

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Use of Low-Oil DDGS in Swine

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Outline



Energy in DDGS
Energy in low-fat
DDGS
AA in low fat DDGS
Conclusions

Classes of Nutrients



**Energy is Not a
Nutrient!**

- **Water**
- **Protein**
- **Carbohydrates**
- **Lipids**
- **Vitamins**
- **Minerals**



Metabolism crate

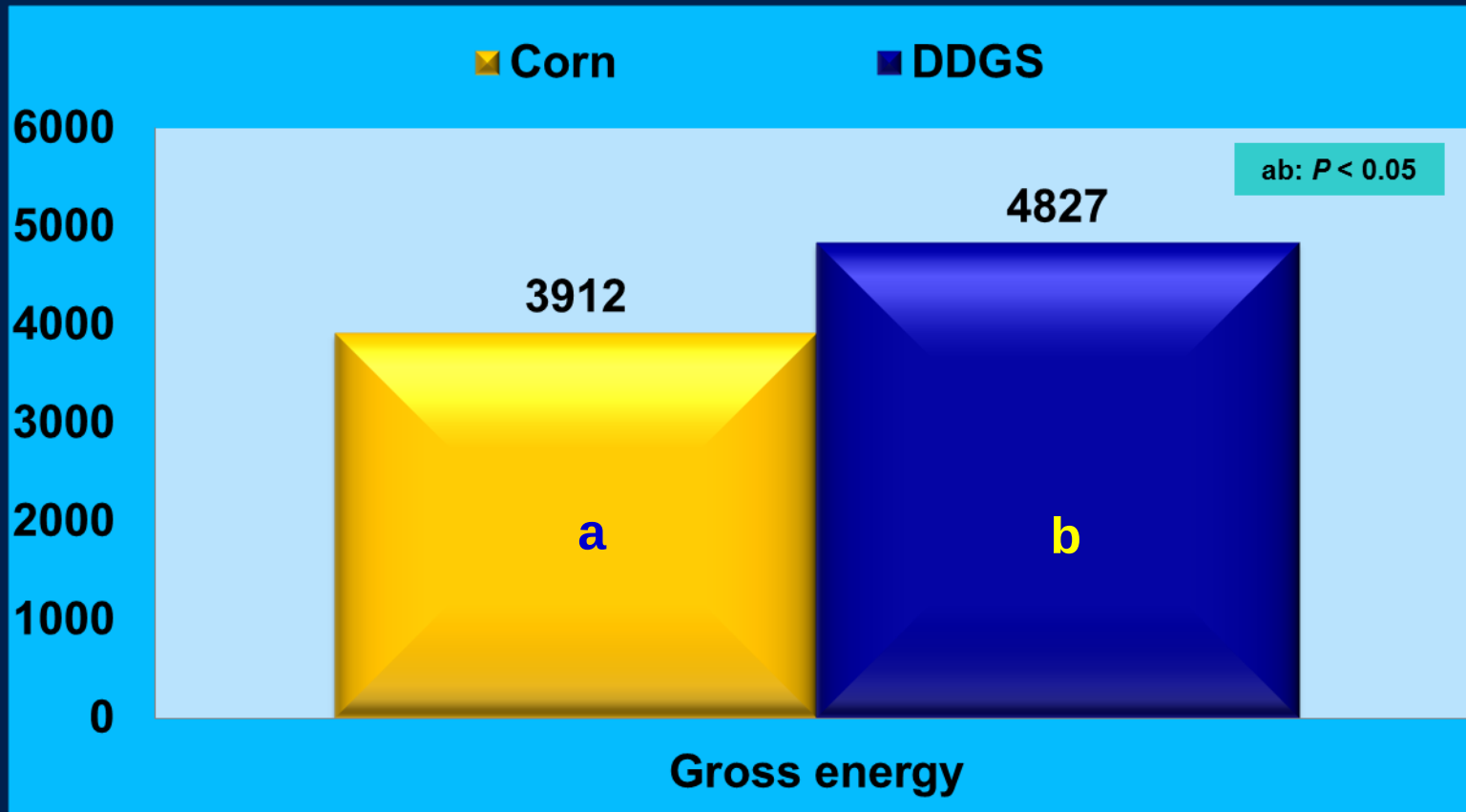


Sample Collections



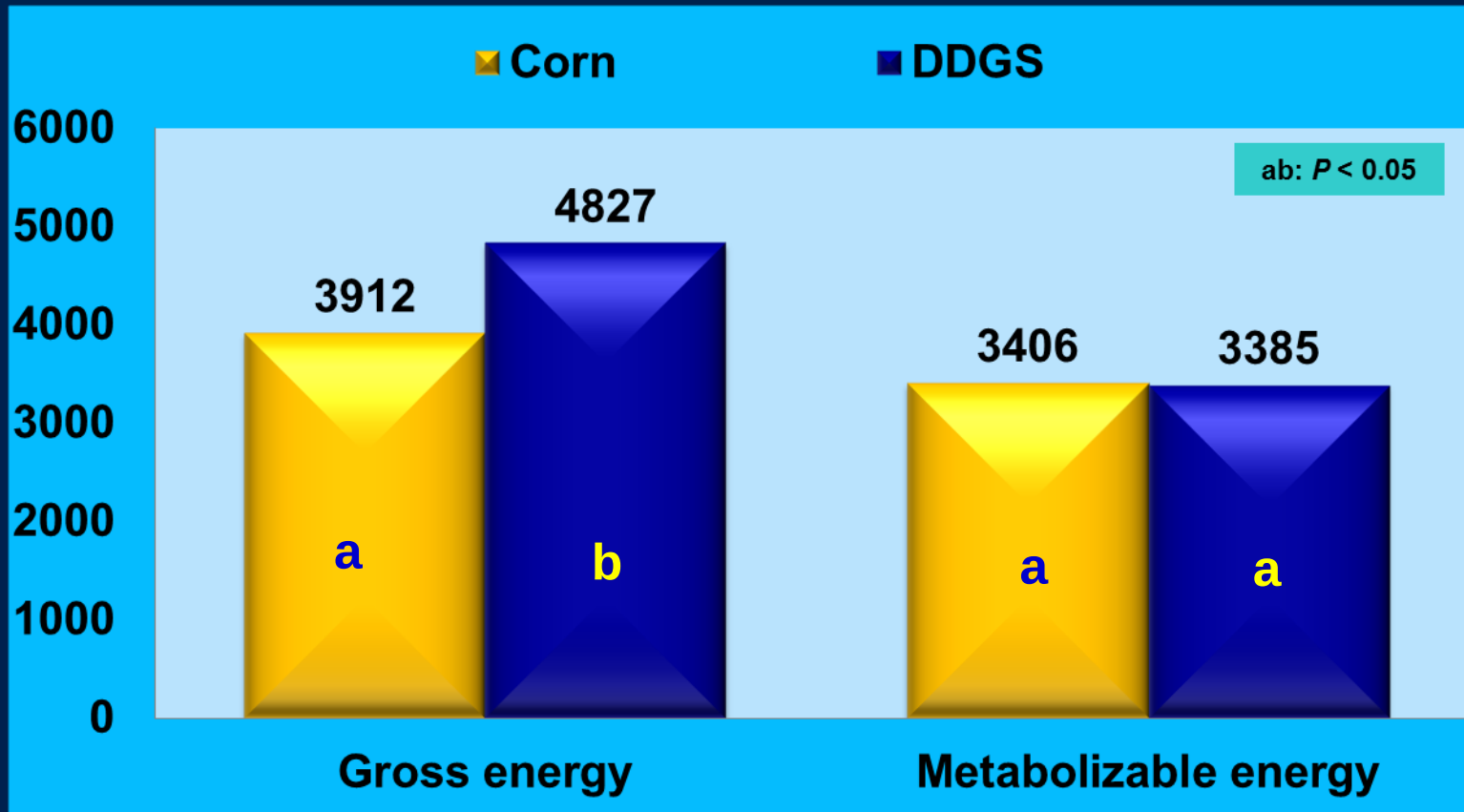
GE in corn and DDGS (kcal/kg)

Corn: N = 41; DDGS, N = 12



GE and ME (kcal/kg)

