NATBIOTICS : NUTRACEUTICAL EVALUATION IN ANIMAL MODELS

EVALUATION OF THE EFFECT OF NATBIOTICS TOWARDS THE INFLAMMATORY BOWEL DISEASE IN AN EXPERIMENTAL MODEL FOR COLITIS IN RATS

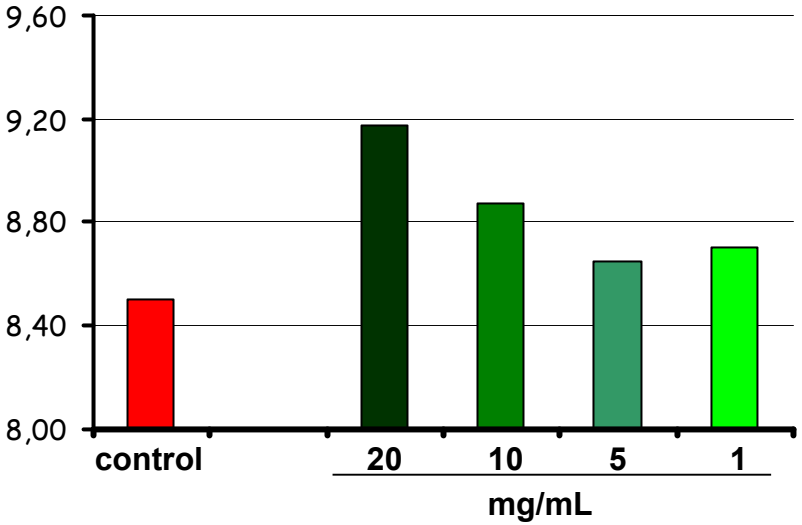
(Trinitrobencenesulfonic acid; TNBS)

NATURALITY R&D

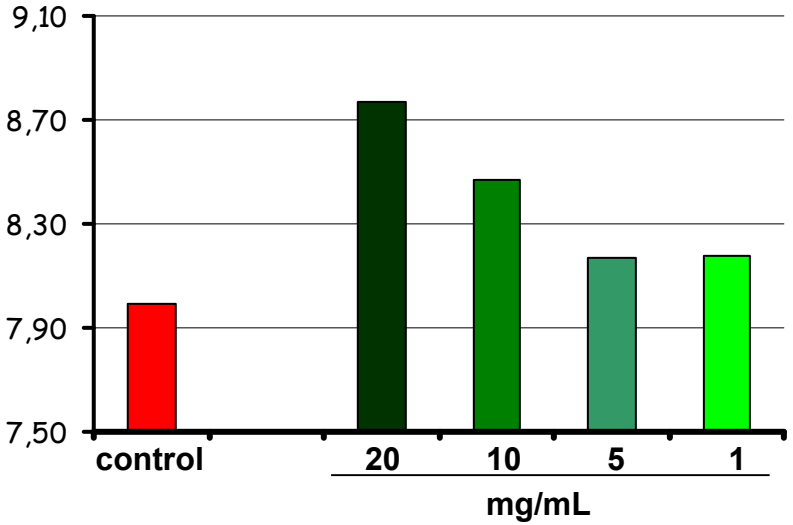
NATBIOTICS EVALUATION IN VITRO

COLONIC MICROFLORA AND SHORT CHAIN FATTY ACIDS (SCFA) IN HEALTHY ANIMALS (RATS)

