EM have higher lean growth (i.e., body protein deposition; Pd) capacity and lower feed intake. In EM, energy intake, rather than the animal’s Pd capacity, generally determines lean growth. Therefore, energy intake of EM should be maintained high. During the 10-14 day transition period after injecting the booster, IC barrows show a substantial increase in feed intake and body lipid deposition, as well as slight reductions in Pd and maintenance energy requirements, in order to achieve a target body fatness that is reflective of barrows and higher than EM. At slaughter—generally 4 to 6 weeks after injecting the booster—body fatness of IC is intermediate to that of EM and PC barrows, and generally lower than gilts. The effect of restricting energy intake after injecting the booster on body fatness remains to be explored. Given the lack of studies defining nutrient requirements of EM and IC in North America, the factorial approach (modelling) has been used for estimating nutrient requirements, reflecting differences in feed intake, Pd and maintenance energy requirements among genders (e.g., NRC, 2012; Nutrient Requirements of Swine). Based on a recent review of field studies in the US, the difference in Pd between EM and gilts or PC barrows appears higher that estimated in NRC (2012). Based on these analyses, typical nutrient requirements of EM may be underestimated by about 5% in NRC (2012). Timing of administering the booster dose to IC barrows and feeding PayleanTM are means to manipulate pork production efficiencies and carcass fatness of pigs, but their impact on carcass quality and nutrient requirements should be carefully considered.

**Key Words:** castration, Improvest, pigs

**O254** Comparison among gilts, physical castrates, entire males and immunologically castrated males in terms of growth performance and nitrogen metabolism. A. J. Elsbernd, J. F. Patience, Animal Science, Iowa State University, Ames.

The objective of this study was to compare growth performance and nitrogen metabolism of immunocastrates (IC), entire males (EM), physical castrates (PC), and gilts (G). This study used individually housed pigs to evaluate performance from an initial BW of 35.7±4.1 kg to a final weight of 145.0±8.6 kg. Six pigs were selected for each treatment based on pre-test average daily gain for each of the two replicates. Diets were formulated to meet or exceed the nutrient requirements of entire boars and were fed ad libitum. Pigs selected for the IC treatment were vaccinated with a gonadotropin releasing factor (GnRF) analog (Improvest®), Pfizer at 13 and 18 weeks of age. Urine, feed and fecal samples were collected, homogenized, sub-sampled and analyzed for nitrogen, and feed and feces for dry matter and titanium dioxide, an indigestible marker. Nitrogen intake and excretion were measured during three 72-h collection periods starting at BW of 39.5±4.1 kg, 73.7±5.7 kg and 105.5±6.1 kg for Periods 1, 2, and 3, respectively, with Period 3 occurring two weeks after the 2nd vaccination. EM and IC had a higher ADG compared to PC and G (1.17 and 1.14 kg/d versus 1.06 and 1.05 kg/d, respectively; P < 0.001). IC had a significantly higher ADFI than EM and G, with IC being intermediate (PC=3.16 kg/d, IC=3.04 kg/d, EM=2.93 kg/d, and G=2.91 kg/d; P < 0.03). EM had the highest gain to feed ratio compared to all the other treatments, while IC were the second highest and G and PC were not significantly different from each other treatments (EM=0.43, IC=0.40, G=0.38, PC=0.36; P < 0.0001). In all N-balance periods, nitrogen excretion in the feces was not significantly different among the treatments (P > 0.10). In Periods 1 and 2, EM and IC had the lowest urinary nitrogen excretion (P < 0.0001). In Period 3, EM had the lowest urinary nitrogen excretion, while IC were not significantly different from G and PC (P < 0.0001). These results suggest that IC have higher nitrogen excretion two weeks after vaccination, which suggests the need for a feeding program similar to PC and G during this time.