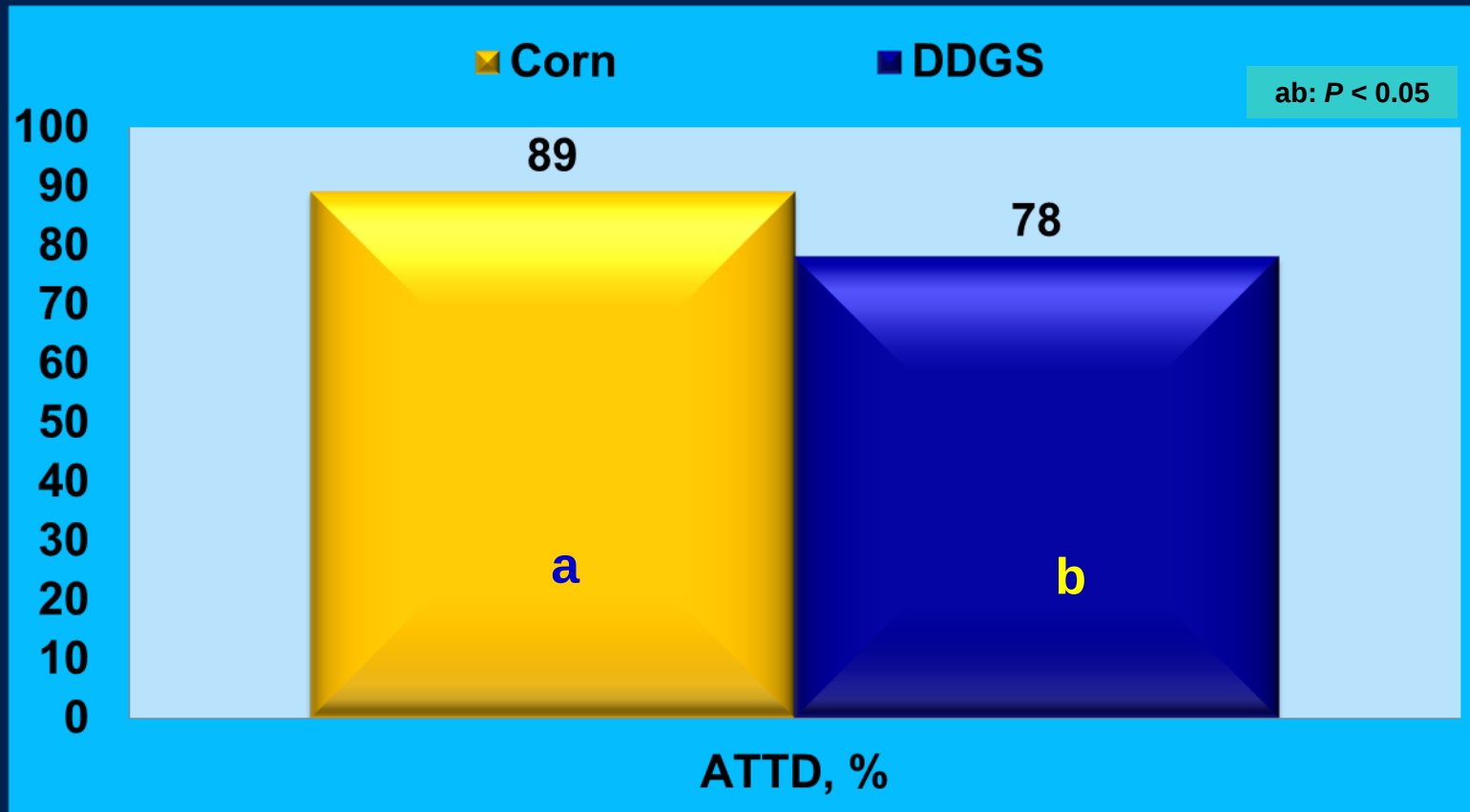
Corn: N = 41; DDGS, N = 12



Univ. IL., 2014

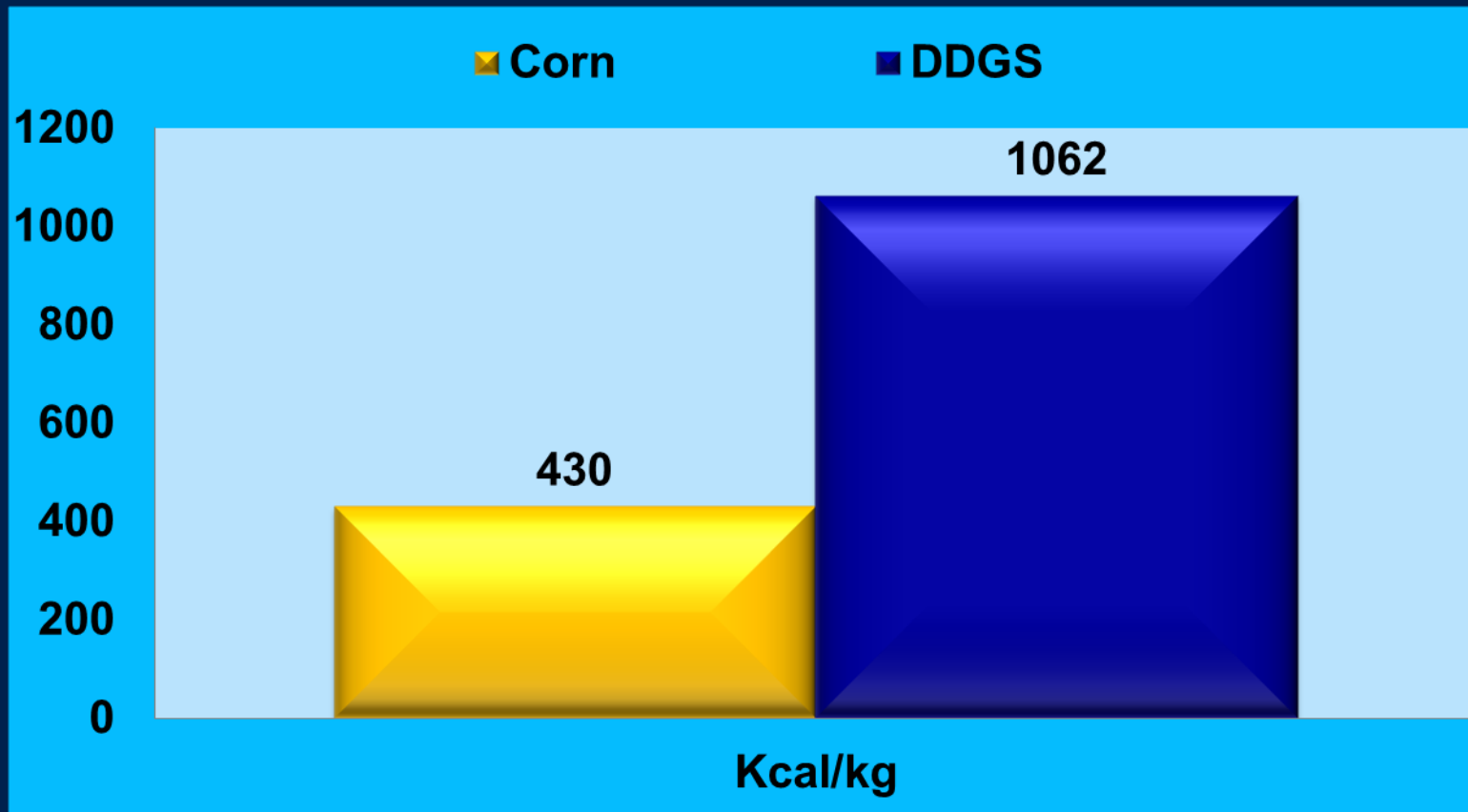
ATTD (%) of GE

Corn: N = 25; DDGS, N = 17

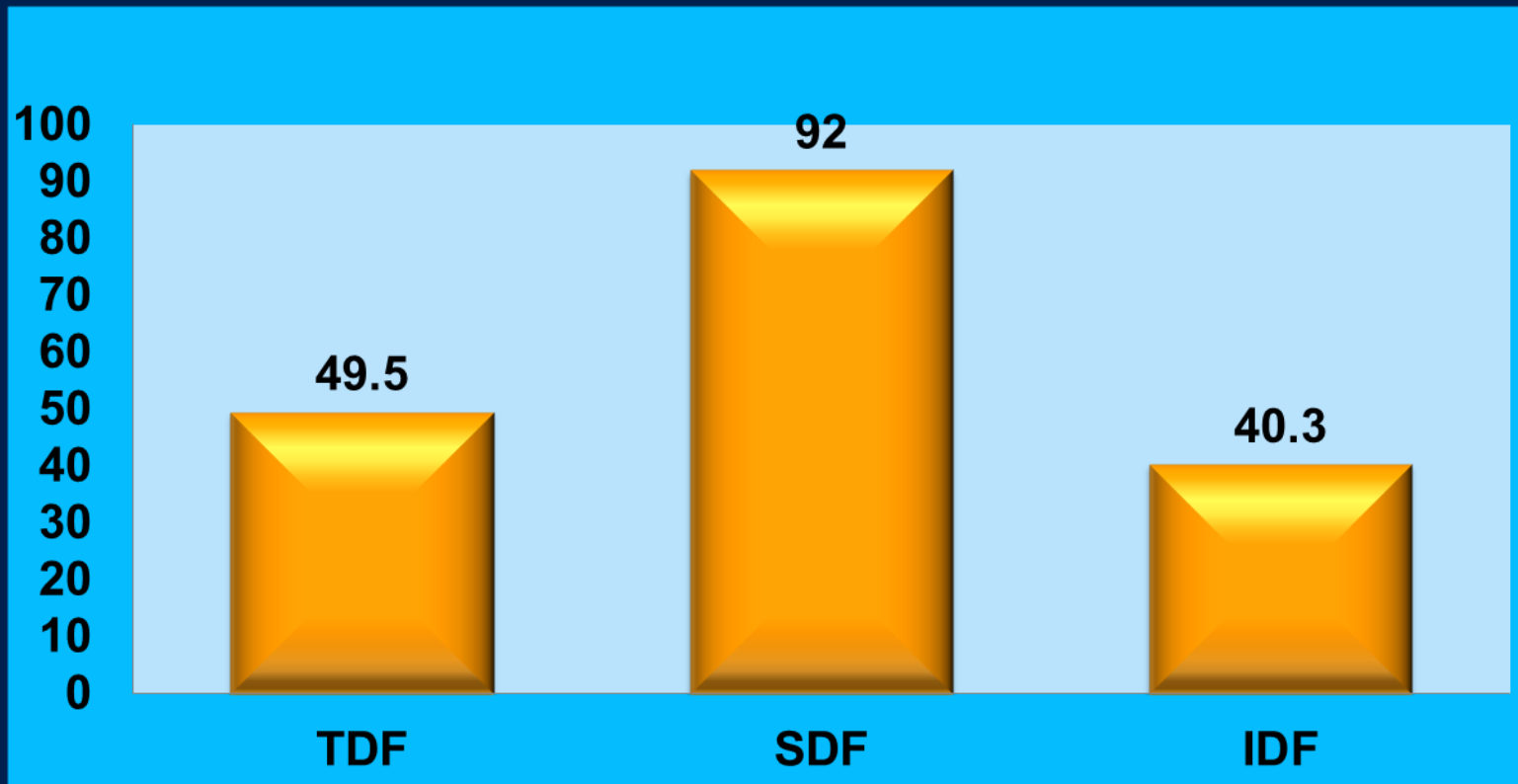


