Use of corn distiller's dried grains with solubles (DDGS) in finishing pig

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Introduction

- **Reductions in growth performance and slaughter weight as DDGS exceed 20% of the diet *(Whitney et al. 2001)***
- **Linear reduction in growth performance and carcass weight with increasing DDGS level *(Fu et al. 2004)***
- **DDGS levels up to 30% had no impact on growth performance, but decrease in carcass yield *(Cook et al. 2005)***

Objective

1. **Evaluate growth performance and carcass characteristics of pigs fed aggressive levels of DDGS (30% inclusion)**

2. **Evaluate the benefit of a bacterial endo-1,4-beta-xylanase (NZ) on performance of pigs fed aggressive levels of DDGS (30% inclusion)**

Materials and Methods

- Randomized complete block design
- 3 Treatments
  - 0% DDGS
  - 30% DDGS
  - 30% DDGS + NZ
- 12 replicate pens/treatment
- 25 pigs/pen
- 880 pigs
- 44 to 129 kg
- Pigs weighed every 3 weeks until slaughter
- Pigs marketed by replicate
  - 103 days from trial start
- Growth performance, carcass characteristics
- Data analyzed using the mixed model in SAS

Evaluation of DDGS in finishing pigs

- DDGS sourced single batched and stored
- DDGS source sampled, analyzed, prior to diet formulation
- No inorganic P in DDGS diets
- No added fat to diets
- Higher digestible lysine to allow energy response should one exist.
- Amino acid and phosphorus digestibility values Stein et al., 2004

Evaluation of DDGS

Nutrient	Analyzed Values DDGS	Corn (NRC, 1998)
Dry matter, %	88.4	89
Crude protein, %	25.41	8.3
Fat, %	10.20	3.5
Crude fiber, %	5.17	1.9
NDF, %	33.29	9.6
ADF, %	9.94	2.8
Ash, %	3.83	1.1
Lysine, %	0.86	0.26
P, %	0.74	0.28
Calculated ME, kcal/kg	3625	3429

