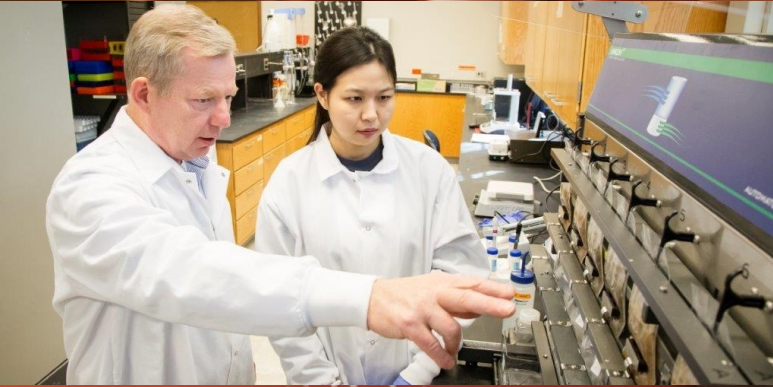




NON-TRADITIONAL FEED INGREDIENTS IN DIETS FOR PIGS

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Non-traditional feed ingredients for pigs

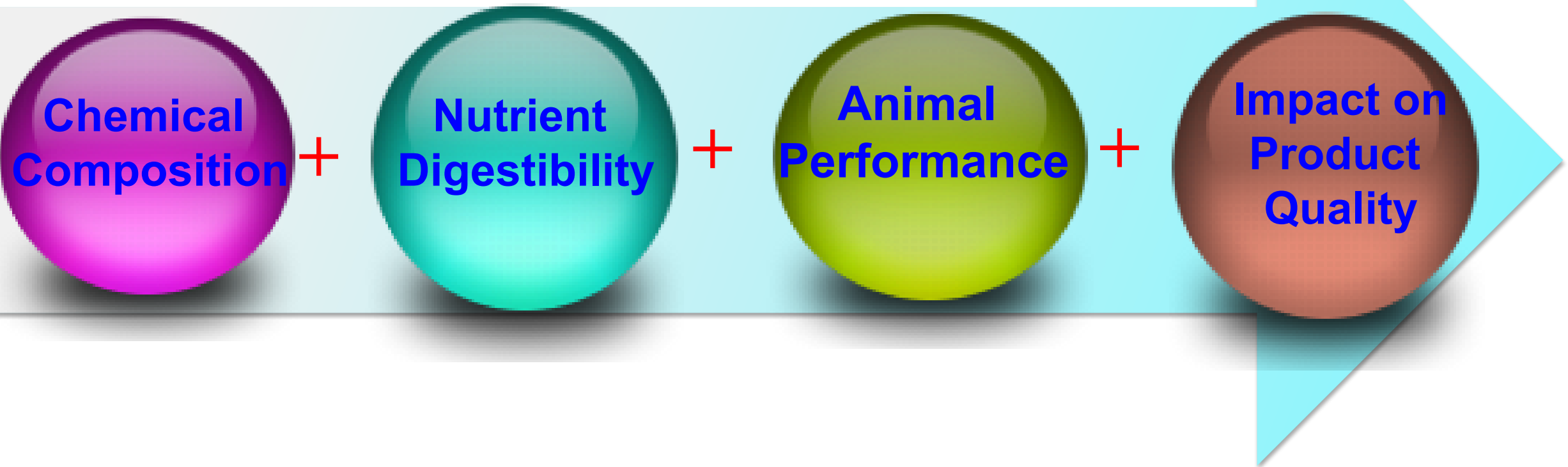


- Introduction
- Rice co-products
- Bakery meal
- Field peas
- Yeast/single cell protein
- Conclusions