Univ. IL, 2014

Un-utilized energy (Kcal/kg)

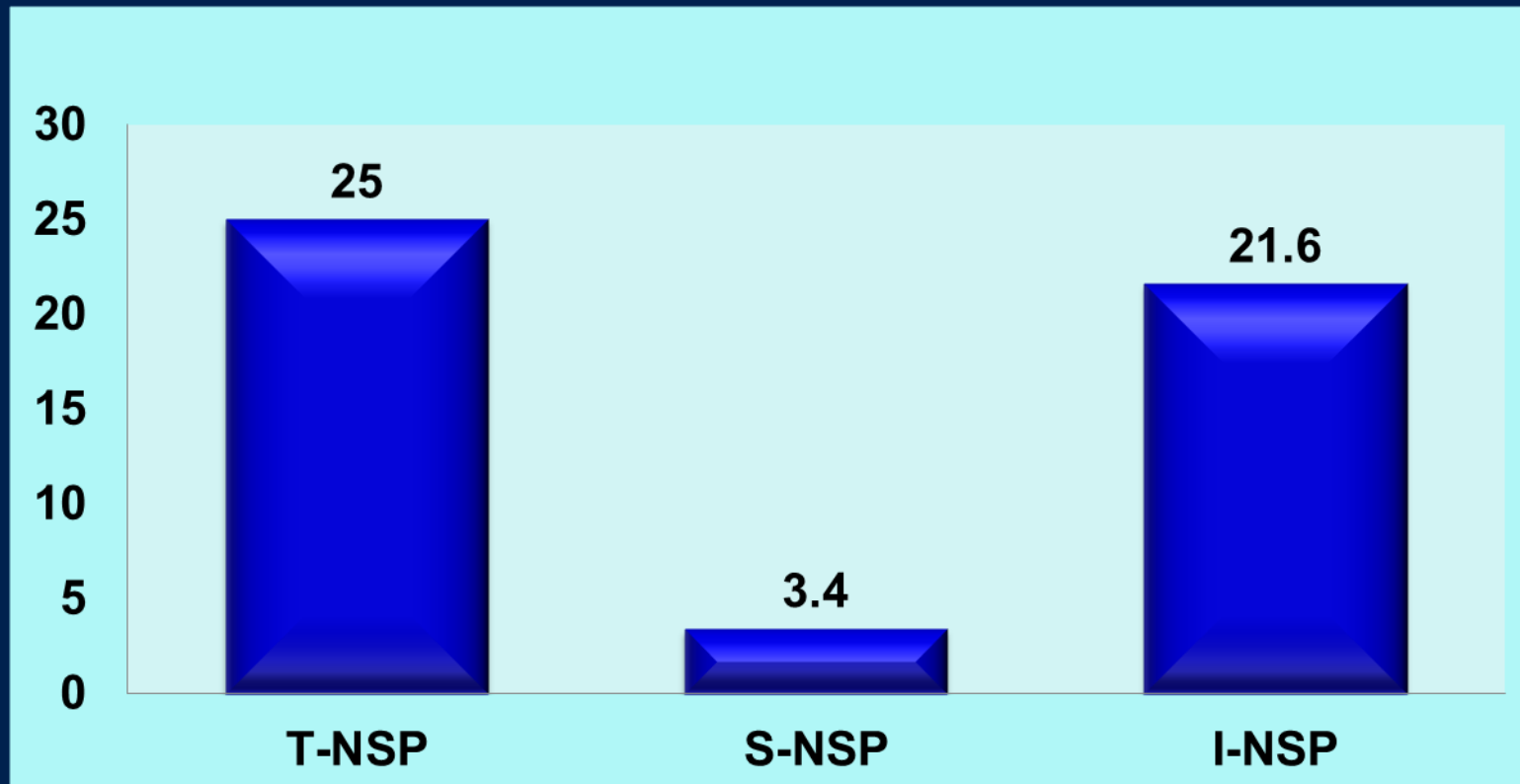


Disappearance of Fiber (%)



Urriola et al., 2010

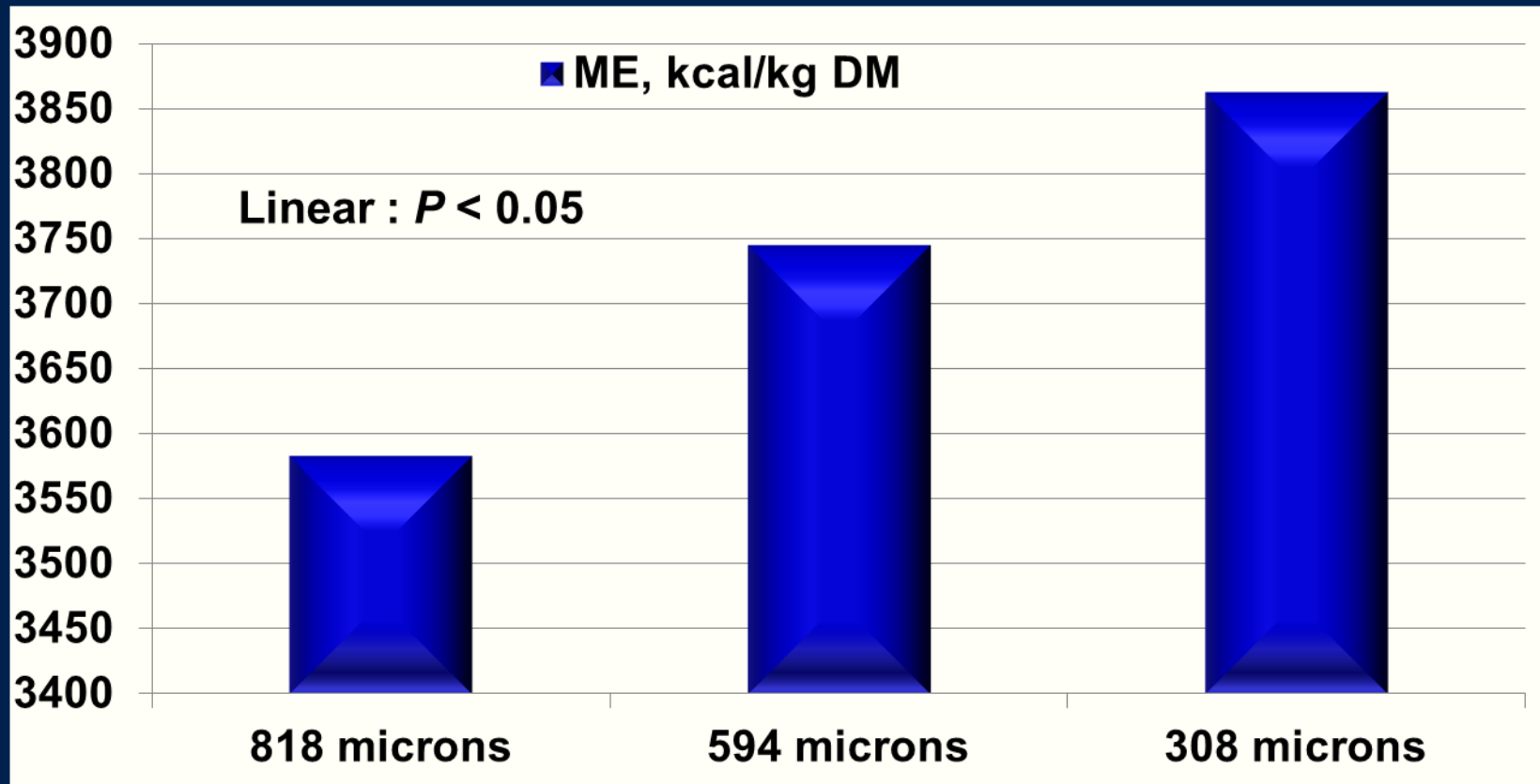
Fiber in DDGS (%)