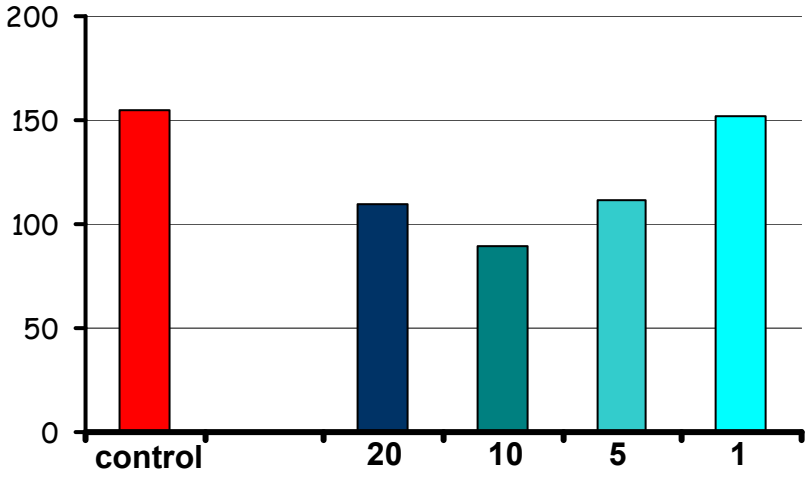
LACTOBACILLUS



BIFIDOBACTERIA



SCFA PRODUCTION

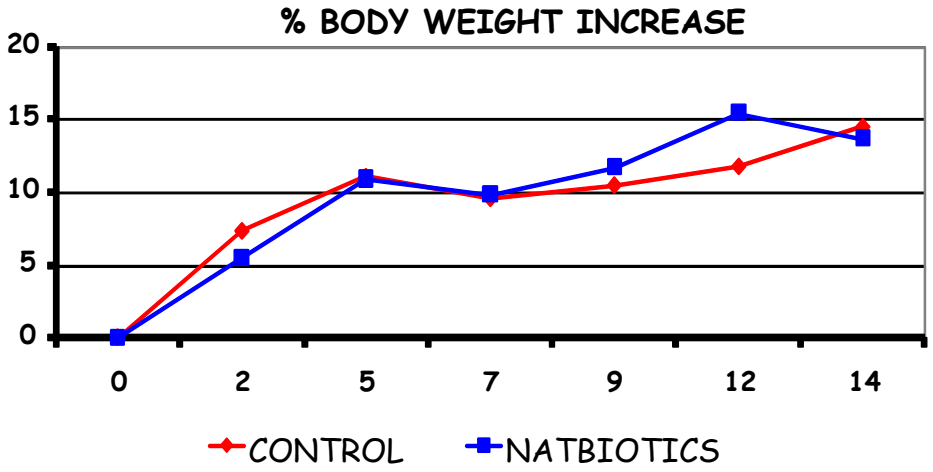


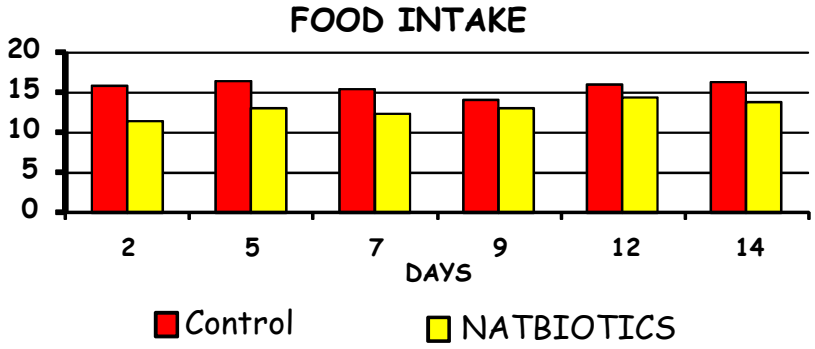
Dose-dependent increase in the population of beneficial bacteria in the colon

Decrease in the production of SCFA (beneficial for proper colonocite functioning)

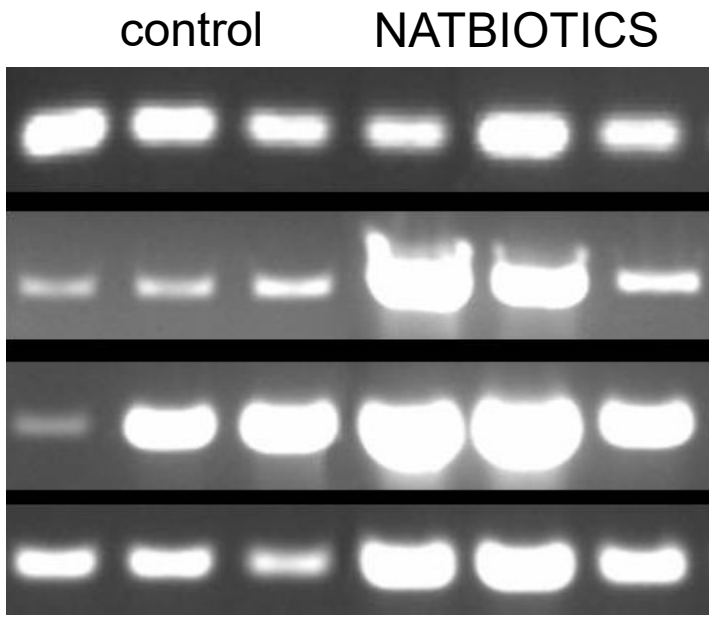
NATBIOTICS EVALUATION IN VIVO

REGULATION OF CYTOPROTECTIVE PROTEIN EXPRESSION IN THE INTESTINE





modest effect on lactobacillus and bifidobacteria populations



β-actine (control)