Feed Ingredients



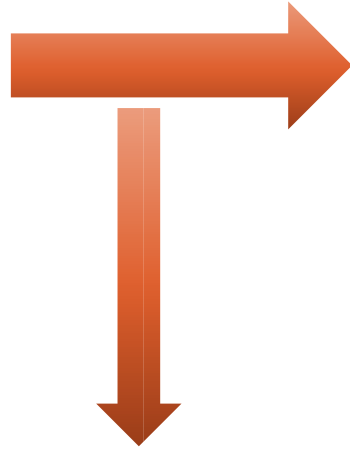
Feed Ingredient Evaluation



Rice co-products



Paddy rice



Hulls



Brown rice



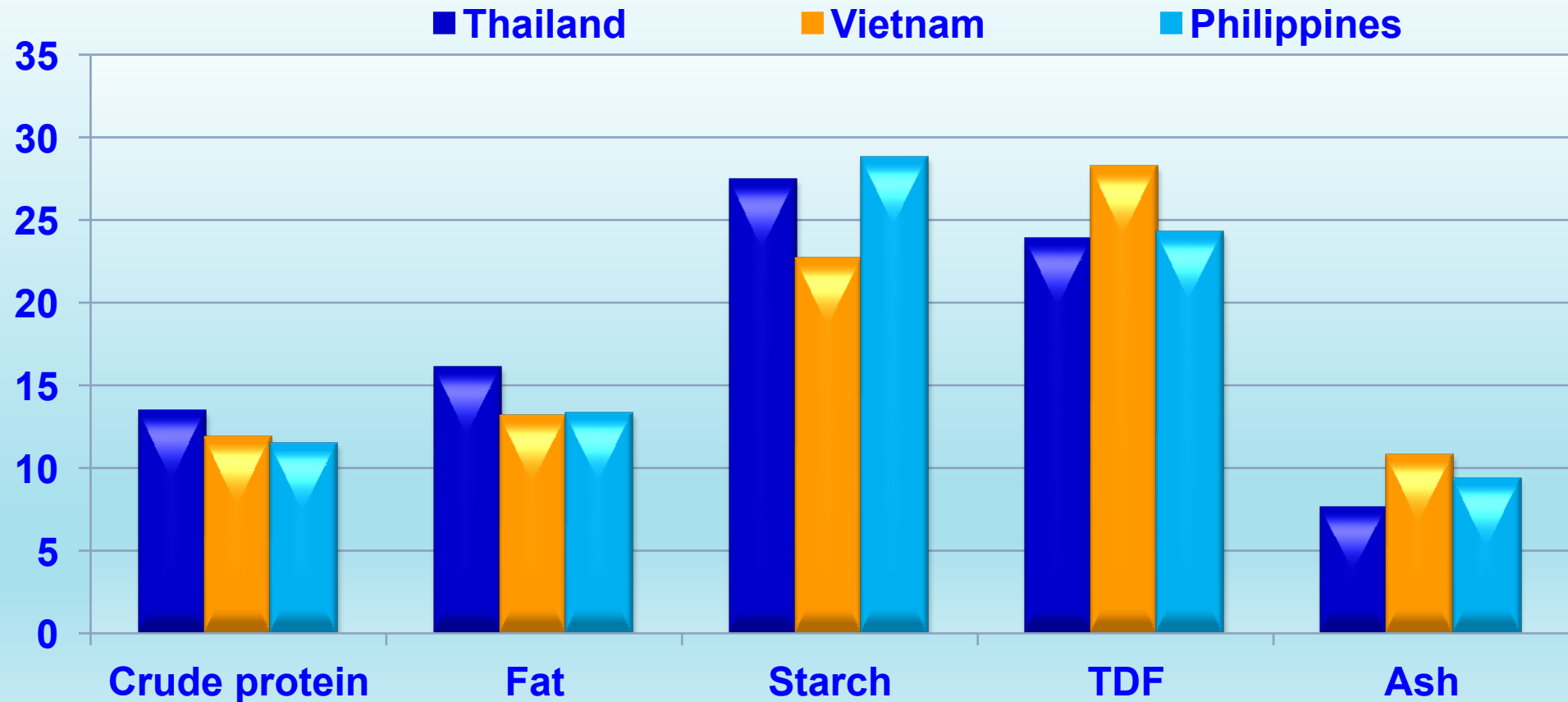
Rice bran



White rice

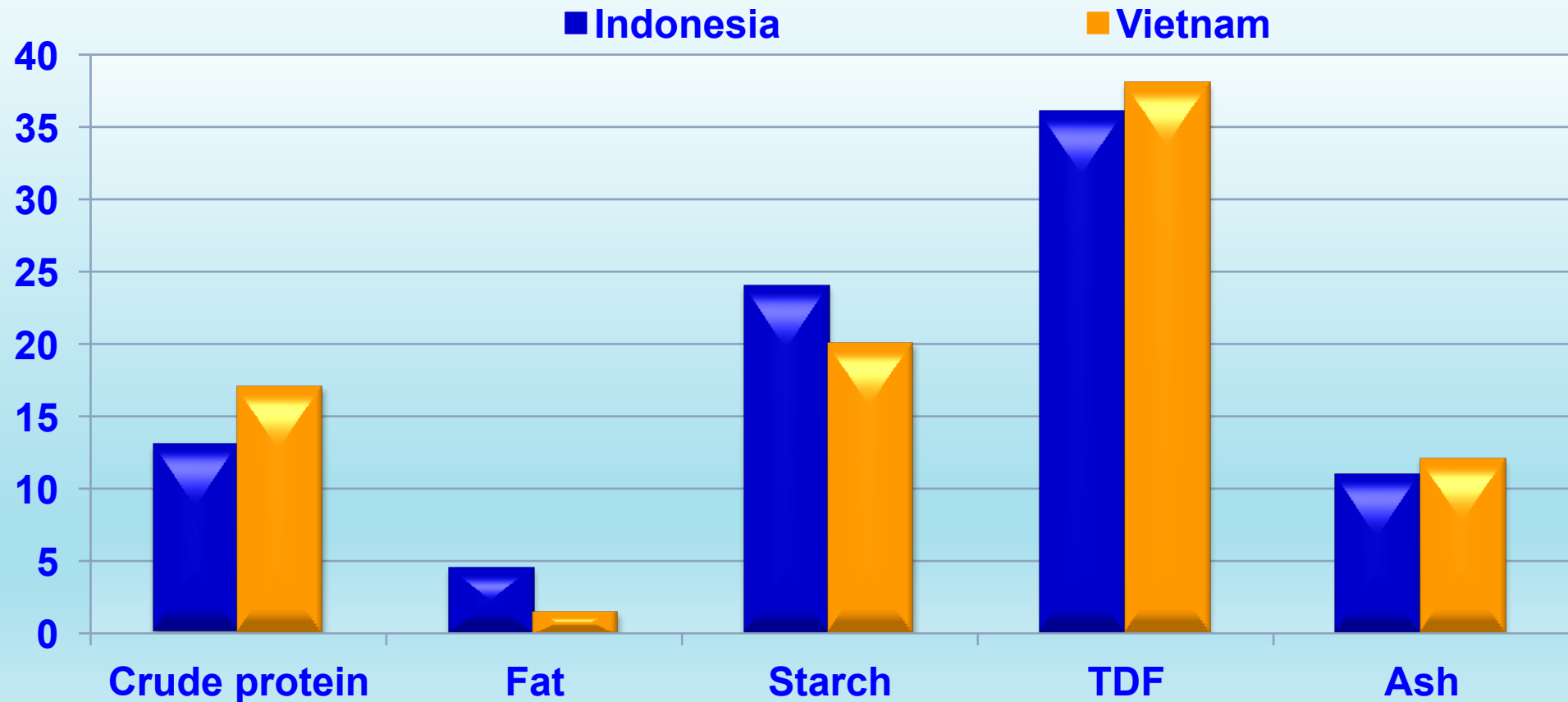