Jaworski, 2012



Effects of Particle size on ME in DDGS



Liu et al., 2012

Low-fat DDGS

Low fat DDGS and De-oiled DDGS

- **Conventional DDGS:** > 9% Fat
- **Low-fat DDGS:** 5 to 9% Fat
- **De-oiled DDGS:** < 5% fat

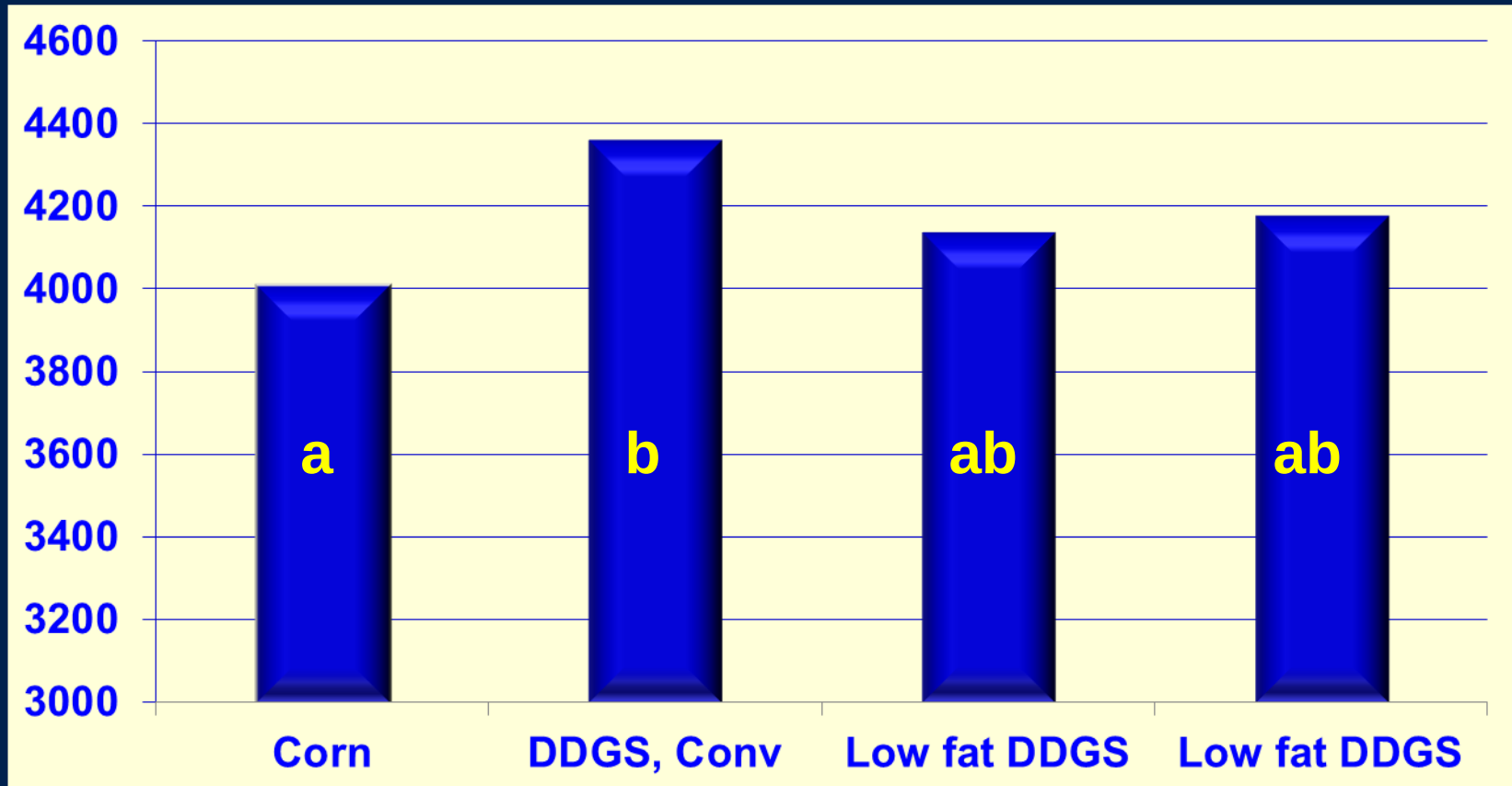
NRC, 2012

Low Fat DDGS

Item	DDGS-conv.	Low fat DDGS	Low fat DDGS
Crude Protein, %	25.2	27.4	27.1
Fat, %	11.5	7.5	6.9
NDF, %	28.6	30.7	29.9
GE, kcal/kg DM	4,865	4,722	4,497

Navarro et al., 2013

ME in Low Fat DDGS, kcal/kg DM



Navarro et al., 2013



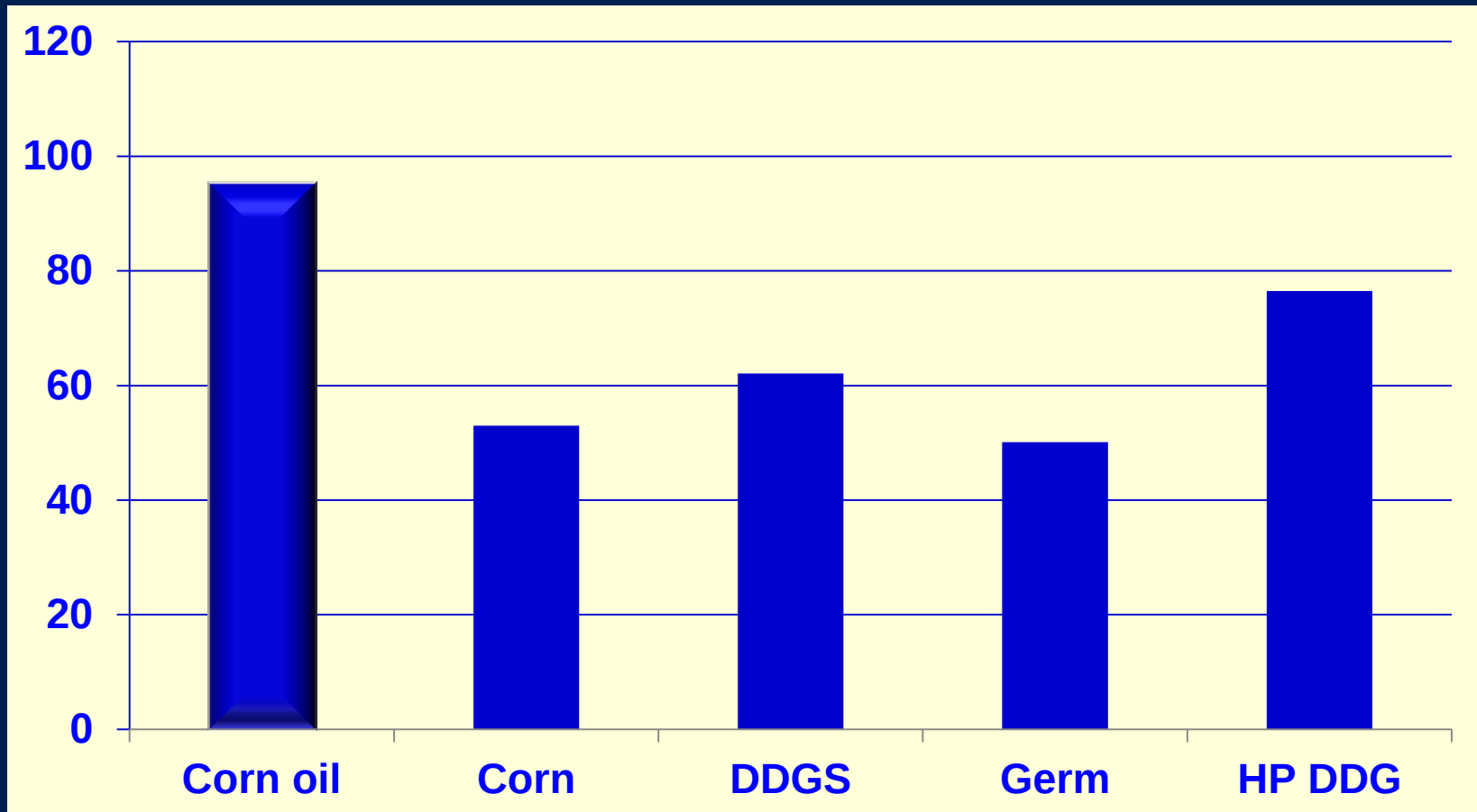
Effect of fat on ME

Item	1	2	3	4
Fat, %	4.88	5.61	7.45	10.88
GE, Kcal/kg	4,780	4,841	4,943	5,113
ATTD of GE, %	74.65	79.11	70.77	75.70
ME, kcal/kg DM	3,698	4,060	3,630	4,110

Kerr et al., 2013



TID of Lipids (%)