MUC1

MUC2

} Cytoprotective glycoproteins

TFF-3 Cytoprotective peptide

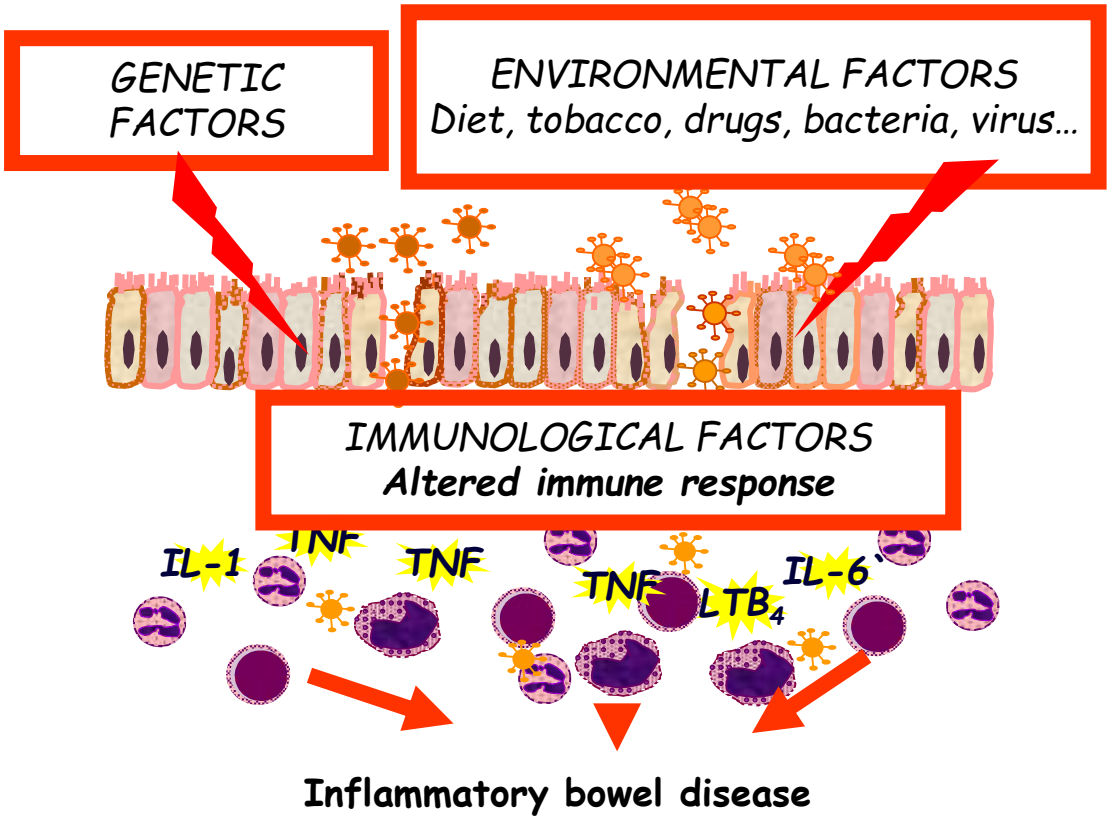
INFLAMMATORY BOWEL DISEASE

Inflammatory bowel disease (IBD) is the name of a group of disorders that cause the intestines to become inflamed (red and swollen). The inflammation lasts a long time and usually comes back over and over again. The exact causes are unknown. The disease may be caused by a germ or by an immune system problem.

Two kinds of inflammatory bowel disease are Crohn's disease (CD) and ulcerative colitis (UC). Crohn's disease usually causes ulcers (open sores) along the length of the small and large intestines. Crohn's disease either spares the rectum, or causes inflammation or infection with drainage around the rectum. Ulcerative colitis usually causes ulcers in the lower part of the large intestine, often starting at the rectum.

The prevalence in western countries is of 250 per 100.000 persons

THERAPIES FOR THE INFLAMMATORY BOWEL DISEASE



1. ANTIINFLAMMATORY AND IMMUNOSUPRESORY DRUGS
   - × Aminosalicilates
   - × Azathioprine
   - × MetotrexatE
   - × Glucocorticoids
   - × 6-mercaptopurine
   - × Ciclosporin

2. ANTIBIOTICS
   - × Metronidazole
   - × Ciprofluoxacine

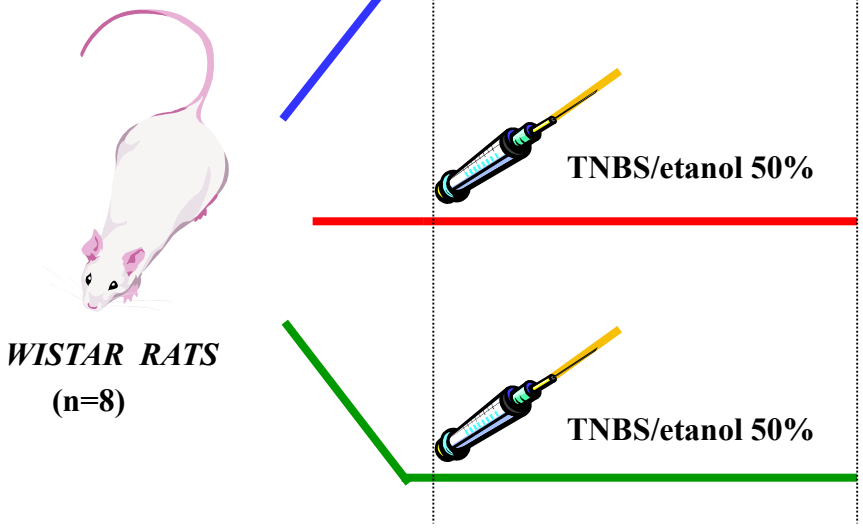
3. BIOLOGICAL THERAPY
   - × Infliximab

4. ALTERNATIVE THERAPIES

NATBIOTICS ?