**Key Words:** immunocastration, nitrogen metabolism, pig


The objective of this research was to compare the growth and carcass performance of gilts and immunologically-castrated (IC) barrows as affected by dietary intake of fiber and energy. At 6 wk postweaning, 1,720 pigs (PIC 337 × C29 genetics, 26 ± 2 kg) were blocked by sex (gilts and entire males) and body weight to form eight (8) replicates of 27 pigs per sex, according to a randomized complete-block design with a split-plot arrangement of treatments, with sex as the whole plot and dietary treatment the split-plot. Pigs were allowed ad libitum access to common diets prior to the start of the experiment, and then fed experimental diets to market (N = 133 d). The dietary treatments included 1) corn-SBM, 2) 30% DDGS (89% DM, 28% CP, 8% fat, 26% NDF), 3) As 2 + 3% added fat (choice white grease), 4) As 2 + ascending inclusion of fat (1/2/3/4% fat to 59/73/91 kg/mkt). Gilt diets were formulated according to PIC (2011) requirements for SID lysine (g/Mcal ME), and those requirements were adjusted for the IC barrow diets according to Dritz et al. (2011). Immunocastration was carried out in the male pigs via a 2-dose treatment with Improvest®. The 1st injection occurred at an average of 11 wk of age (range 9-13 wk), and the 2nd injection occurred 5 wk prior to market. Pigs were harvested by pen in a commercial processing facility, where carcass weights were obtained and tissue depths (BF and LM) were measured via ultrasound. IC barrows achieved heavier (P < 0.001) BW, 7% greater ADG (P < 0.01), and 5% greater G/F (P = 0.05) compared to gilts. Fat supplementation effected reduced (P < 0.05) feed intakes and greater (P < 0.01) G/F, with a trend towards lower (P < 0.10) G/F in the ascending relative to the constant strategy. There was also a trend towards lower (P < 0.10) G/F in the DDGS-supplemented treatments relative to the corn-SBM treatment. DDGS supplementation effected a trend towards greater reductions in carcass weights in IC barrows than gilts (sex × treatment, P < 0.10). Similarly, added energy affected a trend towards greater carcass weights in IC barrows (sex × treatment, P < 0.10), but similar carcass weights in gilts. This experiment suggests a differential response in carcass growth performance to fiber and energy in IC barrows relative to gilts.

**Key Words:** energy, fiber, immunological castration


A total of 1,360 pigs (24 kg BW) were used in a 125-d study to determine the effects of DDGS withdrawal post-immunocastration (Improvest®) on growth performance of grow-finish pigs. Treatments were arranged in a 2 × 3 factorial with the main effects of sex
(physical castrated barrow; PC or immunological castrate; IC) and diet (no DDGS throughout, 30% DDGS throughout, or 30% DDGS through d 75 then withdrawn to no DDGS to d 125). Pigs of pens were randomly allotted by BW and sex to dietary treatments with 8 replicate pens with 29 to 32 pigs per pen. No sex × diet interactions \( (P=0.12) \) were observed. For the period before the 2nd Improvest injection (d 0 to 74), boars had lower \( (P<0.001) \) ADFI, but were more efficient \( (P<0.001) \) than PC. During this period, pigs fed 30% DDGS had reduced \( (P<0.001) \) ADG, but were similar \( (P=0.08) \) in G:F. After the 2nd Improvest injection (d 74 to 125), IC had increased \( (P<0.001) \) ADG, ADFI, and G:F. Overall (d 0 to 125), IC had improved \( (P<0.003) \) ADG and G:F and lower \( (P<0.003) \) ADFI than PC. The inclusion of 30% DDGS regardless of withdrawal or sex decreased \( (P<0.001) \) G:F. Carcass yield was lower \( (P<0.001) \) for IC (74.5%) than PC (76.2%) regardless of diet. Pigs fed 30% DDGS throughout had decreased \( (P<0.001) \) carcass yield (74.8%) than pigs fed corn-soy diets (75.6%); however, withdrawing DDGS on d 74 was effective at fully recovering the yield loss (75.5%). In summary, IC had reduced carcass yield, regardless of diet type; however, they also had lower ADFI and improved ADG, which resulted in improved F/G.

### Gender:

<table>
<thead>
<tr>
<th>Gender</th>
<th>d 0 to 74</th>
<th>d 74 to 125</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>ADG, kg</td>
<td>ADG, kg</td>
</tr>
<tr>
<td>PC</td>
<td>0.92</td>
<td>0.94</td>
</tr>
<tr>
<td>IC</td>
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</table>

### Key Words:

DDGS, Improvest, withdrawal

### O258 Behavior of immunologically-castrated barrows in comparison to gilts, physically-castrated barrows, and intact males.

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The behavior of immunologically-castrated (IC) barrows, gilts, physically-castrated (PC) barrows, and intact males was investigated with 160 commercial crossbred pigs using a RCBDe (running factor date of start on test) with 4 genders: 1) Intact males (IM), 2) IC barrows (with Improvest®), 3) PC barrows, and 4) Gilts (G). Start of test was time of 1st Improvest® dose and transitioned to become more similar to the behavior of PC after the 2nd dose.

### Key Words:

behavior, immunological castration, pigs