Composition of full fat rice bran, %



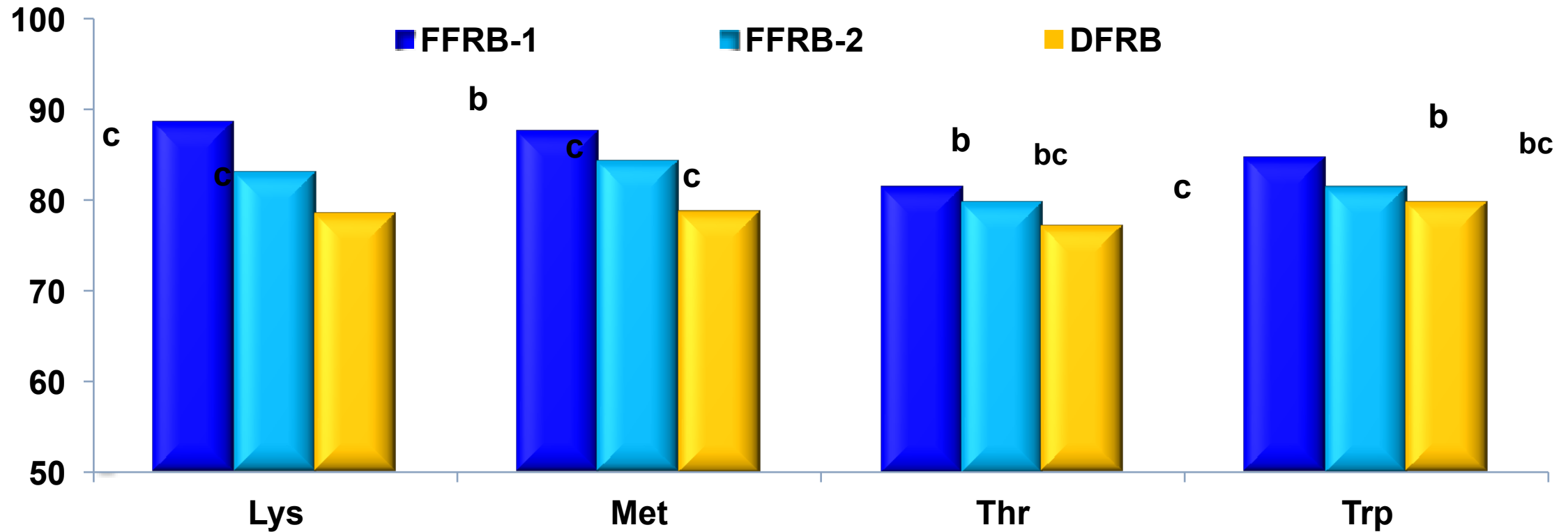
Fanelli et al., 2023

Composition of defatted rice bran, %



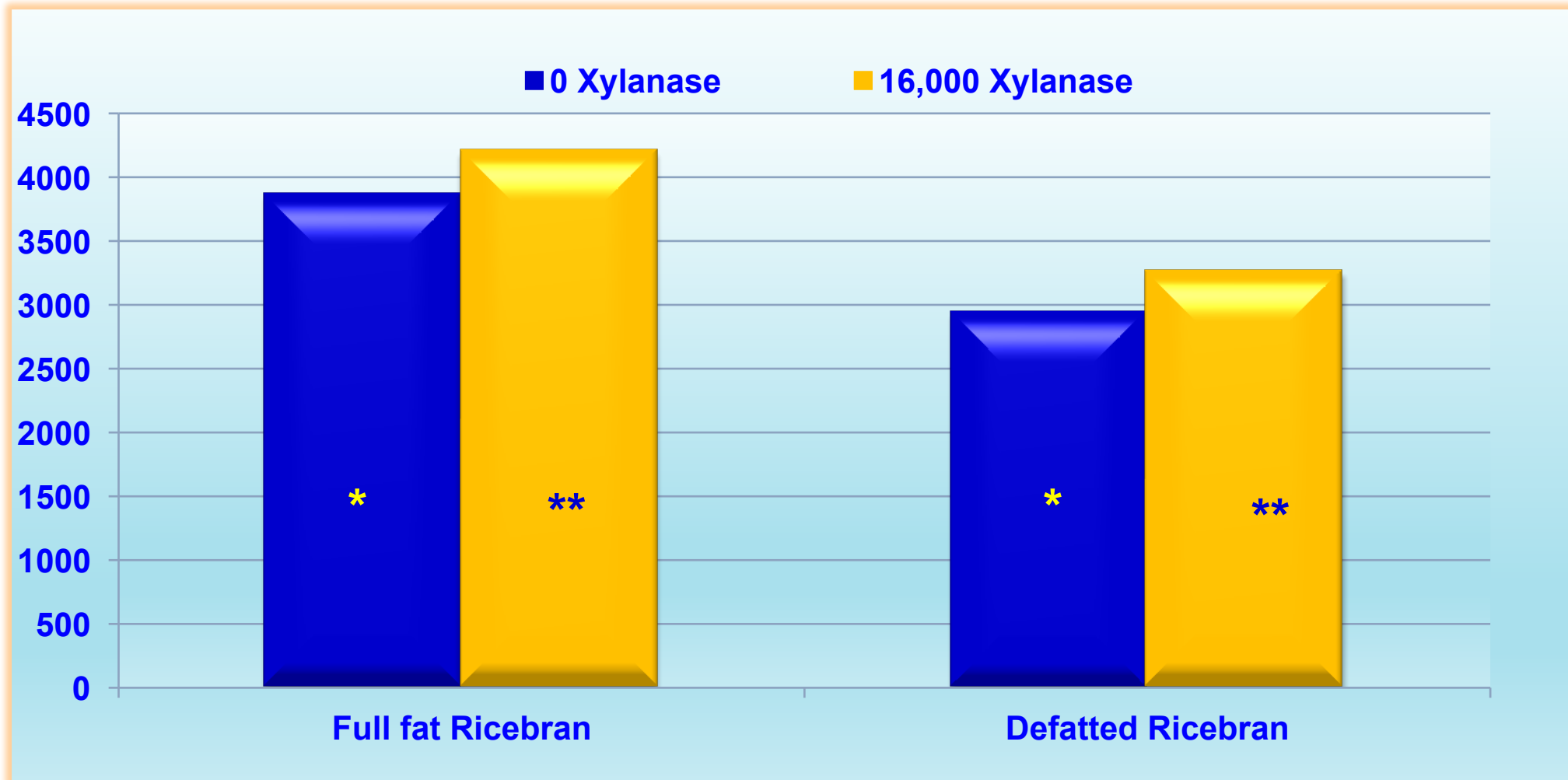
Fanelli et al., 2023