Example Diet

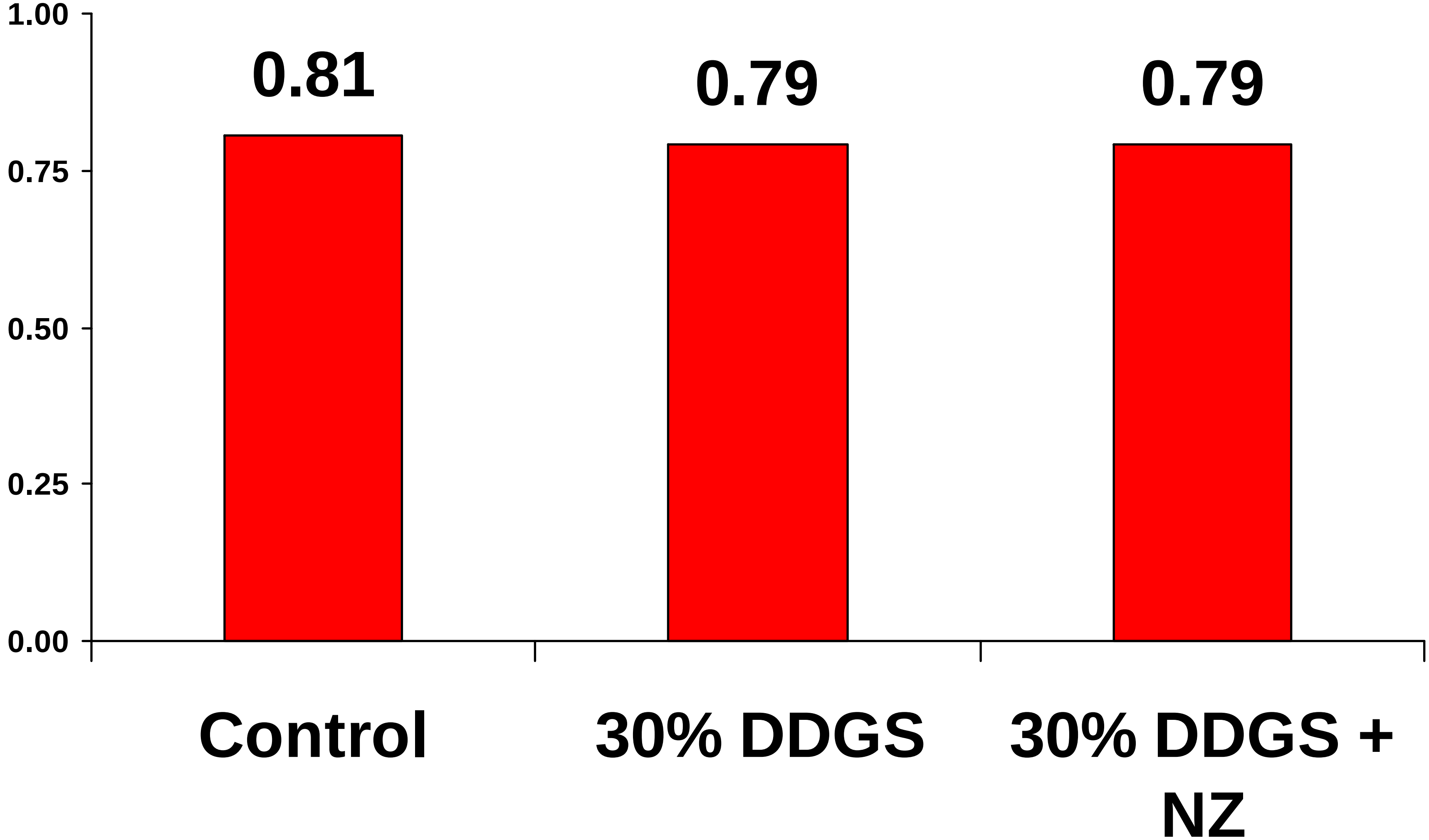
Ingredient, %	Phase 3 Control	Phase 3 30% DDGS	Phase 3 30% DDGS + NZ
Corn	75.96	52.05	52.04
Soybean Meal	21.79	16.11	16.11
DDGS	0	30.00	30.00
Premix	2.25	1.84	1.84
NZ	0	0	0.01
Total	100	100	100

	44 – 54 kg		54 – 73 kg		73 – 91 kg		91 – 109 kg		109 – 129 kg	
	Barrow	Gilt	Barrow	Gilt	Barrow	Gilt	Barrow	Gilt	Barrow	Gilt
SID Lys, %	1.15	1.15	1.00	1.05	0.85	0.95	0.75	0.85	0.65	0.75

Nutrient Composition

	44 – 54 kg		54 – 73 kg		73 – 91 kg		91 – 109 kg		109 – 129 kg	
	Control	DDGS	Control	DDGS	Control	DDGS	Control	DDGS	Control	DDGS
ME, Kcal/kg	3347	3398	3358	3405	3358	3407	3360	3411	3369	3418
P avail, %	0.27	0.27	0.25	0.25	0.24	0.24	0.24	0.24	0.21	0.21
Ca:P	1.37	1.37	1.30	1.30	1.30	1.30	1.30	1.30	1.25	1.25
Na, %	0.17	0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15
K, %	1.01	1.01	0.90	0.90	0.80	0.80	0.72	0.72	0.65	0.65
SID SAA:Lys	0.54	0.60	0.56	0.64	0.58	0.67	0.61	0.71	0.65	0.76
SID Thr:Lys	0.60	0.64	0.61	0.66	0.62	0.67	0.63	0.68	0.65	0.72
SID Trp:Lys	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

