

Alternative methods to control intestinal disorders in swine industry: case study complementary feed based on citrus extract and saponin containing plants

Mohammed el Amine BENARBIA¹ (amine.benarbia@norfeed.net), Anouk-COTTIN-TILLON¹, Benoit THYS¹, Miss Liao², Ivan CHIU³, Margaret CHING³, Fabiola DAUBNER⁴ and Pierre CHICOTEAU¹

1 NORFEED SAS, Beaucoz , France. 2 College of Veterinary Medicine Chiayi National University, Yulin County, Taiwan. 3 Kaye Biotech, Taipei, Taiwan. 4 PULTE GMBH,

Introduction:

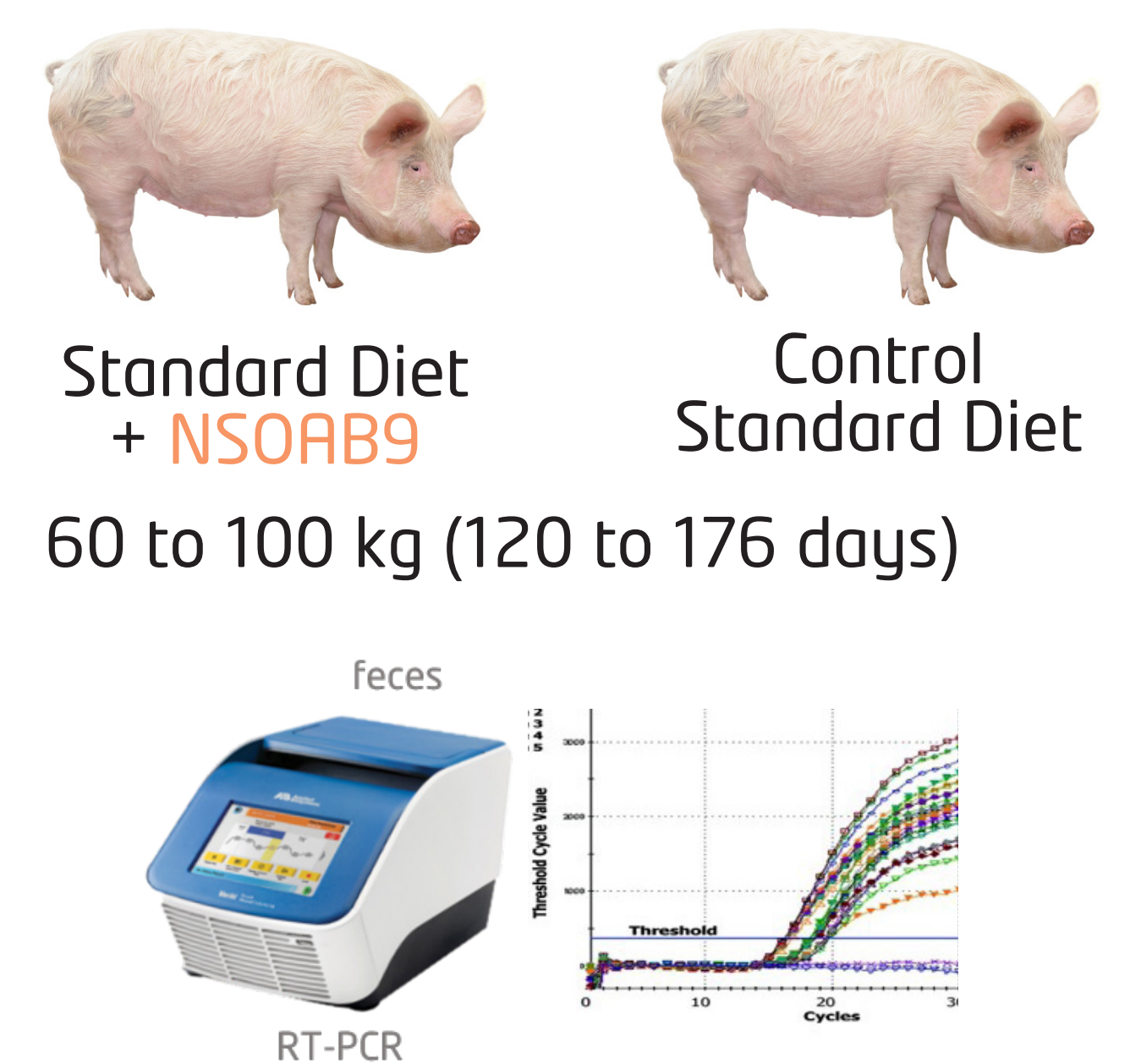
Fattening in pig livestock represents a stressful period where antibiotics are used in order to control swine dysentery (SD) (Kajiwara et al. 2016; Rugna et al. 2015). This disorder, mainly due to *Lawsonia intracellularis* (LI) and *Brachyspira hyodysenteriae* (BH), leads to serious economic loss.