- × Prebiotics (dietetic fiber, FOS…)
- × Probiotics
- × Polyinsaturated fatty acids, ω3
- × Antioxidants: flavonoids

NATBIOTICS as NUTRACEUTICAL



✓ General macroscopic parameters:
- corporal weight and food
- diarrhea incidence
- colonic weight/length ratio
- damage extension
- macroscopic damage index (MDI)

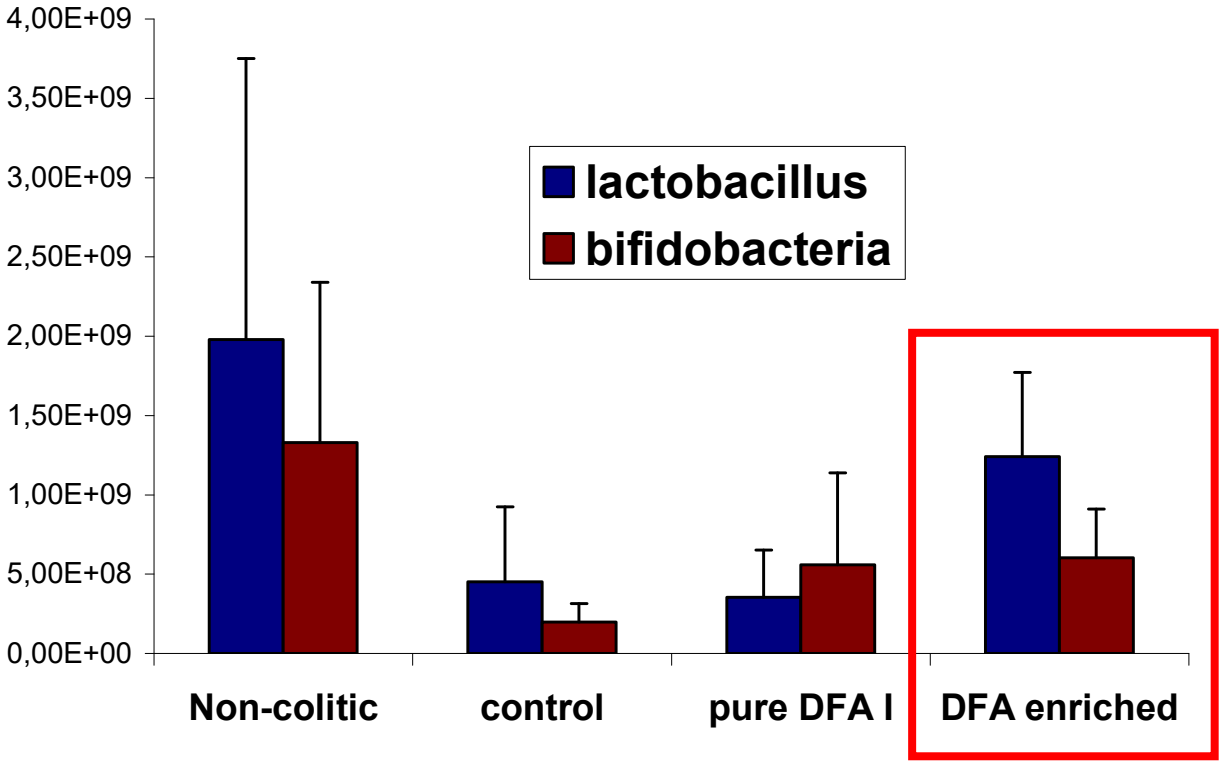
✓ Biochemical parameters
- myeloperoxidase activity (MPO)

✓ Impact in gut microflora:
- lactobacillus
- bifidobacteria

GROUP	COLON WEIGHT	MDI (0-10)	MPO (U/g tissue)
Non-colitic	63.5 ± 6.9	0.0	21.5 ± 4.0
Control TNBS	180.7 ± 36.1	7.5 (6-10)	116.7 ± 9.2
Pure DFA Di-α-Fruf 1,2:2,3	216.3 ± 52.0	8 (6-9.5)	74.9 ± 8.3
NATBIOTICs (14% imp)	137.2 ± 39.5	5.5 (4.5-7.5)	88.6 ± 10.3
NATBIOTICS (72% imp)	140.5 ± 28.9	5.75 (3-7)	69.0 ± 7.5