ADG, kg



Sex P < 0.01
Diet P < 0.16

SEM = 0.01

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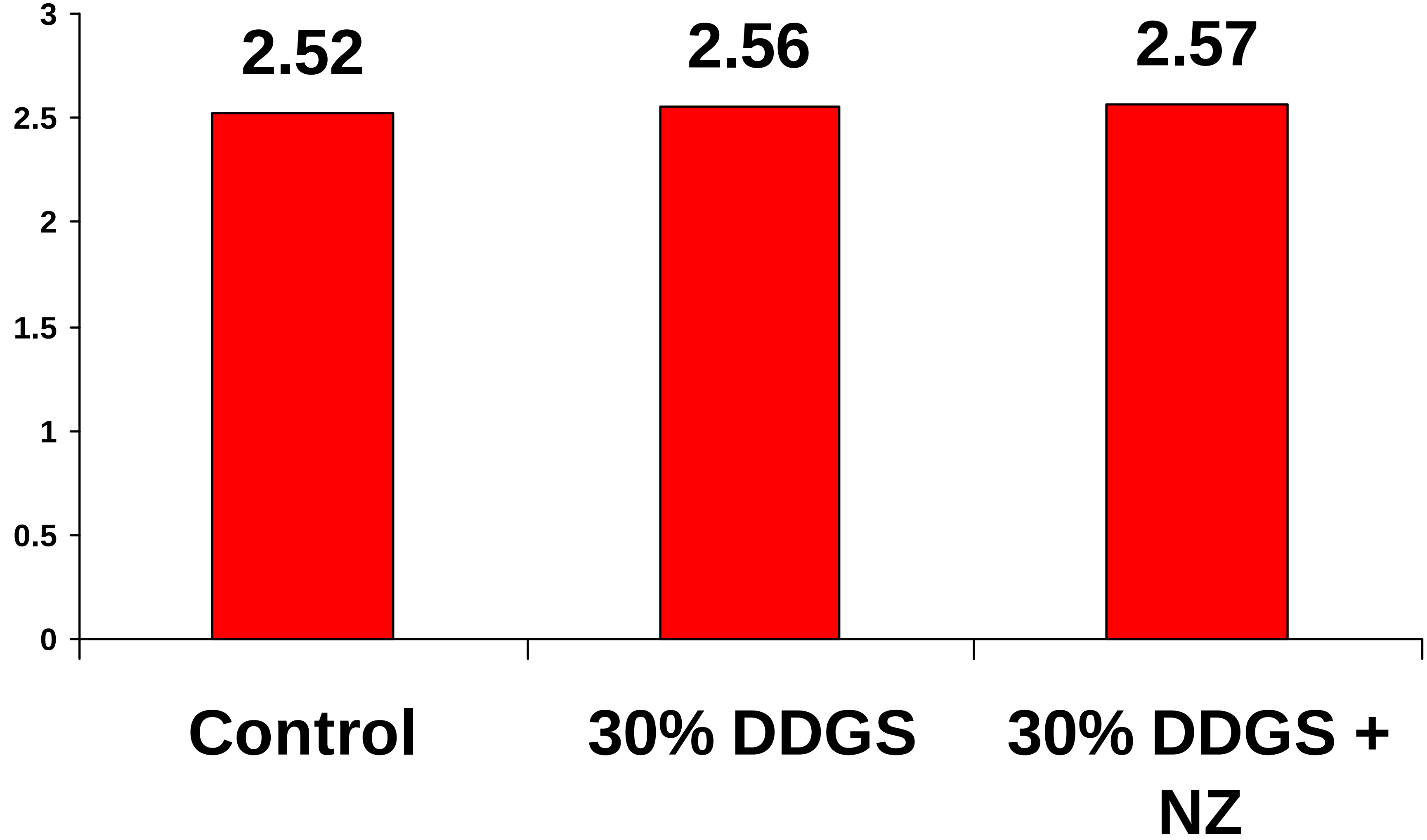
ADFI, kg