In this trial, we studied the effect of feed supplementation with a complementary feed (NSOAB9[®]) based on citrus- and saponin containing plants as an alternative to antibiotic in order to control swine dysentery pathogens LI and BH.

Material and methods:

EXPERIMENT 1: 120-day age pigs were divided into 2 groups. the NSOAB9 group received a standard diet supplemented with 1500 ppm of NSOAB9 and the control group received a standard diet without any supplementation. Feces were collected at the beginning (age 120 d) and at the end of the trial (age: 176 d). Real time PCR was performed on the feces to quantify BH and LI.

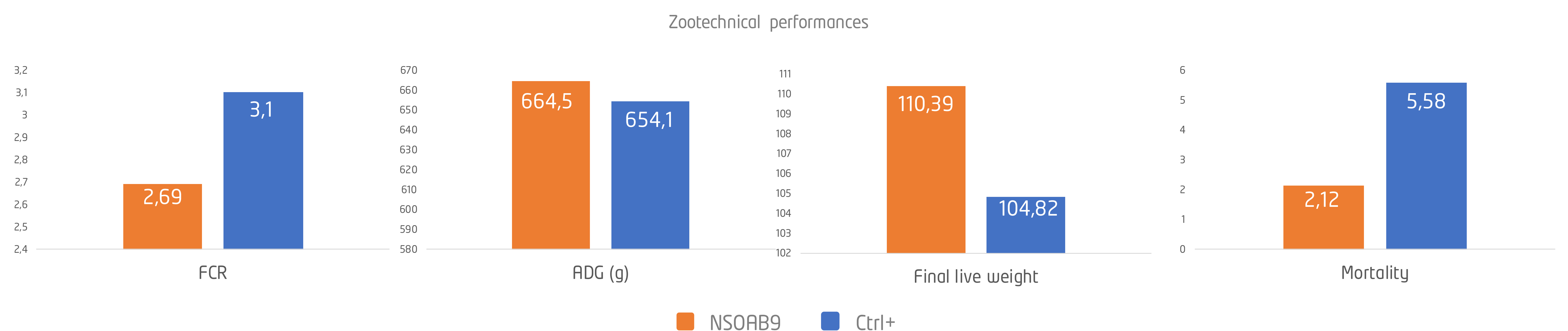
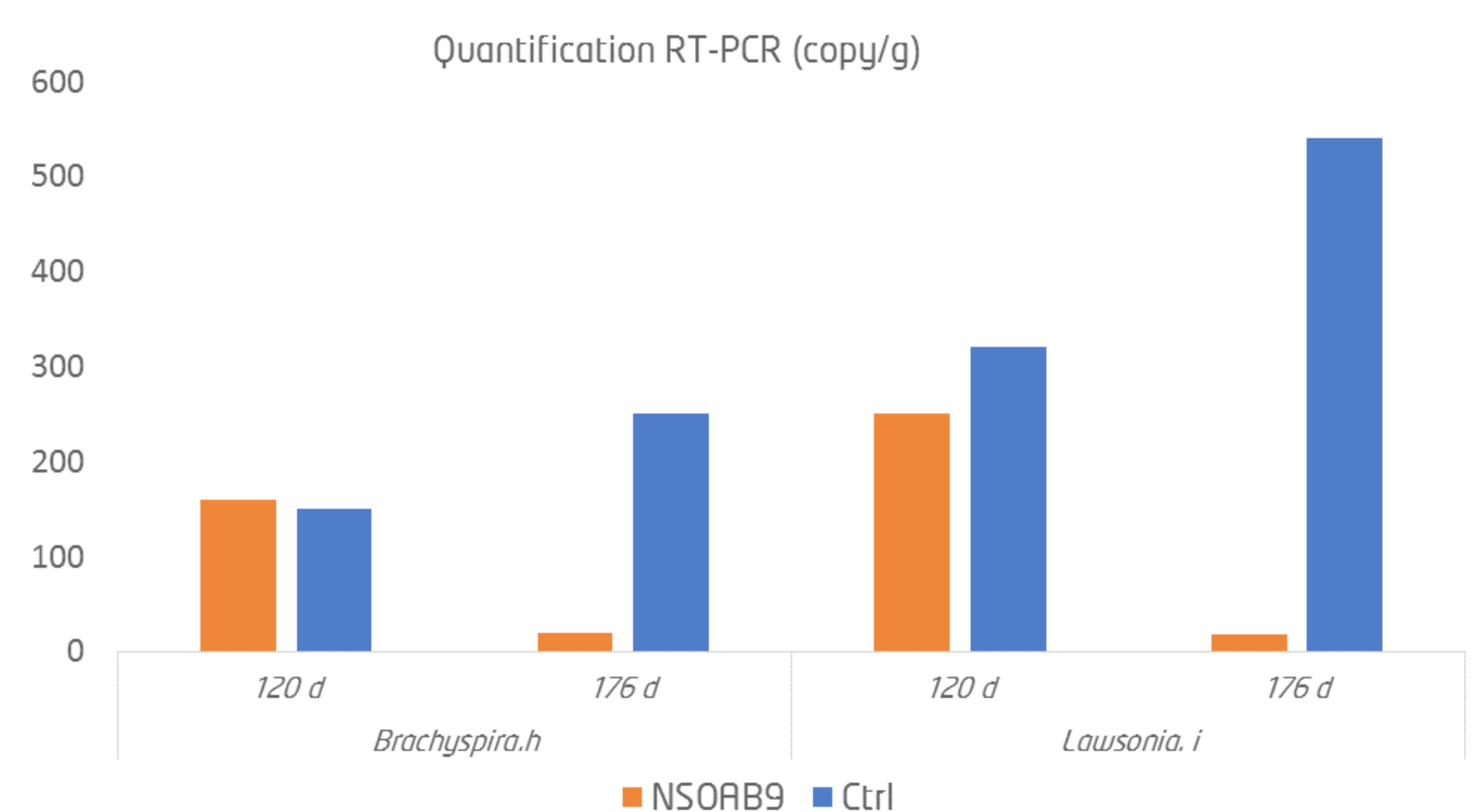
EXPERIMENT 2: 1710 pigs were divided into 2 groups: positive control (Ctrl+), pigs received standard diet supplemented with a commercial solution based on carvacrol and hydrolysable tannins and a trial (NSOAB9) group that received standard diet supplemented with NSOAB9 (1500 ppm).