Kim et al., 2012

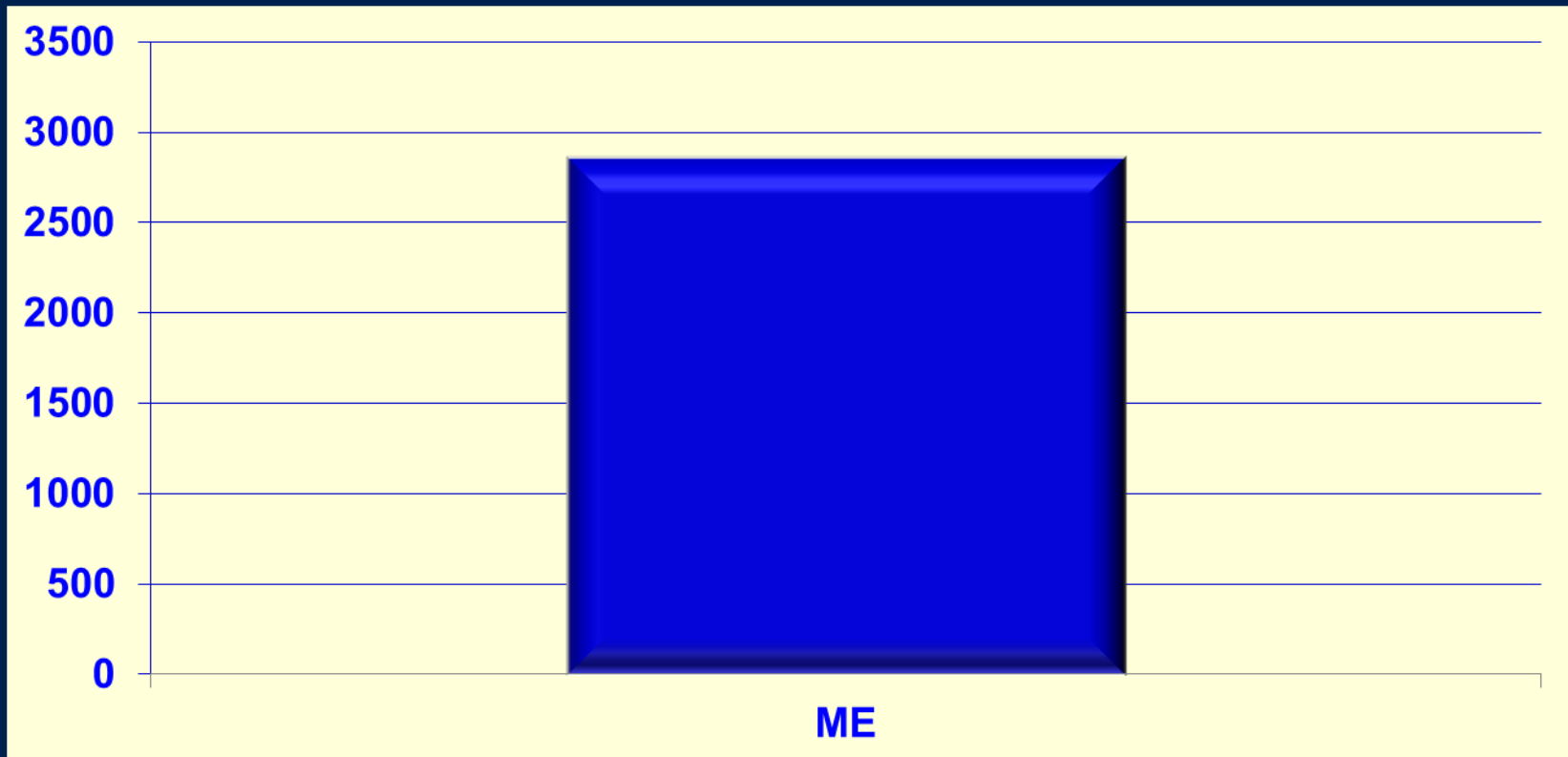
De-oiled DDGS

De-oiled DDGS

Item	De-oiled DDGS
Crude Protein, %	31.2
Fat, %	4.0
NDF, %	34.6
GE, kcal/kg DM	5,098

Jacela et al., 2011

De and ME in De-oiled DDGS, kcal/kg DM



Jacela et al., 2011

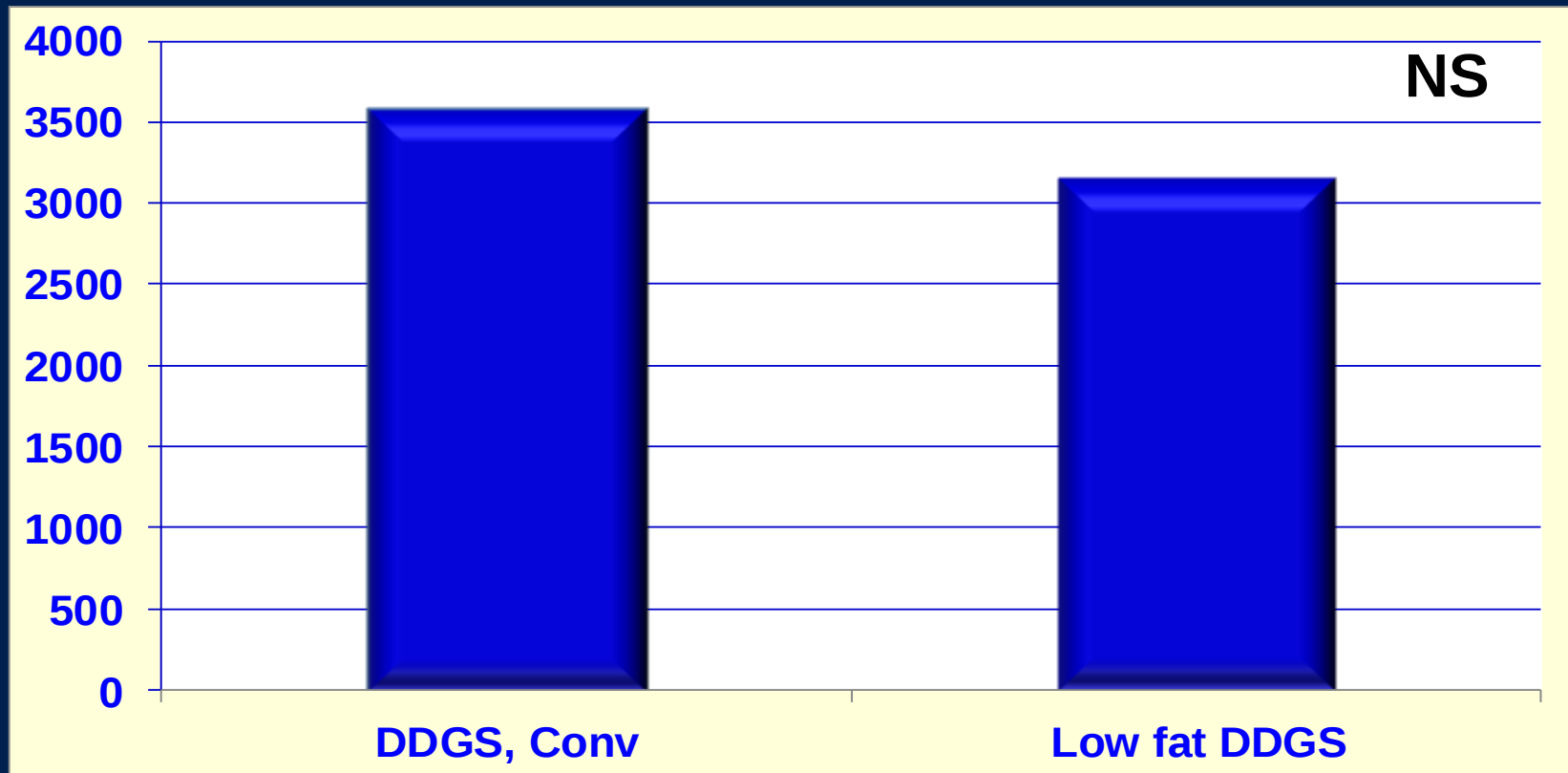


Chinese De-oiled DDGS

Item	DDGS, Conv.	De-oiled DDGS
Crude Protein, %	26.6	28.7
Fat, %	9.24	3.5
NDF, %	36.0	37.9
GE, kcal/kg DM	4,833	4,473