Sex P < 0.01

Diet P < 0.34

SEM = 0.03

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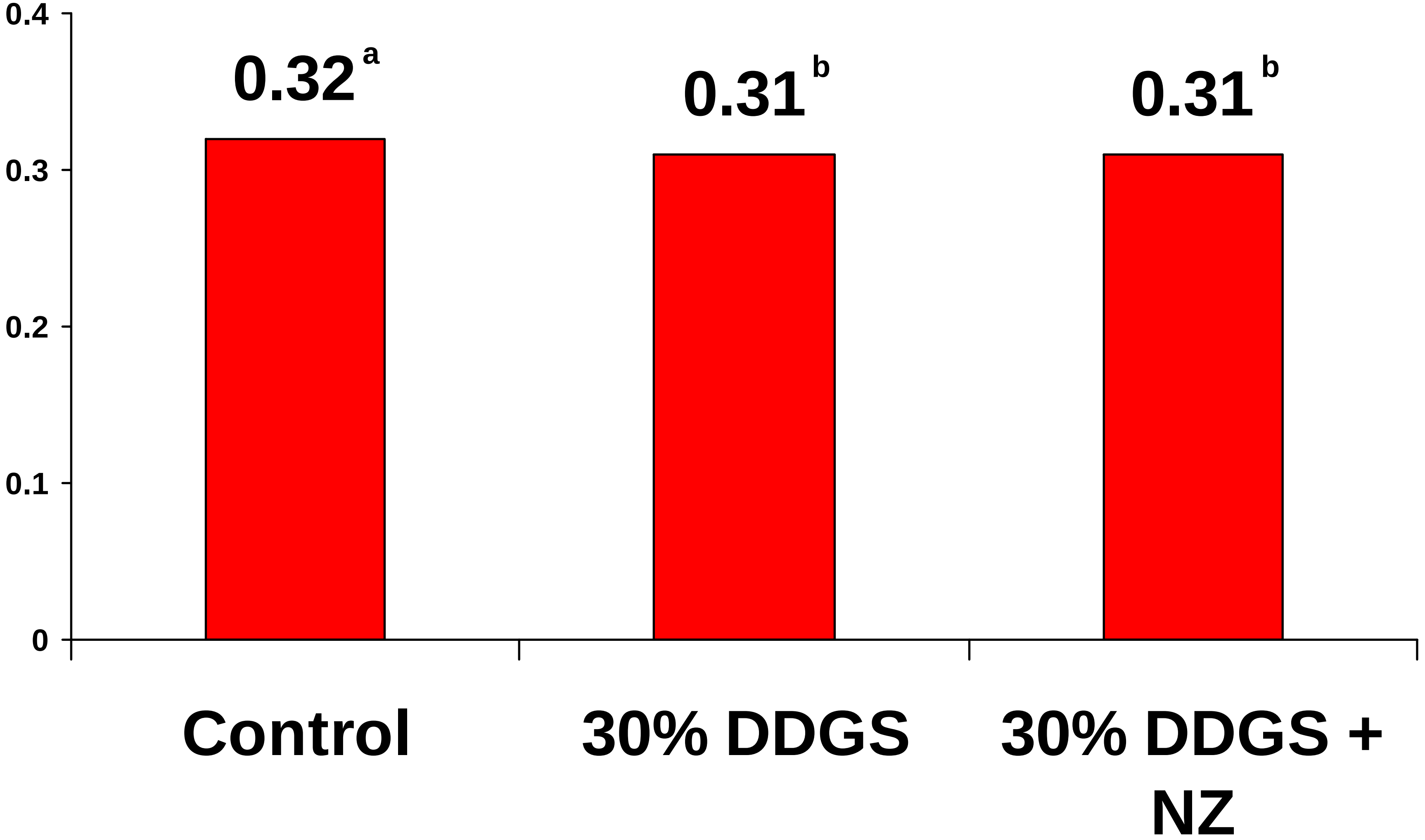
G/F, kg



