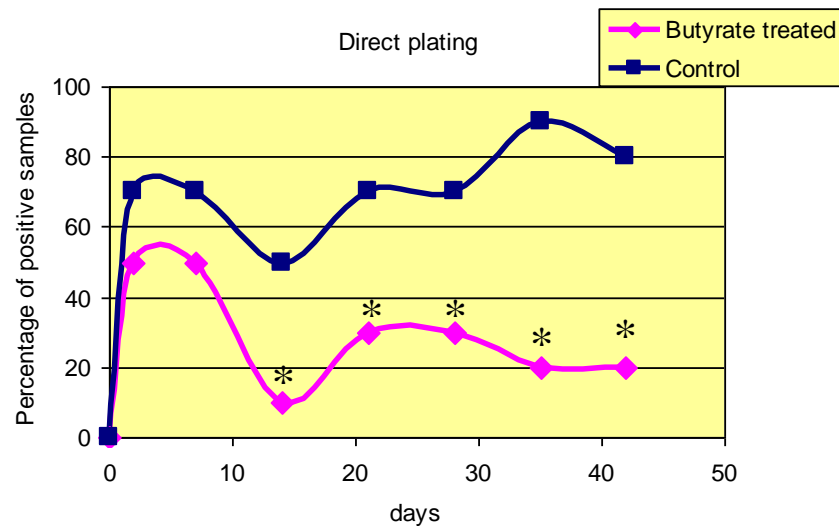
Chicken

Date	14.09		17.09		25.09		2.10		9.10		16.10		23.10		30.10	
Group	C	Butirex C4	C	Butirex C4	C	Butirex C4	C	Butirex C4	C	Butirex C4	C	Butirex C4	C	Butirex C4	C	Butirex C4
AVG	0.58	0.62	0.71	0.68	0.80	0.87	1.04	1.05	1.13	1.17	1.11	1.34	1.39	1.44	1.57	1.64
SEM	0.04	0.02	0.03	0.04	0.06	0.07	0.04	0.09	0.06	0.12	0.09	0.16	0.09	0.18	0.10	0.18

3.2. Fecal shedding of *Salmonella*-infected chicken without enrichment

Figures show the fecal shedding of *Salmonella*-infected chicken after 2, 7, 14, 21, 28, 35 and 42 days post-inoculating in control and butyrate supplemented group after direct BGA plating or with enrichment (plating after enrichment).

Fecal shedding of *Salmonella*-infected chicken without (direct plating) or with enrichment (plating after enrichment)



Asterisk means significant difference ($p < 0.05$) between Butirex C4 and control (without Butirex C4).

4. Summary

- (1) Lower number of *Salmonella*-positive cloacal swabs was found in the butyrate-treated chicken group during the fattening period compared to control group.
- (2) Butyrate treatment increased slightly the body weight compared the non-treated control.

5. Report

This document contains the final report of the “in vivo effect of sodium butyrate on salmonella infected chicken” engagement agreement. The experiments and investigations were performed in the Department of Pharmacology and Toxicology, Faculty of

Veterinary Sciences, Szent István University. The trial were done with the financial support of Novation, and VFA C4/ Butirex C4 (sodium butyrate) was tested in this experiment.

Yours sincerely,

22th of Dezember, 2010
Budapest, Hungary

Prof. Péter Gálfi, DVM., DSc.
Head of Department