Colitic animal Healthy animal

NATBIOTICS as NUTRACEUTICAL colonic microflora

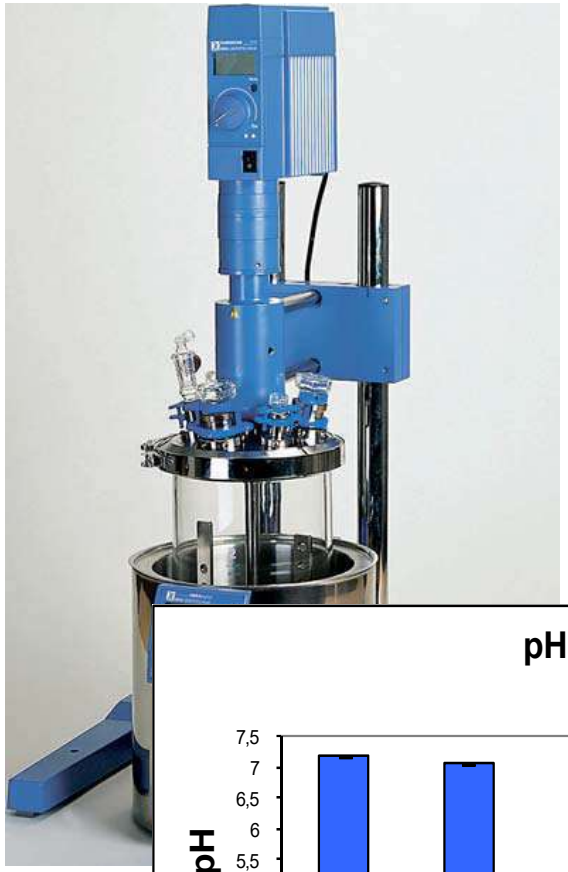


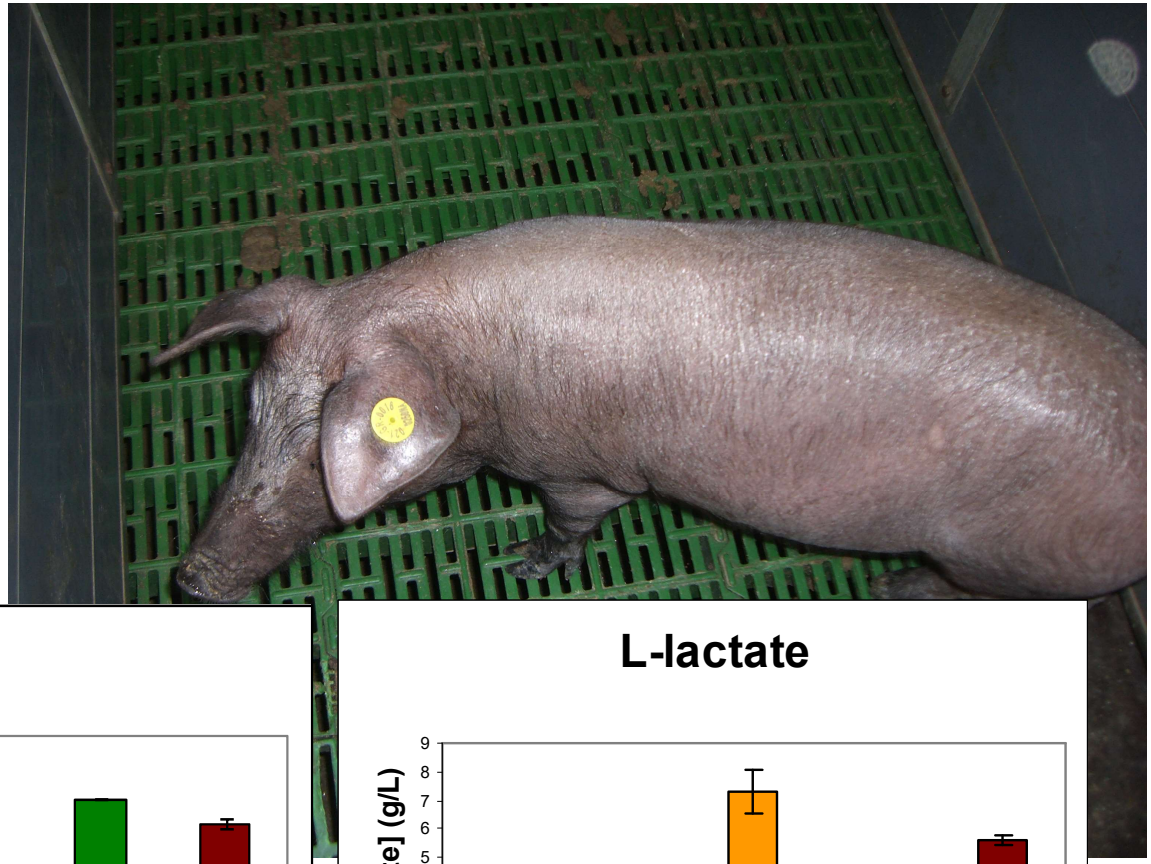
NATBIOTICS (or DFAs enriched) **help to reach normal levels of beneficial colonic bacteria after intestinal damage.**