Sex P < 0.01
Diet P < 0.01

SEM = 0.01

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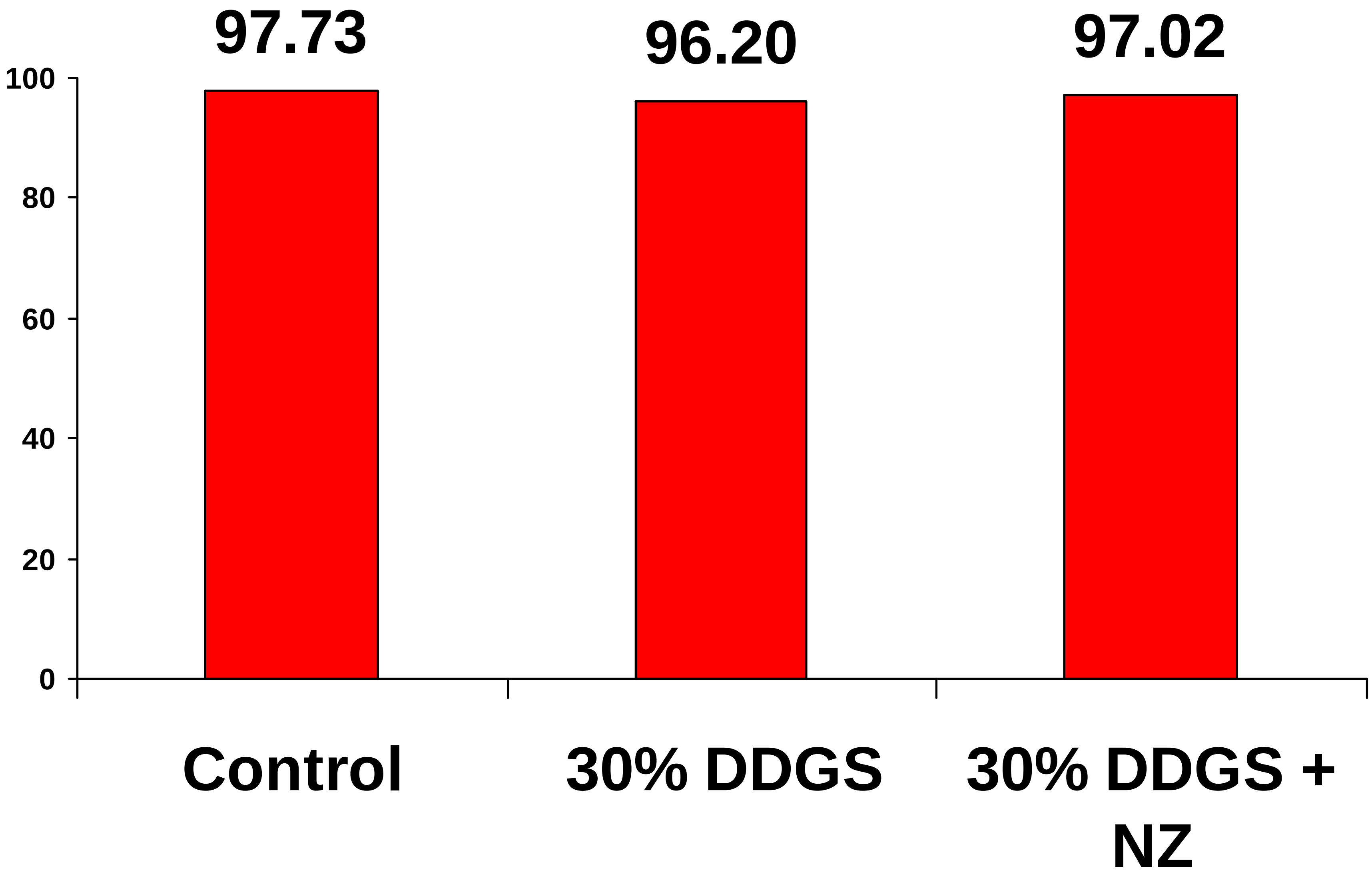
Carcass Weight, kg



