



HAL
open science

The effects of fructo-oligosaccharides or whole wheat on the digestive bacterial community of broiler chickens using fingerprint methods

Irène Gabriel, C. Pissavin, Jeanne Williams, Serge Mallet, V. Beven, Christine Burel, Maryse Leconte, Patricia Rideaud, Carole C. Moreau-Vauzelle, Christele Dupont, et al.

► To cite this version:

Irène Gabriel, C. Pissavin, Jeanne Williams, Serge Mallet, V. Beven, et al.. The effects of fructo-oligosaccharides or whole wheat on the digestive bacterial community of broiler chickens using fingerprint methods. 6. INRA-RRI Symposium Gut Microbiome. Functionality, Interaction with Host and Impact on the Environment, Jun 2008, Clermont-Ferrand, France. INRA, 2008, 6. INRA-RRI Symposium Gut Microbiome. hal-02753393

HAL Id: hal-02753393

<https://hal.inrae.fr/hal-02753393>

Submitted on 4 Oct 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

The effects of fructo-oligosaccharides or whole wheat on the digestive bacterial community of broiler chickens using fingerprint methods

I. Gabriel¹, C. Pissavin², J. Williams¹, S. Mallet¹, V. Beven², C. Burel², M. Leconte¹, P. Rideaud³, C. Moreau-Vauzelle³, C. Dupont³, P. Fravallo², M. Lessire¹

¹INRA, UR83 Recherches Avicoles, F-37380 Nouzilly, France, ²Laboratoire d'Etudes et de Recherches Avicoles, Porcines et Piscicoles, AFSSA, BP53, 22440 Ploufragan, France, ³INRA, UE1206 Élevage Alternatif et Santé des Monogastriques, Le Magneraud, BP52, F-17700 Saint-Pierre-d'Amilly, Surgères, France

OBJECTIVES

January 2006 : in the European Union, ban of antibiotic growth promoters (AGP) from animal feed

→ Search for **alternatives** to AGP to control the balance of the digestive microflora

METHODS

Experimental diets

- (1) a negative control (ground wheat based) with no additives
- (2) a positive control containing an AGP (0.01 g/kg avilamycin)
- (3) a diet containing 0.6 g/kg of short chain **fructo-oligosaccharides (FOS)**
- (4) as the Nc diet, but with **whole wheat** (40%)

Broiler chickens

- 6 replicate pens / dietary treatment
- 3 weeks of age : sampling of ileal, cloacal and caecal contents (pools of 6 birds / pen)

Analysis of predominant digestive microflora

- by two fingerprint methods (universal primers)
- Temporal Temperature Gradient gel Electrophoresis (TTGE)
- Capillary Electrophoresis Single-Strand Conformation Polymorphism (CE-SSCP) (6-Fam and Hex labelling)

RESULTS

Dietary treatments

Specific bands (Figures 1 to 4)

Avilamycin	→	CE-SSCP	Disappearance of several bands in the three digestive contents / Appearance of a band in the caeca
		TTGE	Presence of a band corresponding to long segmented filamentous micro organism in the cloaca
FOS	→	CE-SSCP	Appearance of bands in the cloaca and in the caeca
		TTGE	Appearance of a band corresponding to segmented filamentous bacterium in the ileum
Whole wheat	→	CE-SSCP	Appearance of a band in the ileum
		TTGE	Appearance of 2 bands corresponding to segmented filamentous bacterium and <i>Lactobacillus salivarius</i> in the ileum Disappearance of a band corresponding to <i>Escherichia coli</i> in the cloaca

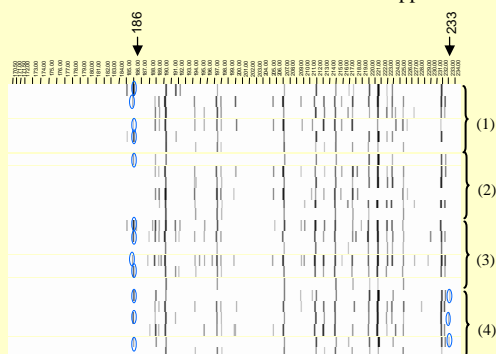


Figure 1. Fingerprints of CE-SSCP (6-Fam labelling) from pools of ileal contents (6 individuals)

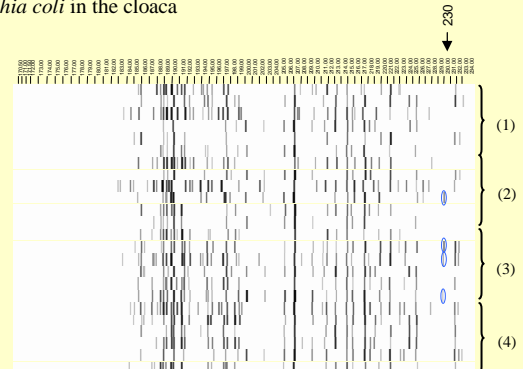


Figure 2. Fingerprints of CE-SSCP (6-Fam labelling) from pools of cloacal contents (6 individuals)

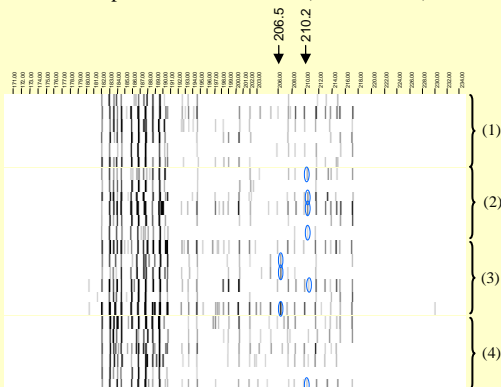


Figure 3. Fingerprints of CE-SSCP (Hex labelling) from pools of caecal contents (6 individuals)

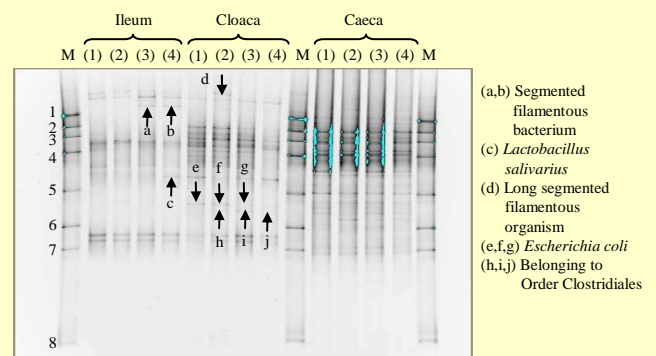


Figure 4. Fingerprints of TTGE from pools of digestive contents (36 individuals)

AGP and two potential alternatives to AGP, FOS and whole wheat, lead to digestive microflora modifications



This work was financed by the European programme **PoultryForGut** (2005-2008).

INRA-RR1 Gut Microbiology Symposium, June 18-20, 2008, Clermont-Ferrand, France