Ren et al., 2011

ME in Chinese De-oiled DDGS, kcal/kg DM



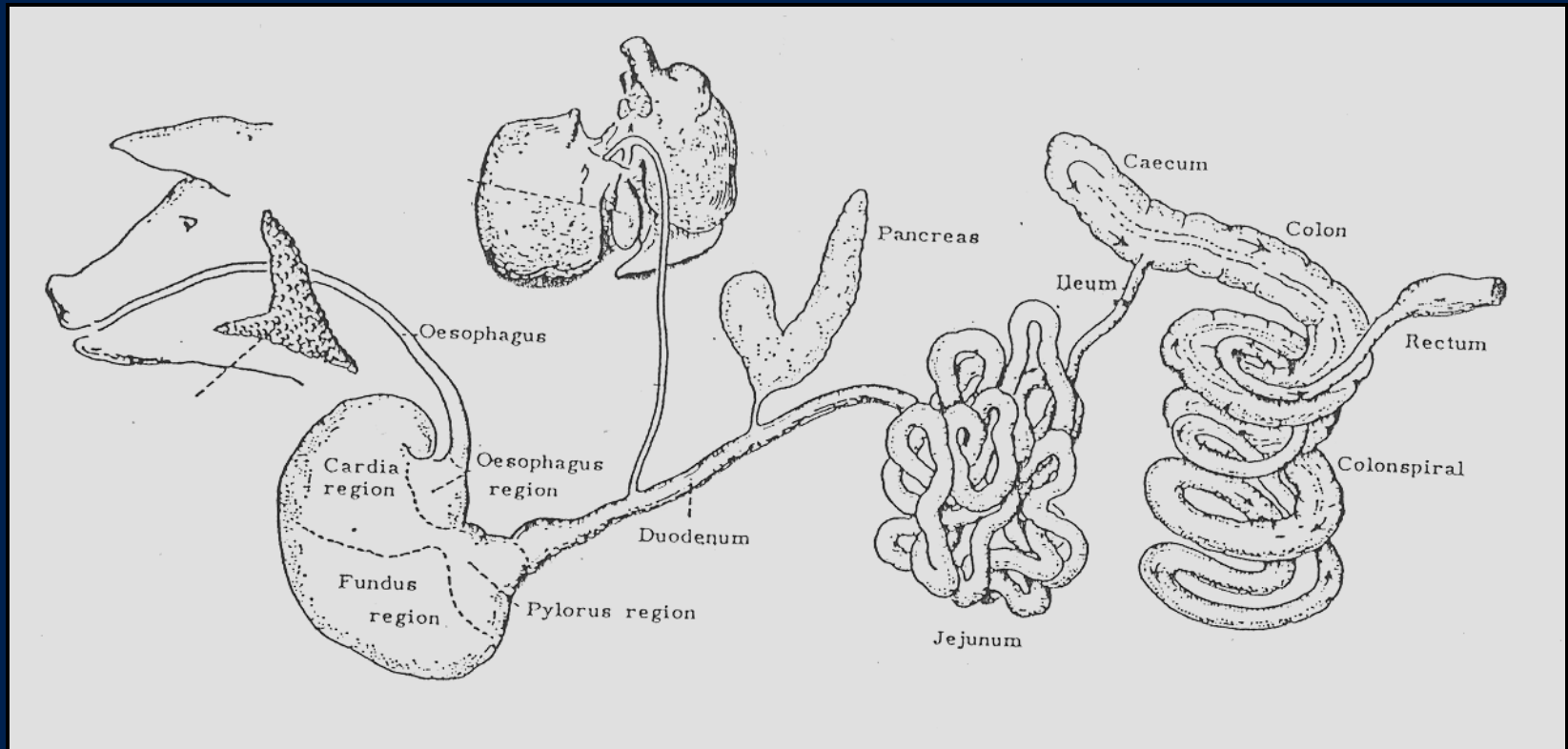
Ren et al., 2011



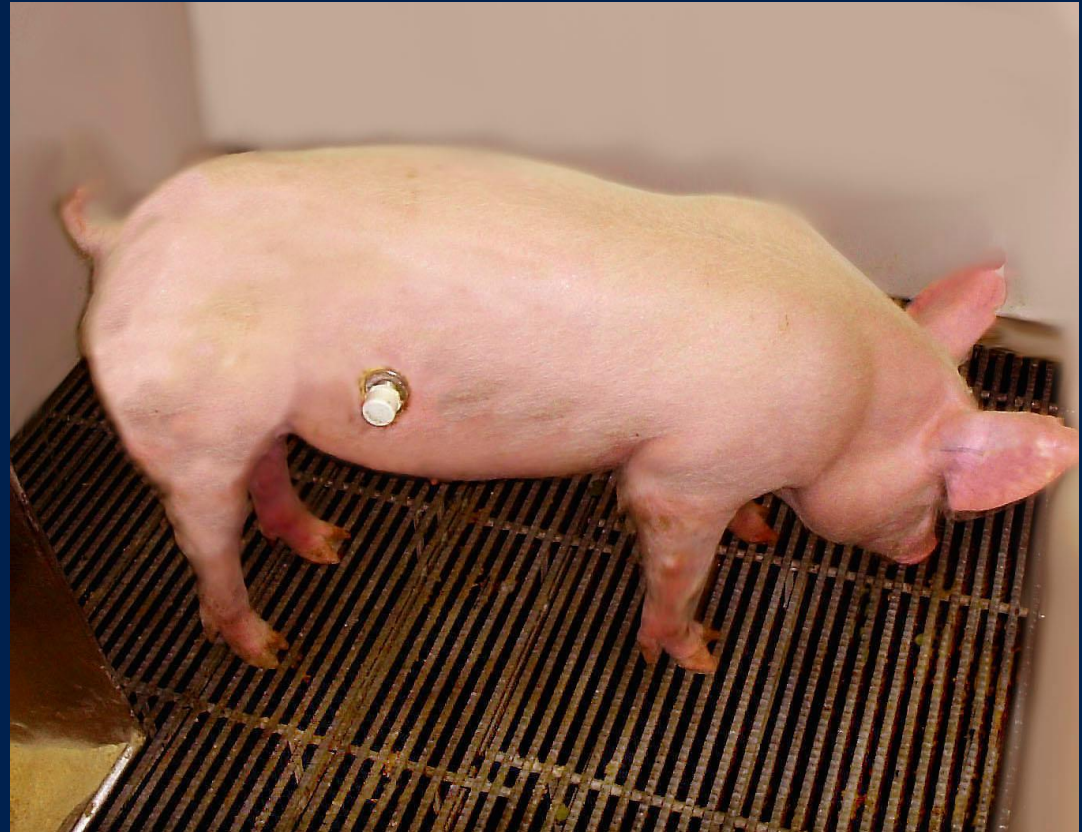
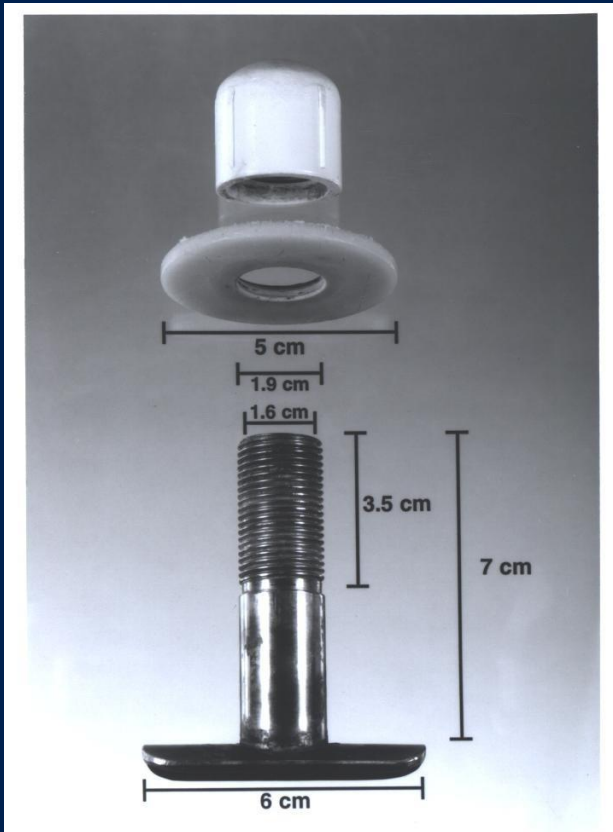
Amino acid digestibility in low-fat DDGS