Sex P < 0.01

Diet P < 0.33

SEM = 0.70

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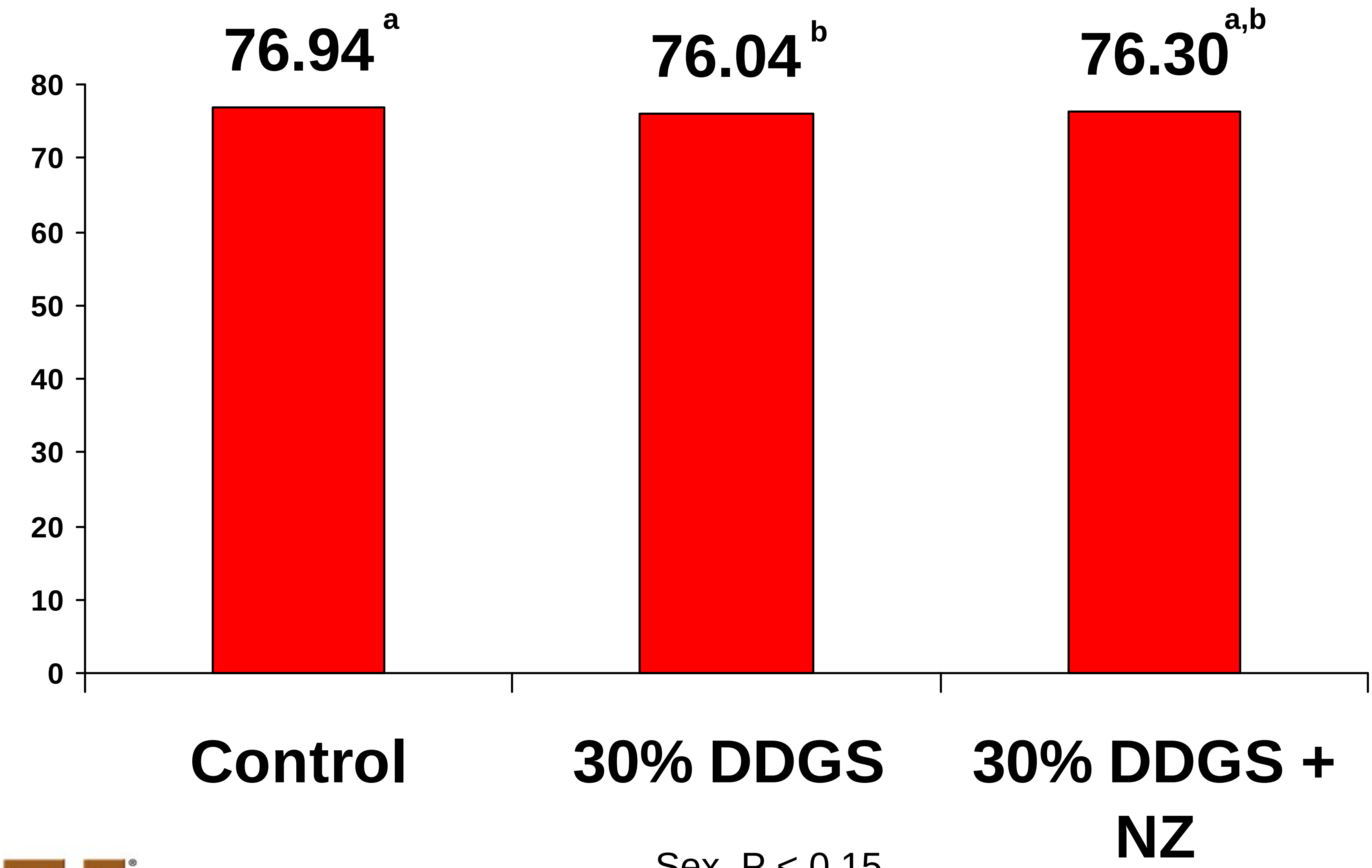
Carcass Yield, %