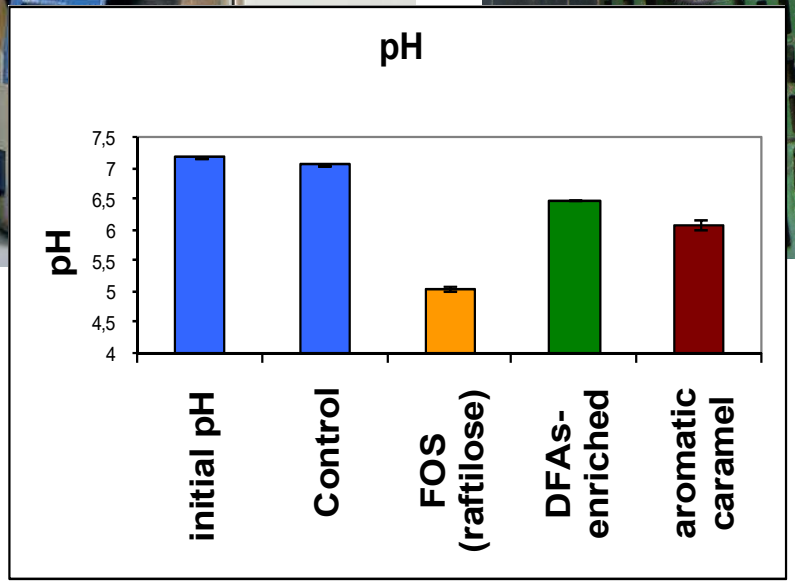
This effect is much more significant in IBD-affected animals **than in healthy animals.**

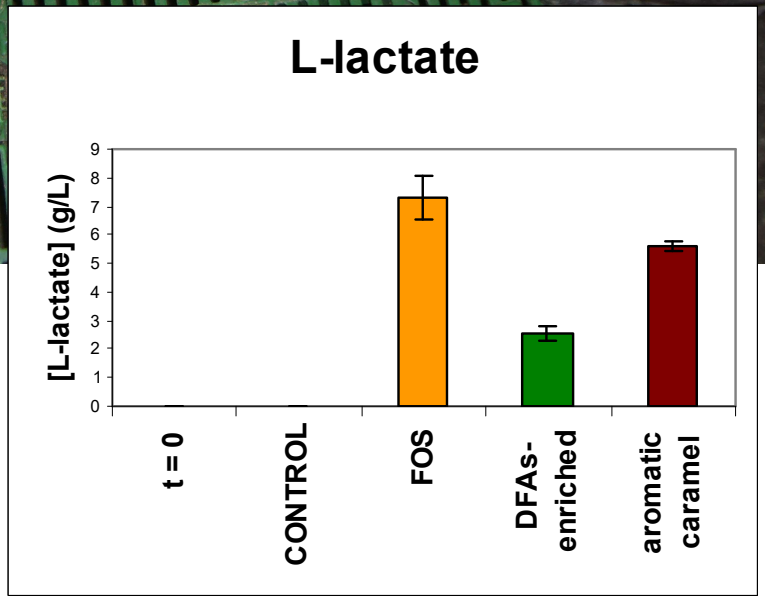
Strong protective and drug-like effect.

