

Effects of fiber inclusion on growth performance and nutrient digestibility of piglets reared under optimal or poor hygienic conditions^{1,2}

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ABSTRACT: Two experiments were conducted to study the effects of inclusion of additional fiber in the Phase I diet on growth performance and nutrient digestibility in piglets reared under “optimal” or “poor” hygienic conditions. In both experiments, the design was completely randomized with a control diet that contained 2.2% crude fiber and 8 additional isonutritive diets that included 2.5 or 5.0% of sugar beet pulp (SBP), straw, oat hulls (OH), or wheat middlings (WHM). Preplanned polynomial contrasts were used to study the effects of 1) fiber inclusion (control diet vs. average of the 8 fiber-containing diets), 2) source of fiber, 3) level of fiber, and 4) interaction between source and level of fiber. In Exp. 1 (clean barn), fiber inclusion increased ($P < 0.01$) the incidence of postweaning diarrhea (PWD) and reduced ($P < 0.05$) feed efficiency and apparent total tract digestibility (ATTD) of all nutrients except that of CP, which was not affected. Piglet performance was not affected by source or level of dietary fiber. The ATTD of all nutrients decreased ($P < 0.05$) as the level of fiber increased and was lower in pigs fed straw or OH than in pigs fed SBP or WHM. The apparent ileal digestibility of GE and DM decreased ($P < 0.05$) with

fiber inclusion, a reduction that was more pronounced ($P < 0.05$) with straw or SBP than with OH inclusion, with WHM inclusion being intermediate. Fiber inclusion did not affect villous height to crypt depth ratio of the ileum mucosa. The inclusion of 5% of a fiber source increased *Escherichia coli* and *Lactobacillus* counts in the cecum ($P < 0.001$) but the *E. coli* to *Lactobacillus* ratio was not affected. In Exp. 2 (dirty barn), fiber inclusion did not affect piglet performance but tended to increase PWD ($P = 0.07$). Also, fiber inclusion reduced ($P < 0.05$) the ATTD of all dietary components except that of CP, which was not affected. Source and level of fiber did not affect ATTD of nutrients except for DM, which was greater for pigs fed SBP than for pigs fed straw ($P < 0.05$). In conclusion, in the current research, pigs reared under optimal hygienic conditions had lower incidence of PWD, better growth performance, and greater DM and GE digestibility than pigs reared under poor hygienic conditions. An excess of dietary fiber was more detrimental for all these traits in piglets reared under optimal hygienic conditions. The effects of the source and level of fiber on piglet performance was limited in the 2 experiments.

Key words: oat hulls, postweaning diarrhea, straw, sugar beet pulp, weaning pigs, wheat middlings

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INTRODUCTION

Dietary fiber (**DF**) is often related to a reduction of the ADFI and energy digestibility in young pigs (Eggum, 1995; Wellock et al., 2008). Recent research,

however, has shown that the inclusion of moderate amounts of certain fiber sources might reduce the incidence of postweaning diarrhea (**PWD**) and improve growth performance in weanling pigs (Mateos et al., 2006; Molist et al., 2014). Ingredients that contain appreciable amounts of insoluble fiber, such as oat hulls (**OH**), straw, and wheat middlings (**WHM**), might affect the motility and transit time of the digesta throughout the gastrointestinal tract (**GIT**) and modify piglet performance (Freire et al., 2000; Solà-Oriol et al., 2010). On the other hand, high soluble fiber ingredients, such as sugar beet pulp (**SBP**), might increase digesta viscosity and decrease rate of feed passage (Molist et

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