Sex P < 0.15

Diet P < 0.04

SEM = 0.24

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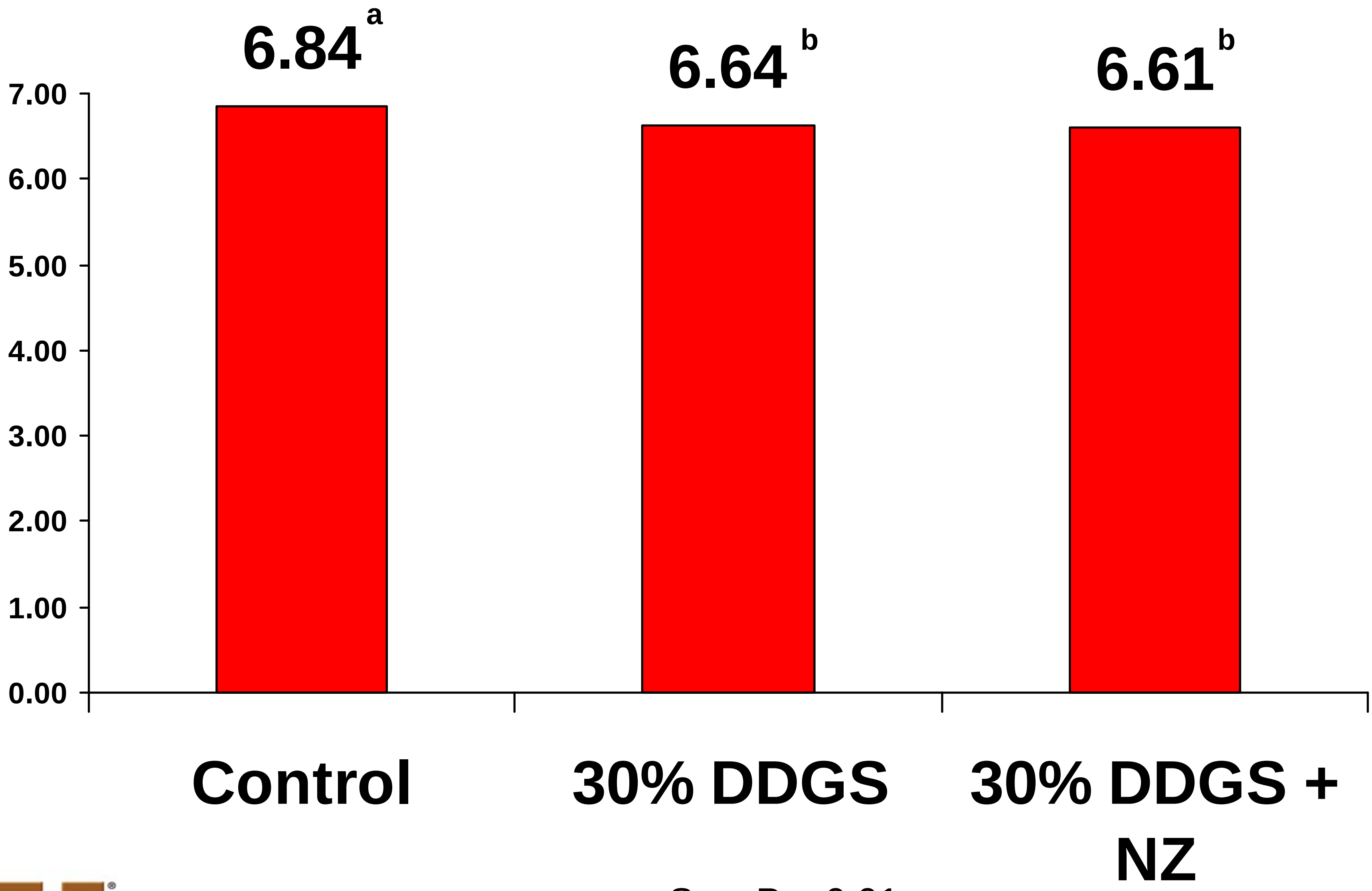
Loin Depth, cm