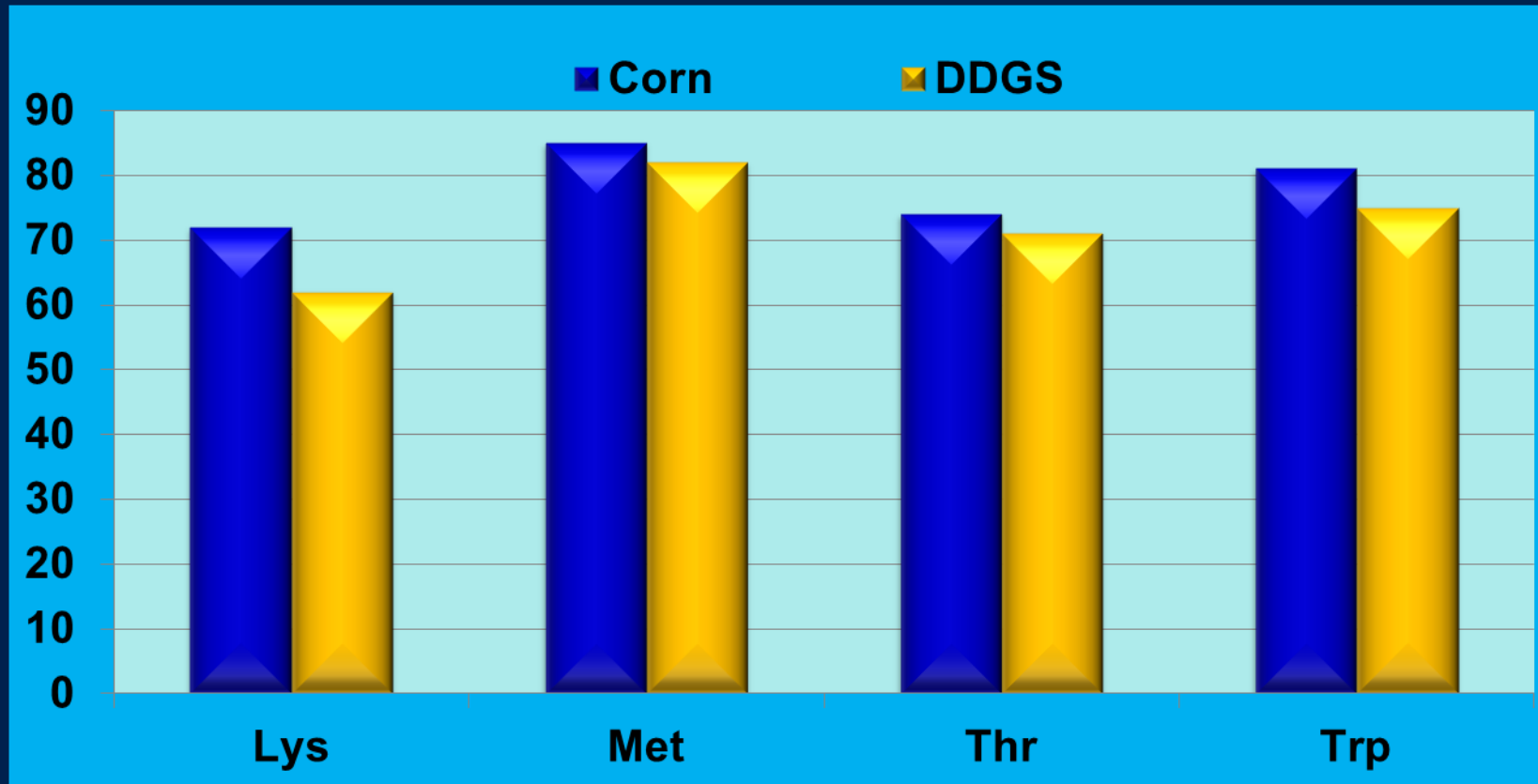
Ileal AA Digestibility



Ileal AA Digestibility

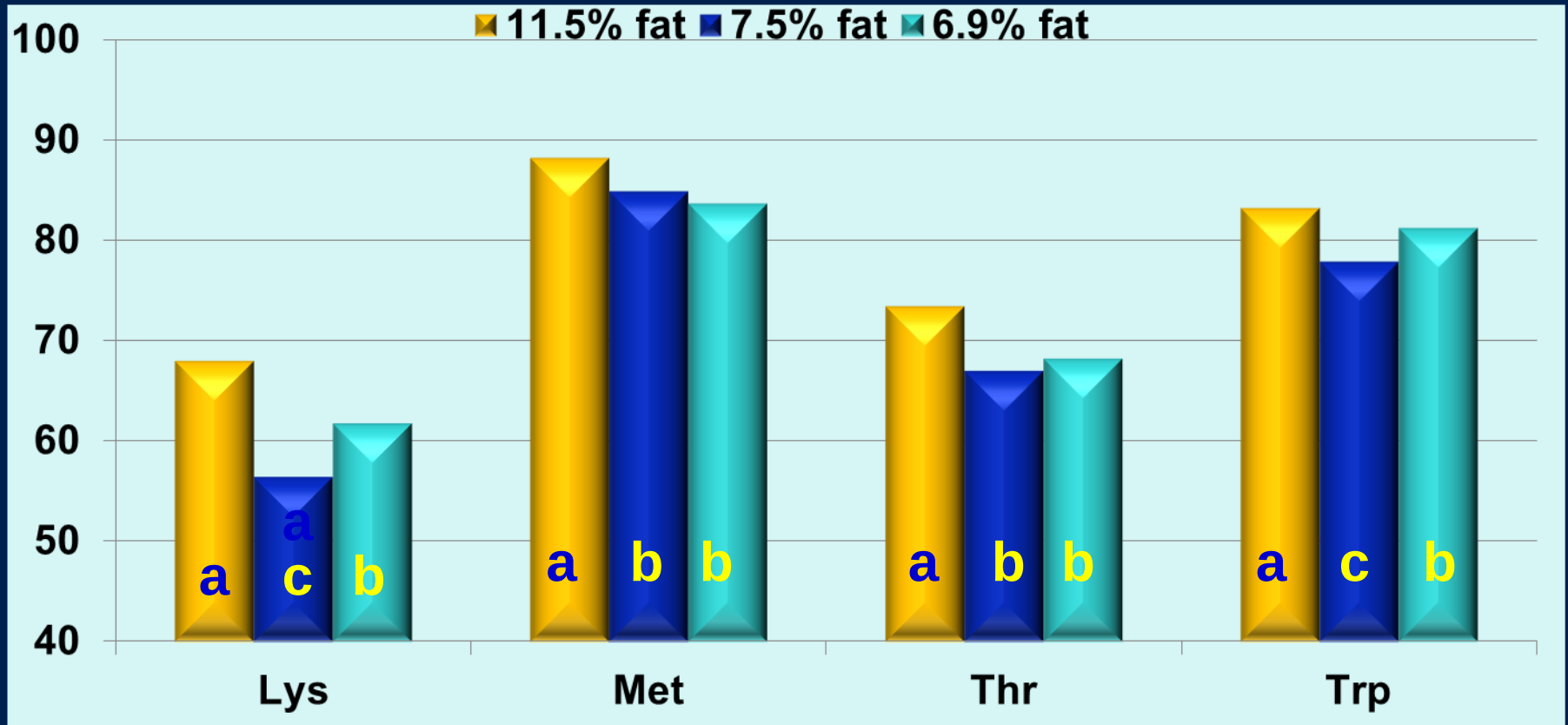


SID AA (%)



Univ. IL, 2012

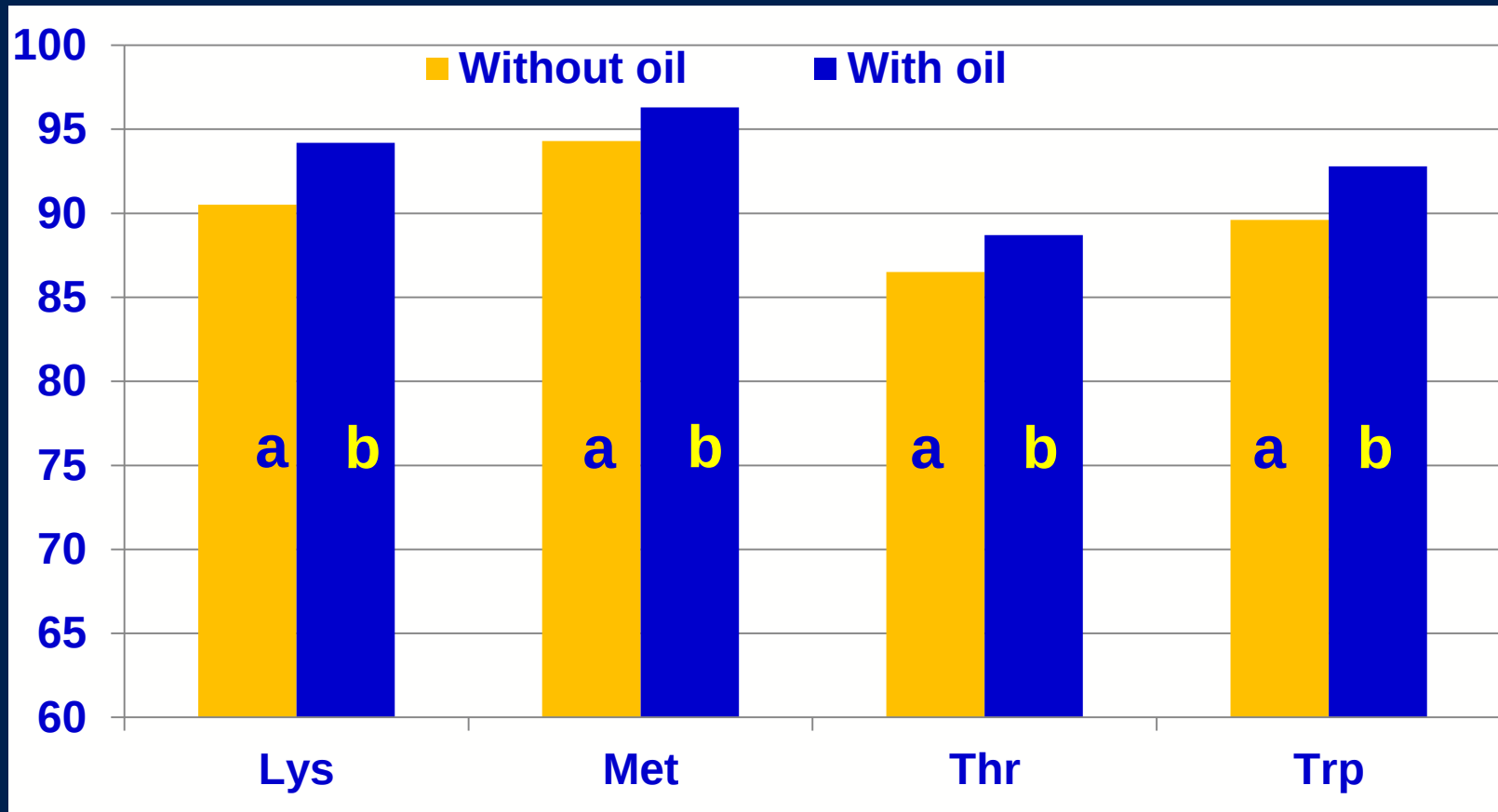
SID AA (%)