SID AA (%), Rice co-products



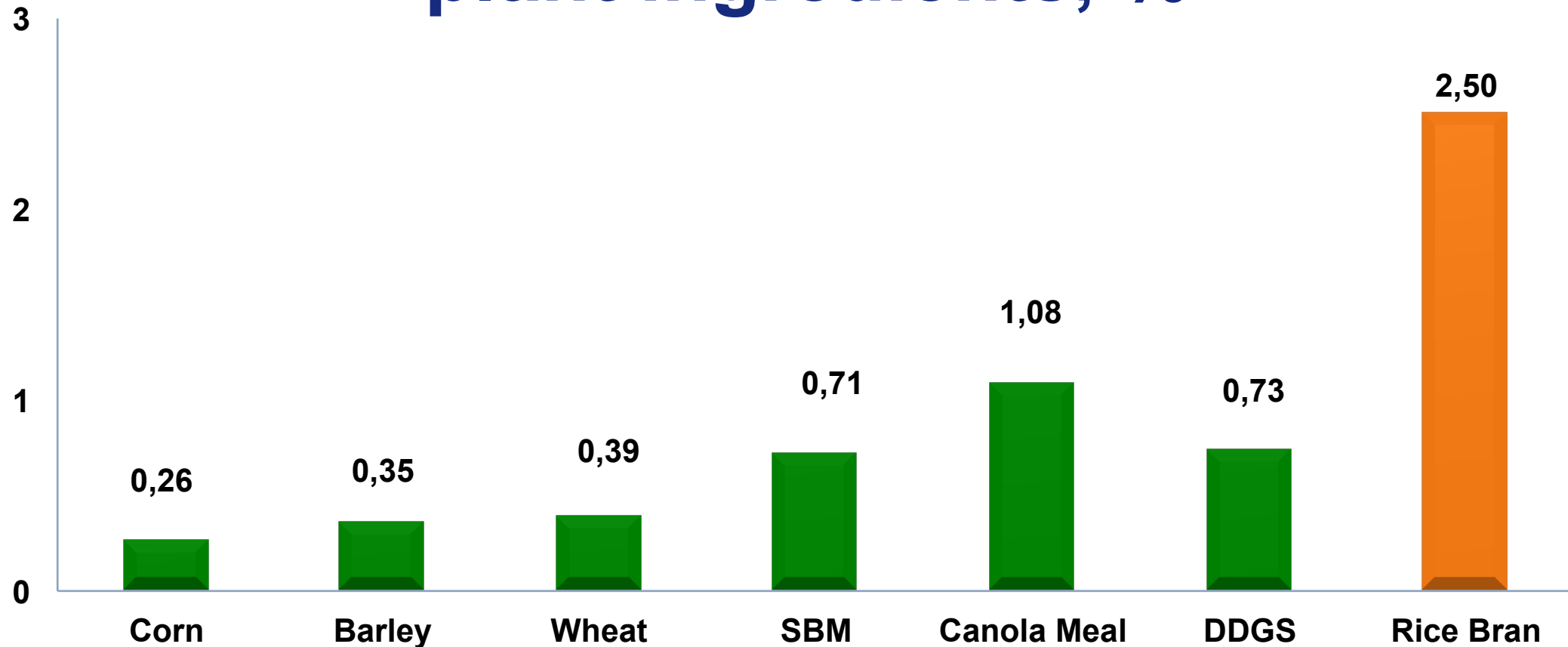
Casas et al., 2015

Xylanase increases ME in rice bran for pigs



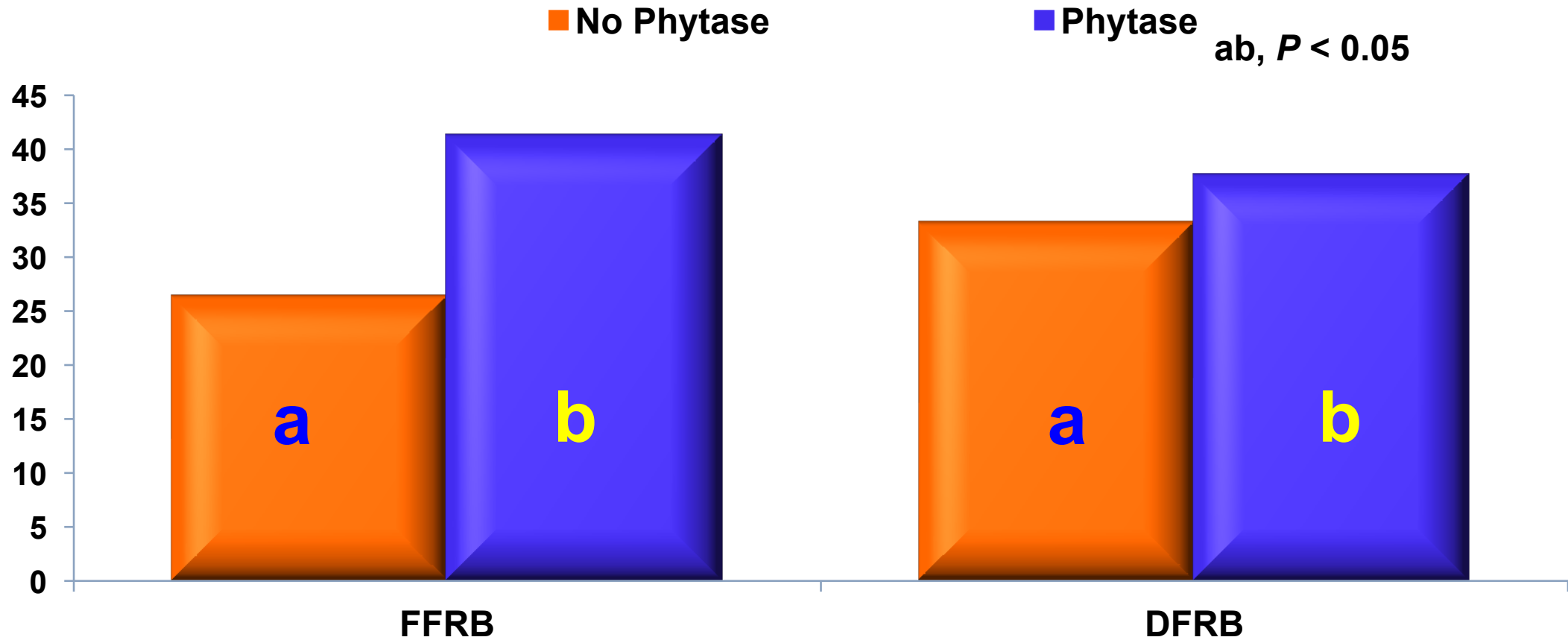
Casas and Stein, 2016

Rice bran contains more P than other plant ingredients, %