NATBIOTICS EVALUATION IN PIGS: FERMENTABILITY

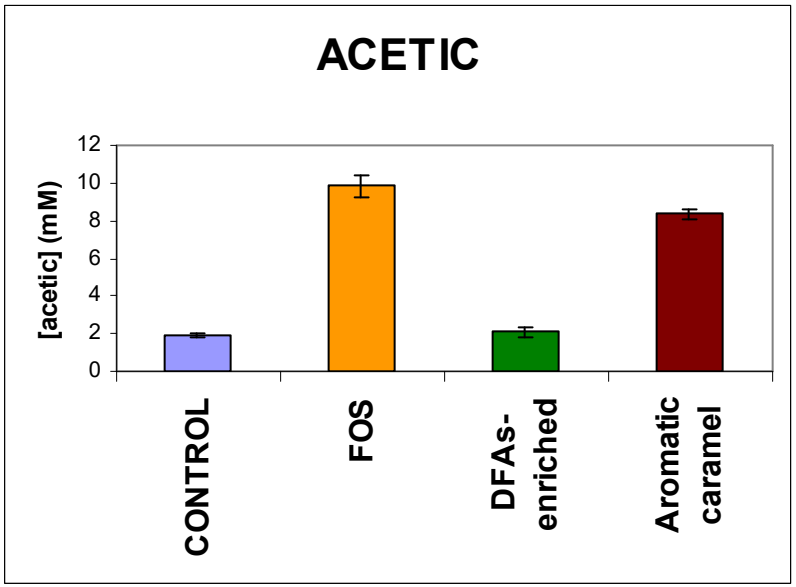


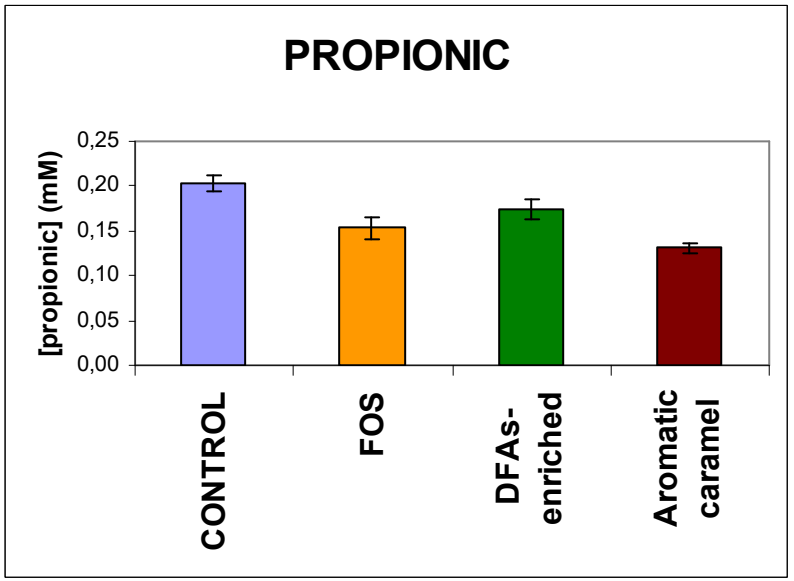


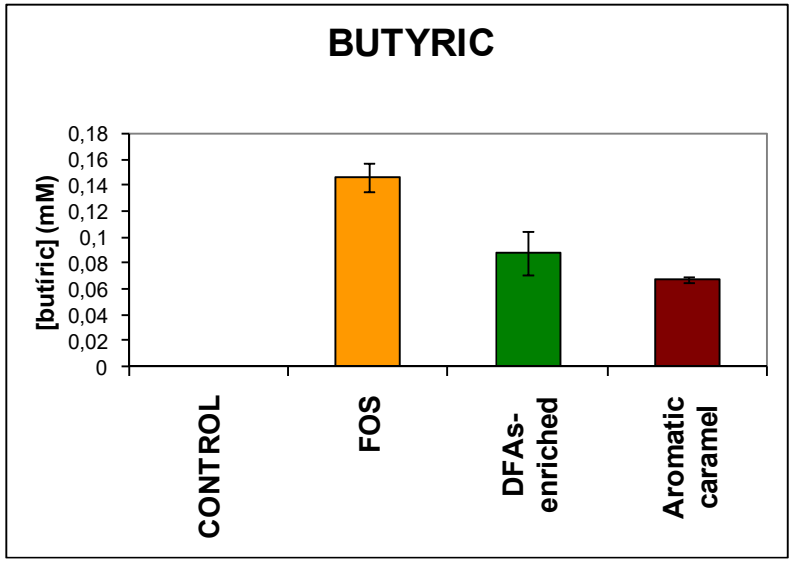


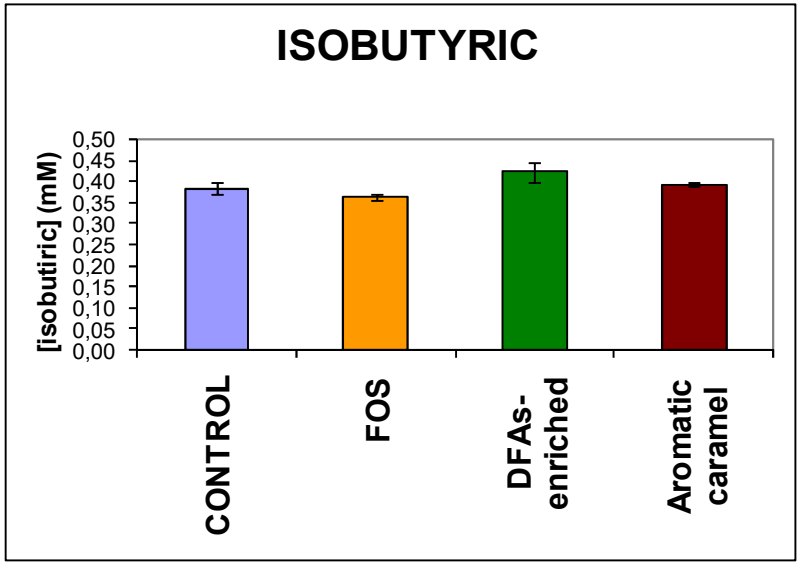


NATBIOTICS EVALUATION IN PIGS: SCFAs

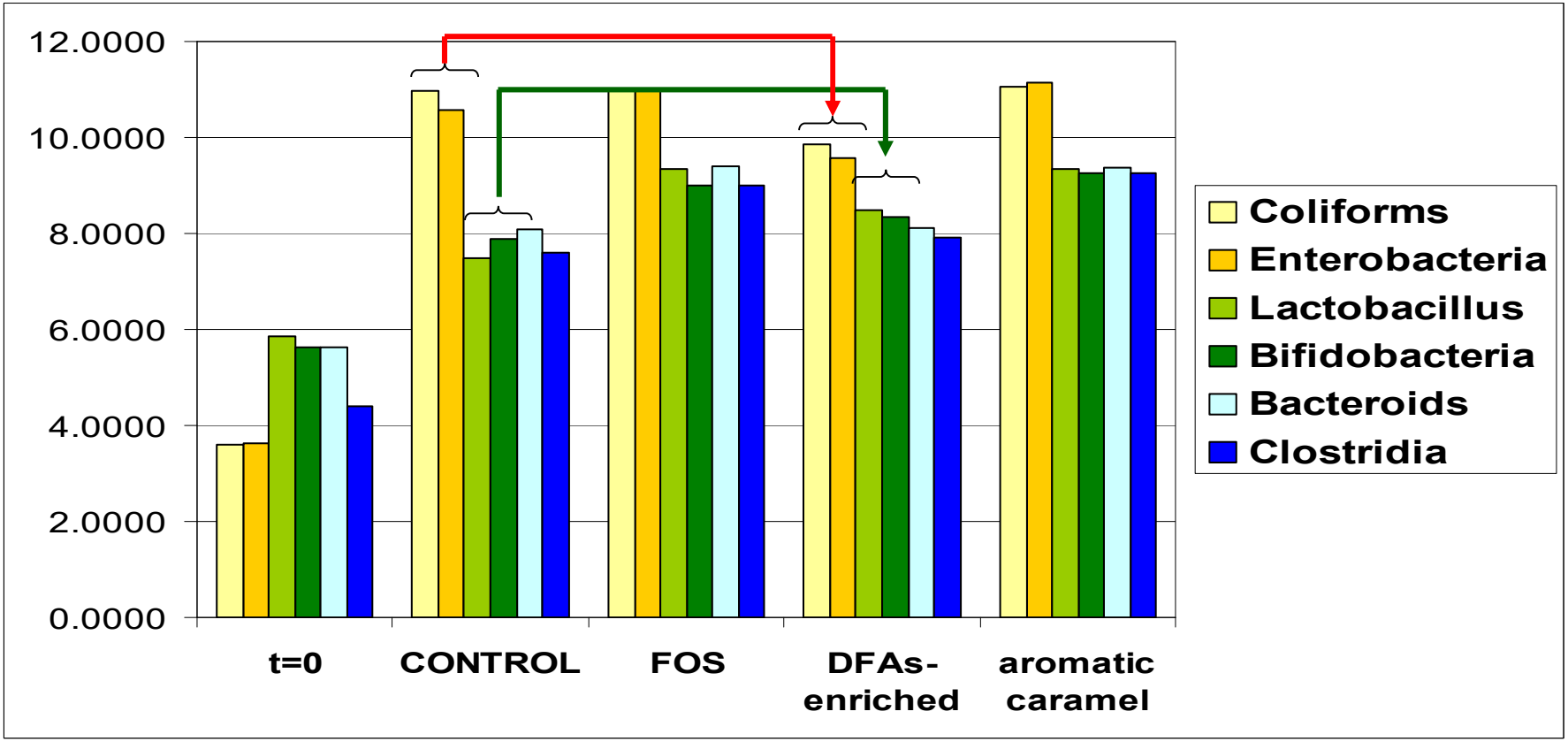








NATBIOTICS EVALUATION IN PIGS: MICROFLORA



☞ Moderate increase in lactobacillus and bifidobacteria populations.

☞ Significant decrease in coliforms and enterobacteria.

☞ NATBIOTICS (DFAs-enriched)have the best ratio between these types of gut bacteria.

☞ Low fermentability (acaloric).

Next: in vivo studies in pig; moving to humans.