Curry et al., 2014



Effect of Oil on SID of AA in SBM and SPC

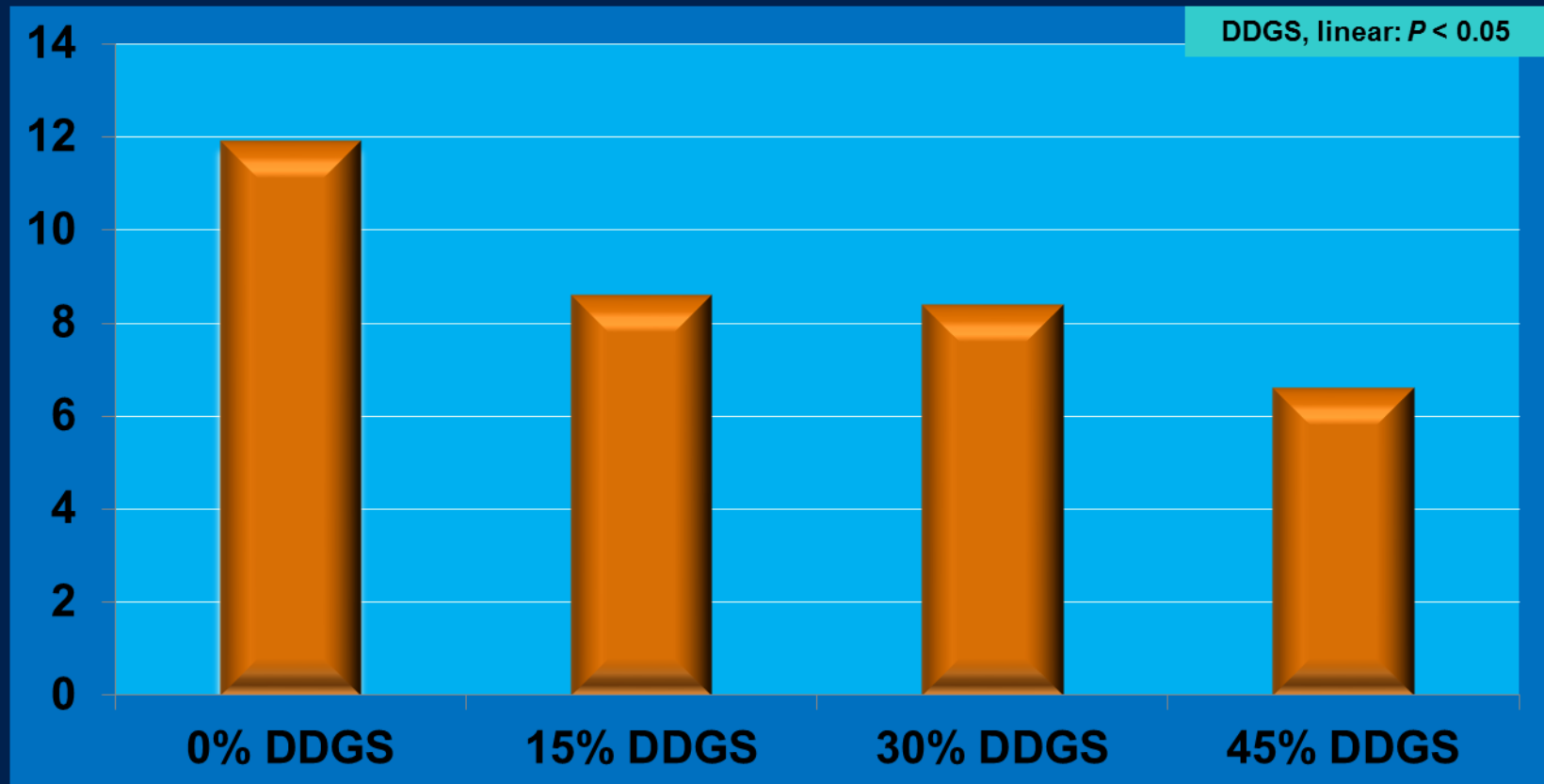


Cervantes-Pahm and Stein, 2008

Positive effect of low-fat DDGS



Belly flex, cm



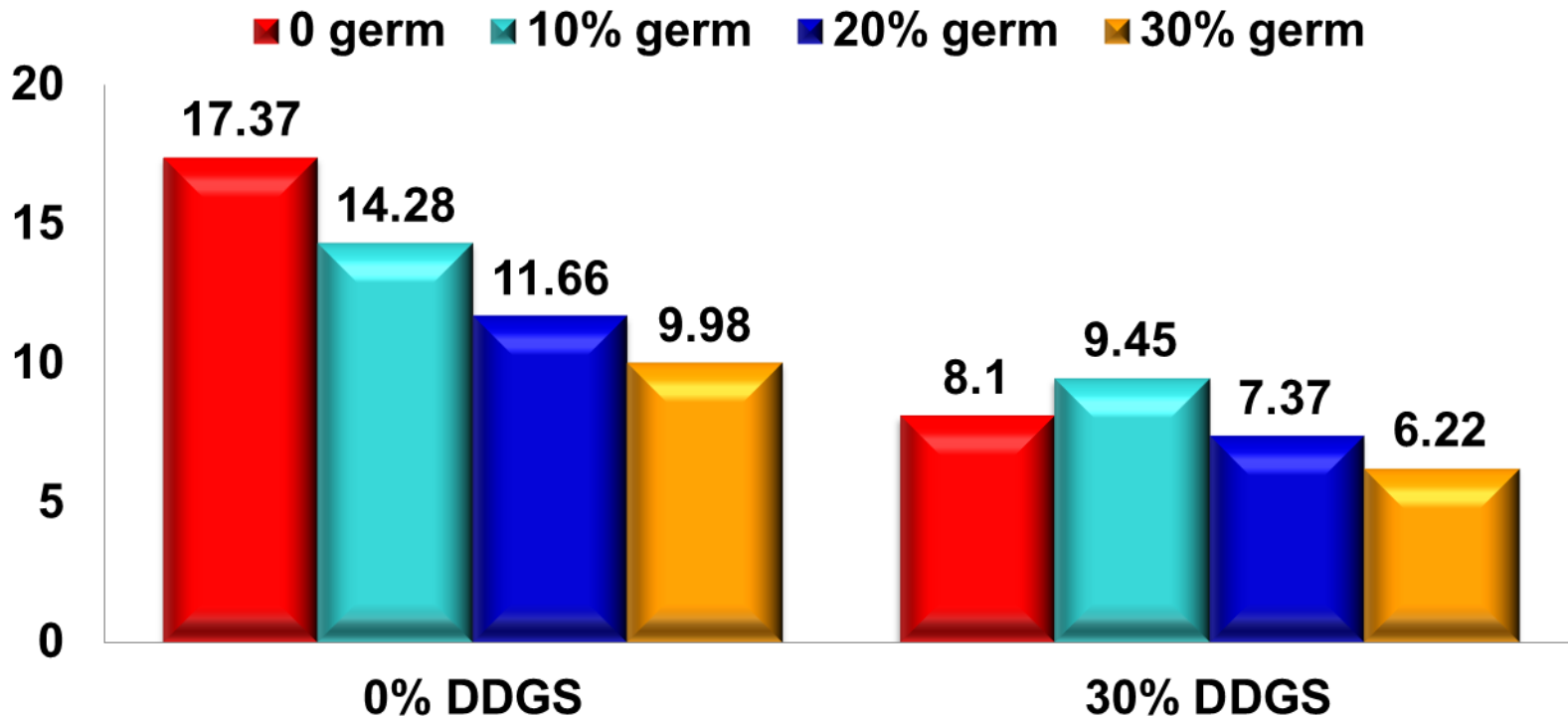
Cromwell et al., 2011



Belly Flop Distance, cm

Germ: $P < 0.05$

DDGS: $P < 0.05$



Lee et al., 2012



Conclusions

- **Energy value in conventional DDGS similar to corn**
- **Energy value in low-fat DDGS (5 – 9% fat) slightly less than in conventional DDGS**
 - **Probably no practical impact**
- **De-oiled DGGS significantly lower DE and ME**

Conclusions, continued

- **AA digestibility may be reduced in low-oil DDGS**
- **Possible positive impact of low-oil DDGS on pork quality**
- **More data coming soon.**

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Acknowledgement



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