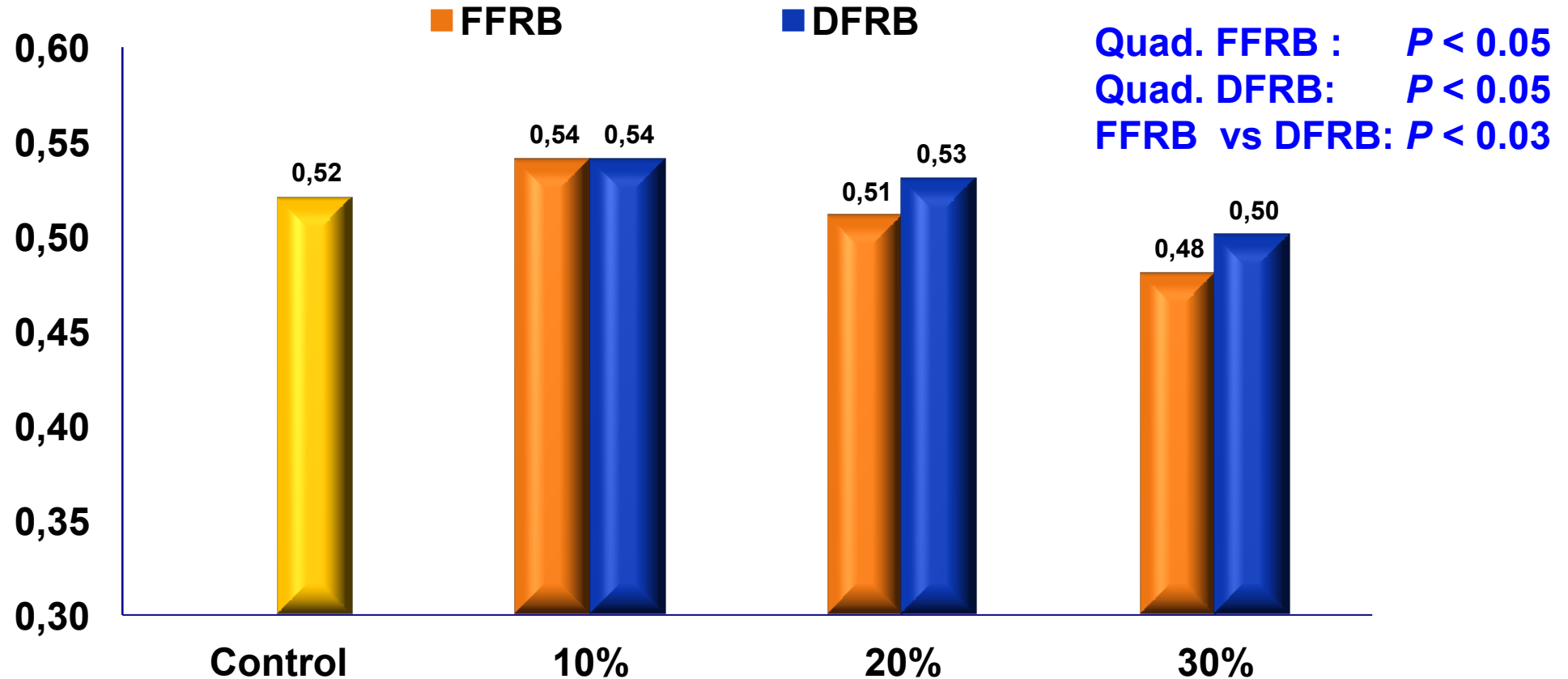
Kwon, 2017

STTD P (%) in rice co-products



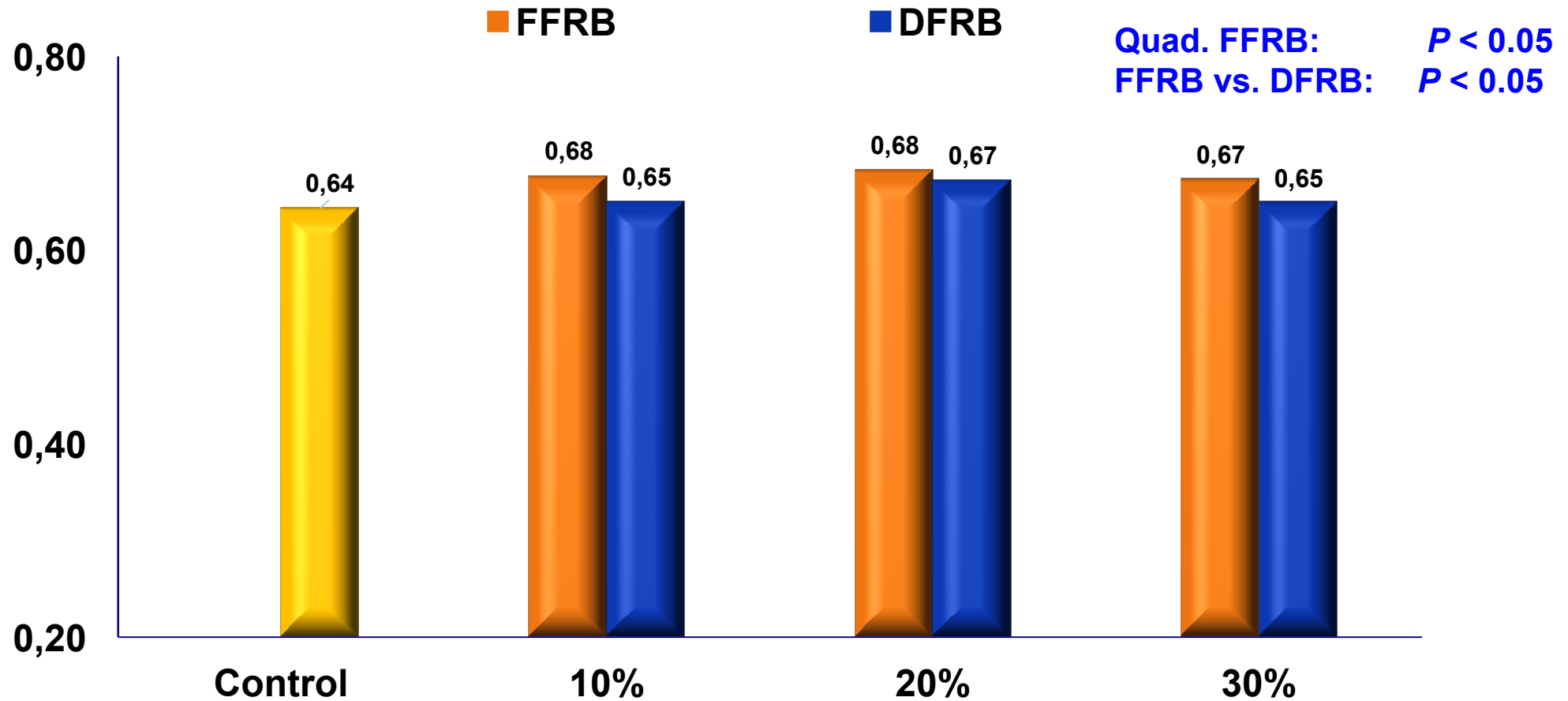
Casas and Stein, 2015

ADG (kg), weanling pigs, d 15-35 post-weaning



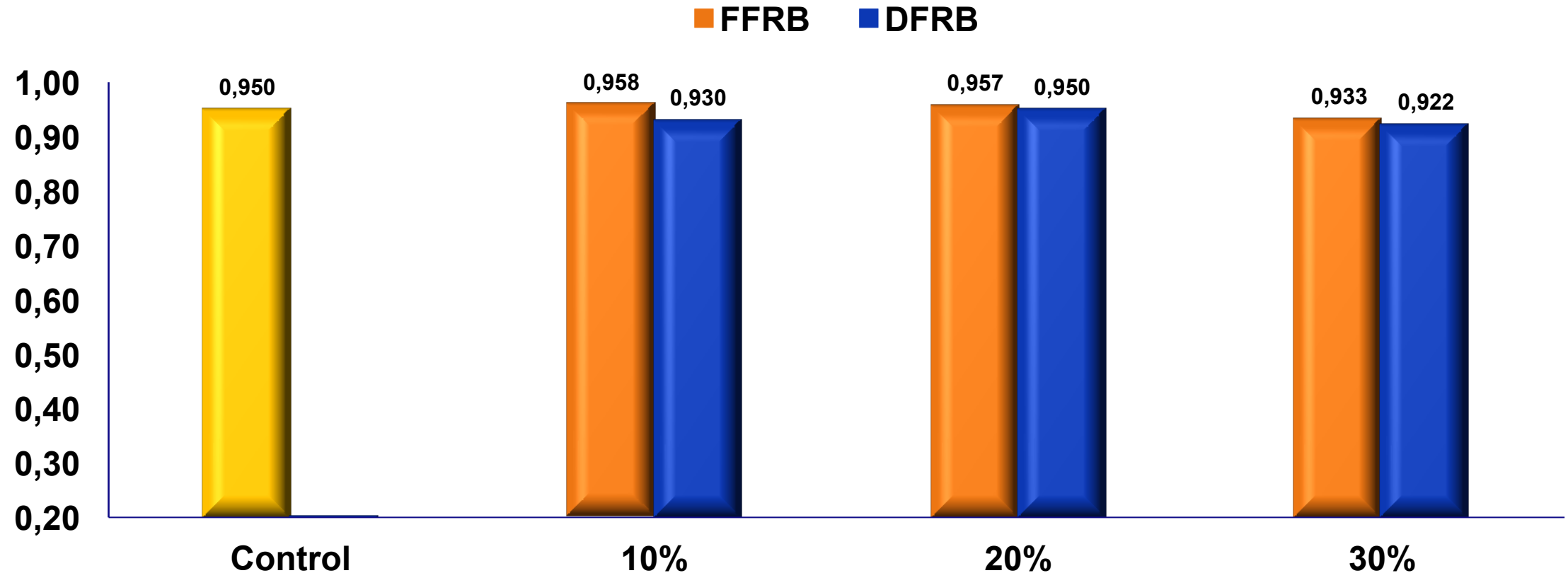