Sex P < 0.01

Diet P < 0.01

SEM = 0.04

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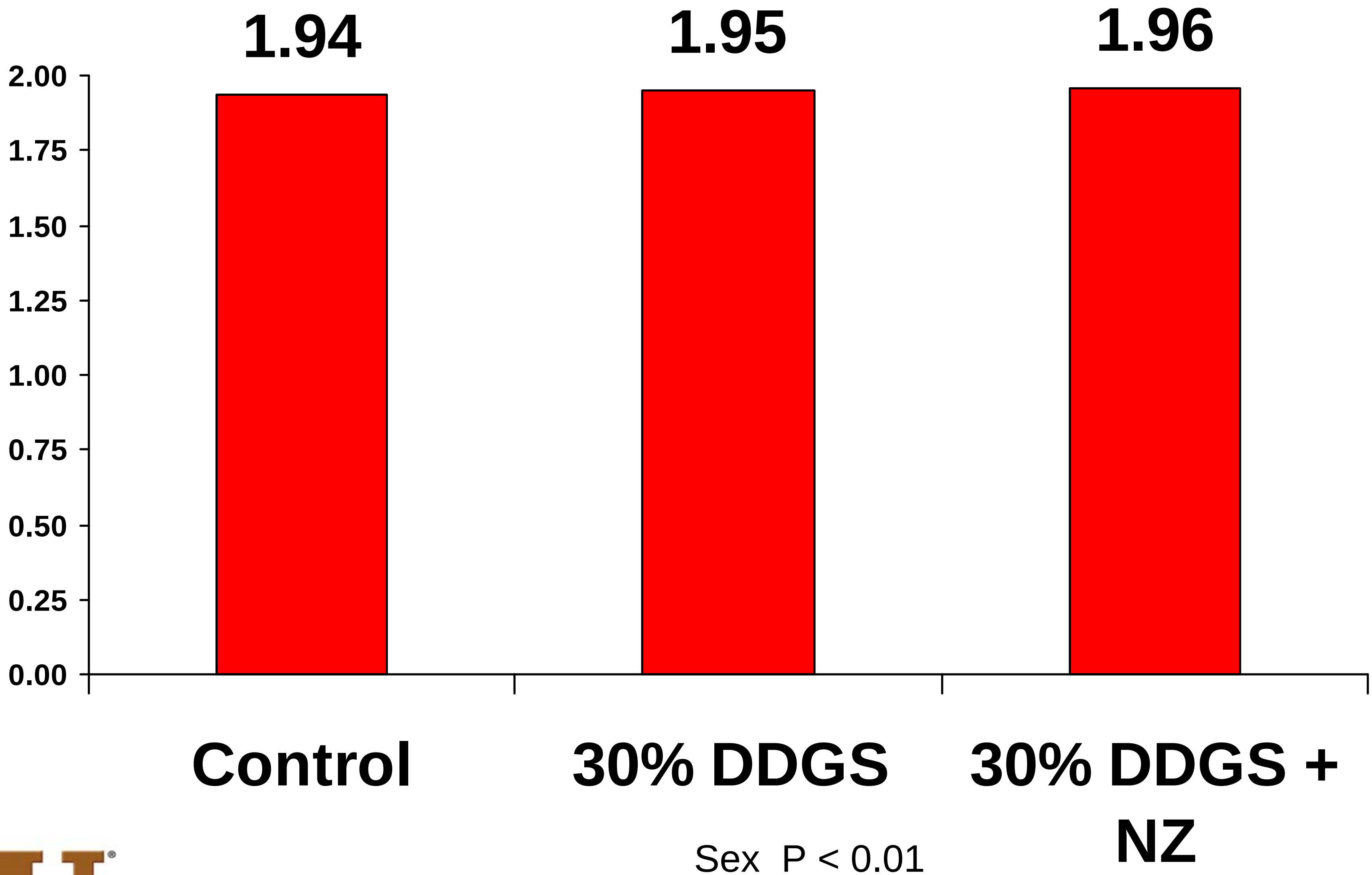
Fat Depth, cm



Sex P < 0.01
Diet P < 0.92

SEM = 0.03

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Economic impact

	Control	30% DDGS	30% DDGS + NZ
Cost/pig, $	35.32	33.82	33.85
Cost/kg gain, $	0.42	0.41	0.41
Return over Feed, (carcass value-feed cost)	104.43	103.74	104.89

Assumptions: Corn, $0.15/kg; SBM, $0.24/kg; DDGS, $0.15/kg; Carcass value $1.43/kg

Discussion

- **30% DDGS Inclusion:**
  - **No effect on growth performance**
  - **Decreased feed efficiency**
  - **Decreased yield %**
  - **No benefit of NZ supplementation on performance**
    - **Exogenous NZ supplementation may improve yield loss**
  - **Decreased yield must be taken into consideration when determining value of DDGS**
    - **30% DDGS: 4.1 kg reduction in HCW *(Fu et al. 2004)***
    - **30% DDGS: 2.3 kg reduction in HCW *(Cook et al. 2005)***
    - **The current trial showed 1.5 kg reduction in HCW**

Conclusion

- **Further research required to minimize the reduction in carcass yield in pigs fed DDGS**

Thank you for your attention

Questions?