Results:

EXPERIMENT 1: At the end of the experiment, the level of LI and BH fecal shedding significantly decreased in the NSOAB9 group whereas this level significantly increased in animals from the control group.

EXPERIMENT 2: Pigs from the NSOAB9 group showed a higher average daily gain and final live weight compared to the positive control pigs. FCR and mortality were reduced in the NSOAB9 group compared to positive control.



Discussion / Conclusion:

Citrus extract and saponins present in NSOAB9 can explain the observed effects. Indeed, citrus extract components, mainly pectic oligosaccharides (POS) and citroflavonoids, showed their ability to increase lactic acid bacteria and decrease pathogenic ones (Unno et al. 2015). Saponins in NSOAB9 have been shown to improve immune response, as they induce protective cellular immunity (den Brok et al. 2016). These elements together can explain the decrease of BH and LI shedding in pigs supplemented with NSOAB9 compared to control pigs and the improvement of zootechnical performances. Based on these results, NSOAB9 supplementation associated to good livestock practices can contribute to manage intestinal disorders during fattening in pigs.

References:

- Brok, Martijn H. den, Christian B ll, Melissa Wassink, Annemarie M. de Graaf, Jori A. Wagenaars, Marthe Minderman, Mayank Thakur, et al. 2016. « Saponin-Based Adjuvants Induce Cross-Presentation in Dendritic Cells by Intracellular Lipid Body Formation ». *Nature Communications* 7 (novembre): 13324. doi:10.1038/ncomms13324.
- Kajiwara, Keita, Midori Kazawa, Takuya Kanazawa, Kouji Uetsuka, Hiromi Nakajima, et Yoshikazu Adachi. 2016. « Drug-Susceptibility of Isolates of *Brachyspira Hyodysenteriae* Isolated from Colonic Mucosal Specimens of Pigs Collected from Slaughter Houses in Japan in 2009 ». *The Journal of Veterinary Medical Science* 78 (3): 517-19. doi:10.1292/jvms.15-0608.
- Rugna, G., P. Bonilauri, E. Carra, F. Bergamini, A. Luppi, Y. Gherpelli, C. F. Magistrali, et al. 2015. « Sequence Types and Pleuromutilin Susceptibility of *Brachyspira Hyodysenteriae* Isolates from Italian Pigs with Swine Dysentery: 2003-2012 ». *Veterinary Journal (London, England: 1997)* 203 (1): 115-19. doi:10.1016/j.tvjl.2014.10.033.
- Unno, Tomonori, Takayoshi Hisada, et Shunsuke Takahashi. 2015. « Hesperetin Modifies the Composition of Fecal Microbiota and Increases Cecal Levels of Short-Chain Fatty Acids in Rats ». *Journal of Agricultural and Food Chemistry* 63 (36): 7952-57. doi:10.1021/acs.jafc.5b02649.