Casas and Stein, 2016

G:F, Weanling pigs, d 15-35 post-weaning



Casas and Stein, 2016

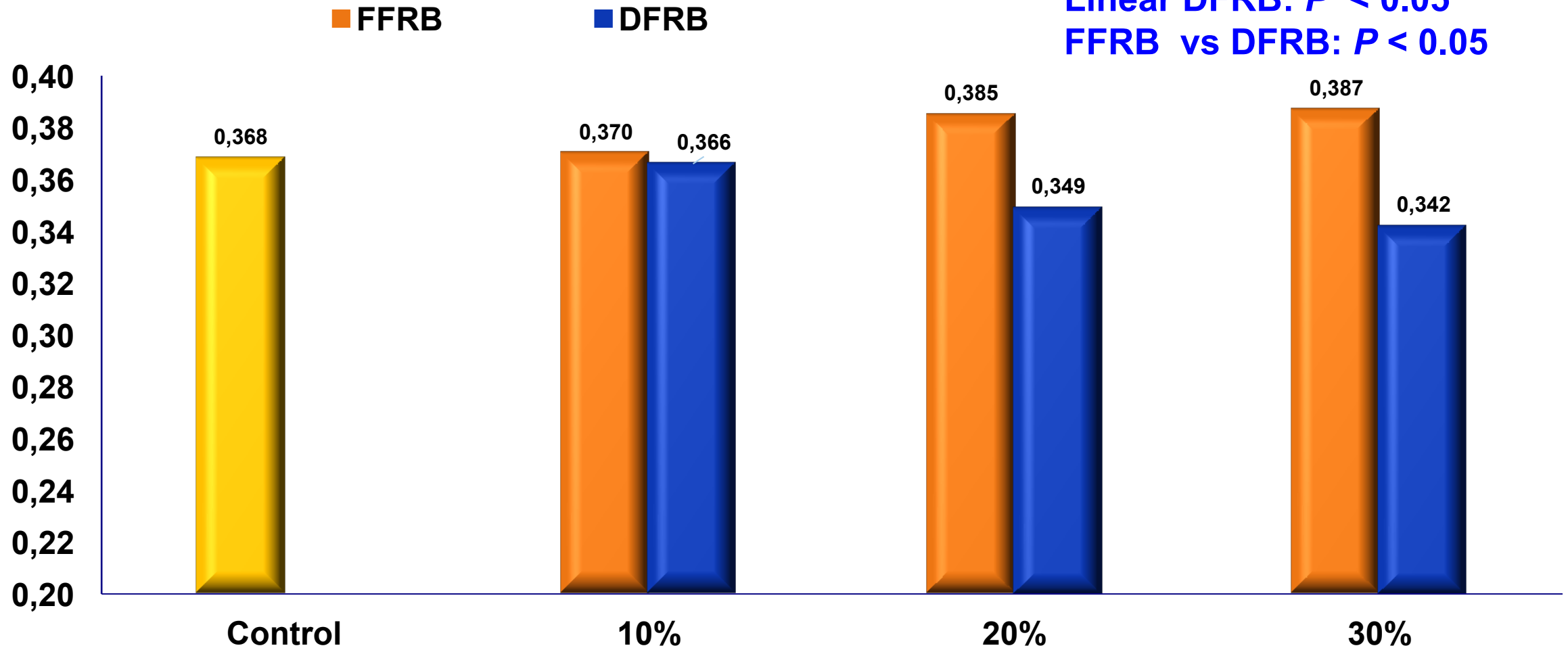
ADG, Grow-finishing pigs, 25 to 125 kg



Casas et al., 2018

G:F, Grow-finish pigs

