Dietary Additions of Flaxseed Compromised Skeletal Growth in Young Pigs


Methods

Crossbred pigs (n=18) were weaned at 3 wk and fed standard UW Starter diets for ~2 wk after weaning (until ~13 kg). Pigs were housed in individual pens and randomly assigned to 1 of 3 diets for a 6-wk trial. Feed consumption and pig weights were determined weekly. DXA scans were completed at 0, 21, and 42 d to determine whole body bone mineral content (BMC). Values for retention of Ca and P were calculated from DXA scans and feed consumption data as shown below.

Results

Abstract

In earlier studies, skeletal integrity was compromised in neonatal pigs fed diets enriched with n-3 fatty acids (FA), but effects of dietary flaxseed (FX) on pig growth and bone integrity are not well studied. Ground flaxseed is a good source of n-3 fatty acids. Recent studies indicate that dietary additions of FX (7.5% and 15%) compromised skeletal growth in young boars and gilts. The current objective was to determine growth, feed intake, and skeletal responses in pigs (8.4+1.7 kg) fed diets with FX. Crossbred pigs (n=6/diet, 1/pen) were randomly allotted to diets with FX at either 7.5% or 15%. Pigs were fed 0% flaxseed (Ctl) or 7.5% or 15% flaxseed diets for 6 wk. The current study was designed to address concerns of the Johnson (1999) study. A 6 wk trial with young growing pigs allowed an anticipated 3fold increase in skeletal mineral accumulation.

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Femur Responses to Flaxseed

Calculations:

Bone Mineral Content Gain

BMCg, g/d = (BMCg 42 – BMCg 0) / 42

Ca retention, g/d = (BMCg x 0.38)/0.964

P retention, g/d = (BMCg x 0.18)/0.80

Ca efficiency = Ca retention / Ca intake

P efficiency = P retention / P intake

Conclusions

Dietary additions of 7.5 or 15% flaxseed suppressed pig weight and skeletal growth. Suppressed skeletal growth could not be explained by differences in pig gains. Apparently a component of flaxseed compromises skeletal growth in young pigs. Based on these results flaxseed may not be a reliable ingredient to use as a source of n-3 fat.

Dietary treatments

0 – 0% flaxseed, Control (Ctl), used corn oil (n-6 fat) to make isocaloric with 15% flaxseed diet

7.5 - 7.5% flaxseed (7.5 flaxseed, 7.5 fat), not isocaloric

15 – 15% flaxseed, isocaloric with Ctl

Except for Ca, diets meet requirements for sodium at each phase: 0.02% Na in 0% flaxseed, 0.04% Na in 7.5% flaxseed, and 0.05% Na in 15% flaxseed diets. BMC gain was reduced (P < 0.01) in pigs fed 7.5 or 15% flaxseed vs Ctl diets. No differences were detected in BMC gain between pigs fed 7.5 or 15% flaxseed. BMC gain was reduced (P < 0.01) in pigs fed 7.5 or 15% flaxseed vs Ctl diets. No differences were detected in BMC gain between pigs fed 7.5 or 15% flaxseed. BMC gain was reduced (P < 0.01) in pigs fed 7.5 or 15% flaxseed vs Ctl diets. No differences were detected in BMC gain between pigs fed 7.5 or 15% flaxseed.

Flaxseed (7.5% and 15%) additions reduced P (P < 0.01) only. Moment of inertia and bending force of femurs collected on day 42 compared with femurs from Ctl groups. Femurs from these pigs were not only reduced P (P < 0.01) in pigs fed 7.5% flaxseed.

Pigs fed diets with 7.5% or 15% flaxseed gained less (P < 0.01) than pigs fed Ctl 0% flaxseed diets. No differences among groups were detected in feed intake. Efficiency reflected differences observed in pig growth.

Pig Growth Responses to Flaxseed

Skeletal Growth Responses to Flaxseed

Introduction

In an earlier study skeletal integrity was compromised in neonatal pigs fed diets enriched with n-6 fatty acids (Johnson, 1999). In contrast, dietary addition of 8% fish oils increased skeletal mass in neonatal pigs (Wolfer et al, 2000).

The current study was designed to address concerns of the Johnson (1999) study. A 6 wk trial with young growing pigs allowed an anticipated 3fold increase in skeletal mineral accumulation. The current study was designed to address concerns of the Johnson (1999) study. A 6 wk trial with young growing pigs allowed an anticipated 3fold increase in skeletal mineral accumulation.

Ground Flaxseed was used to supply a n-3 fatty acids.

Knowledge about skeletal growth responses to dietary fat sources will help reduce skeletal integrity problems in animals and humans.

Objective

Access the impact of dietary flaxseed additions on pig growth, skeletal growth and bone integrity.

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