Linear FFRB : $P < 0.05$
Linear DFRB: $P < 0.05$
FFRB vs DFRB: $P < 0.05$



Casas et al., 2018

Other relevant Co-products

2

Fermented
soybean
products

4

Wheat co-
products

1

High protein
corn products

3

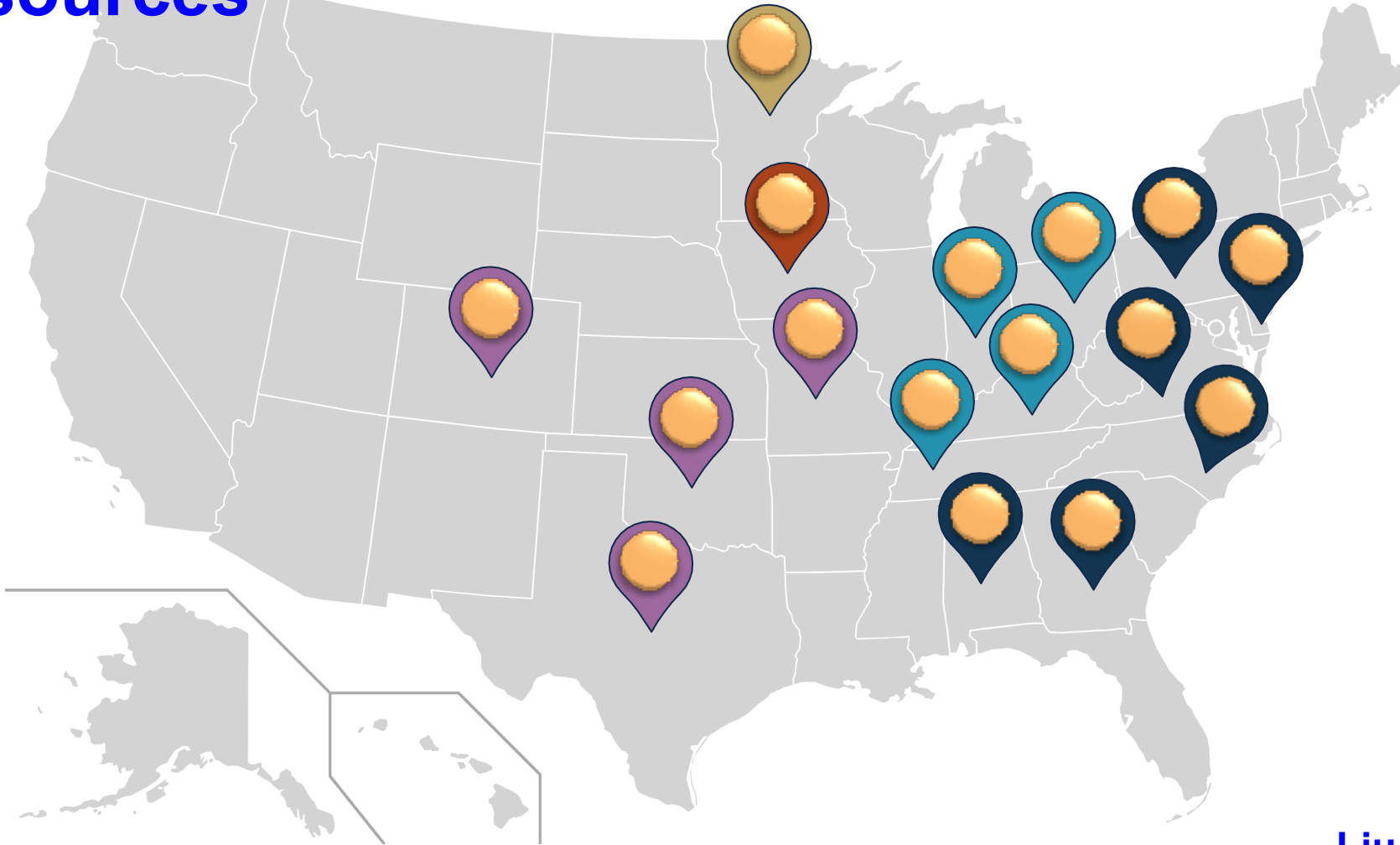
Other oilseed co-
products

Bakery Meal



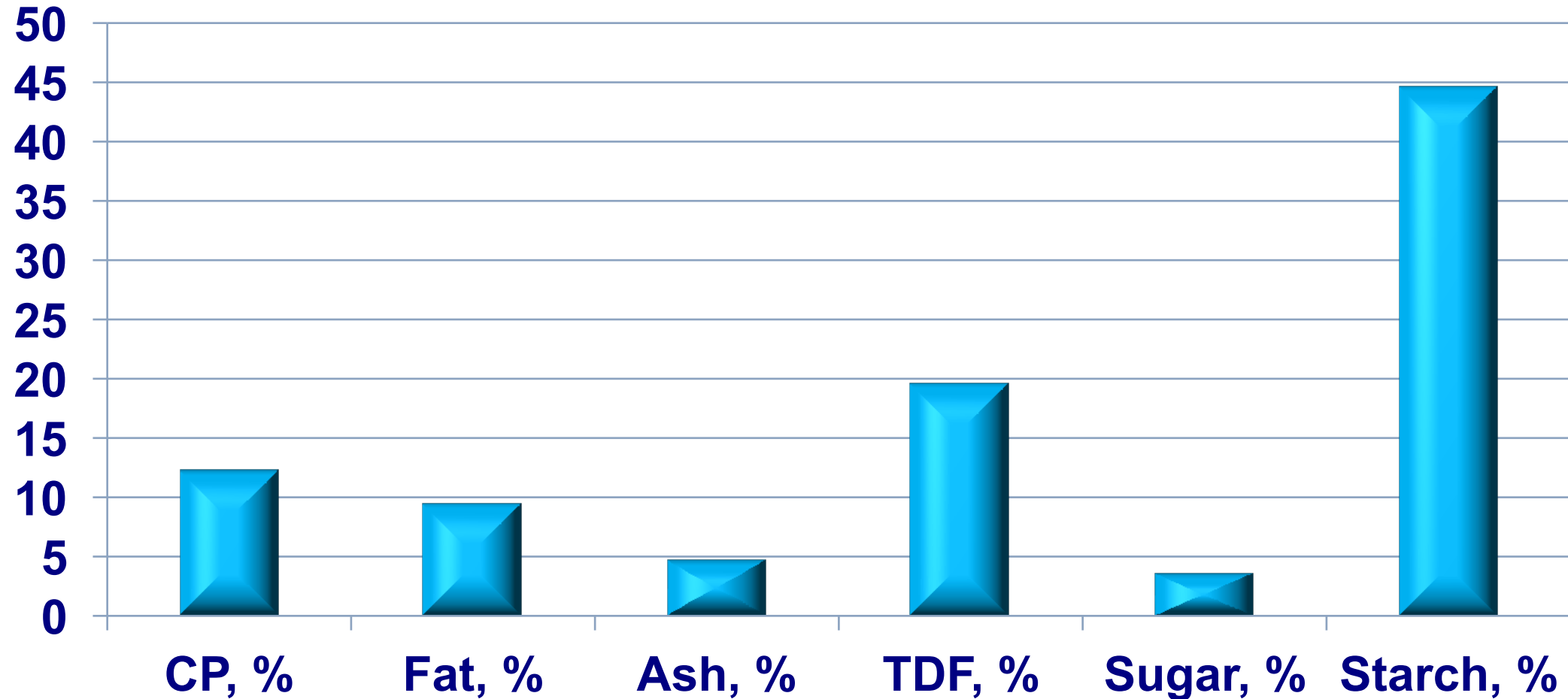
Bakery meal: Chemical Composition

Total: 46 sources



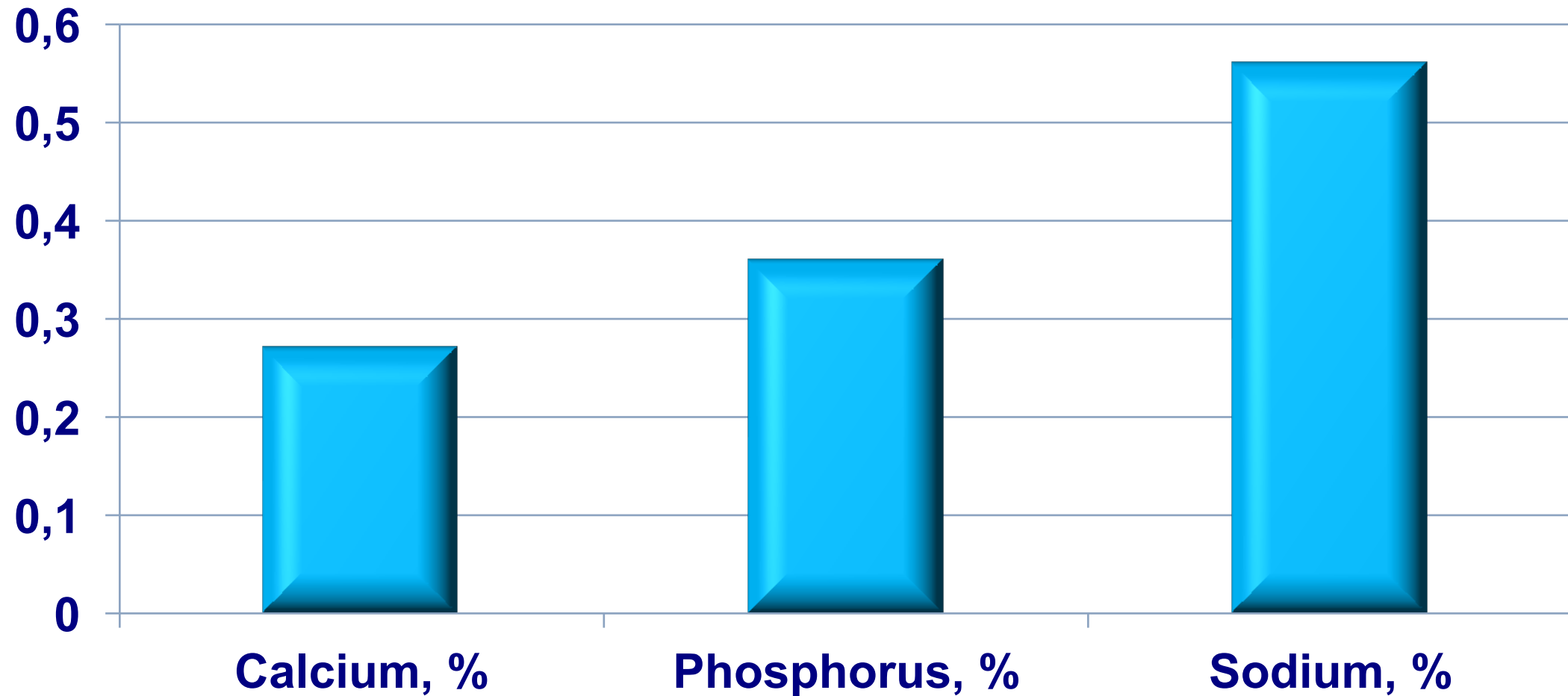
Liu et al., 2018

Bakery meal, Composition



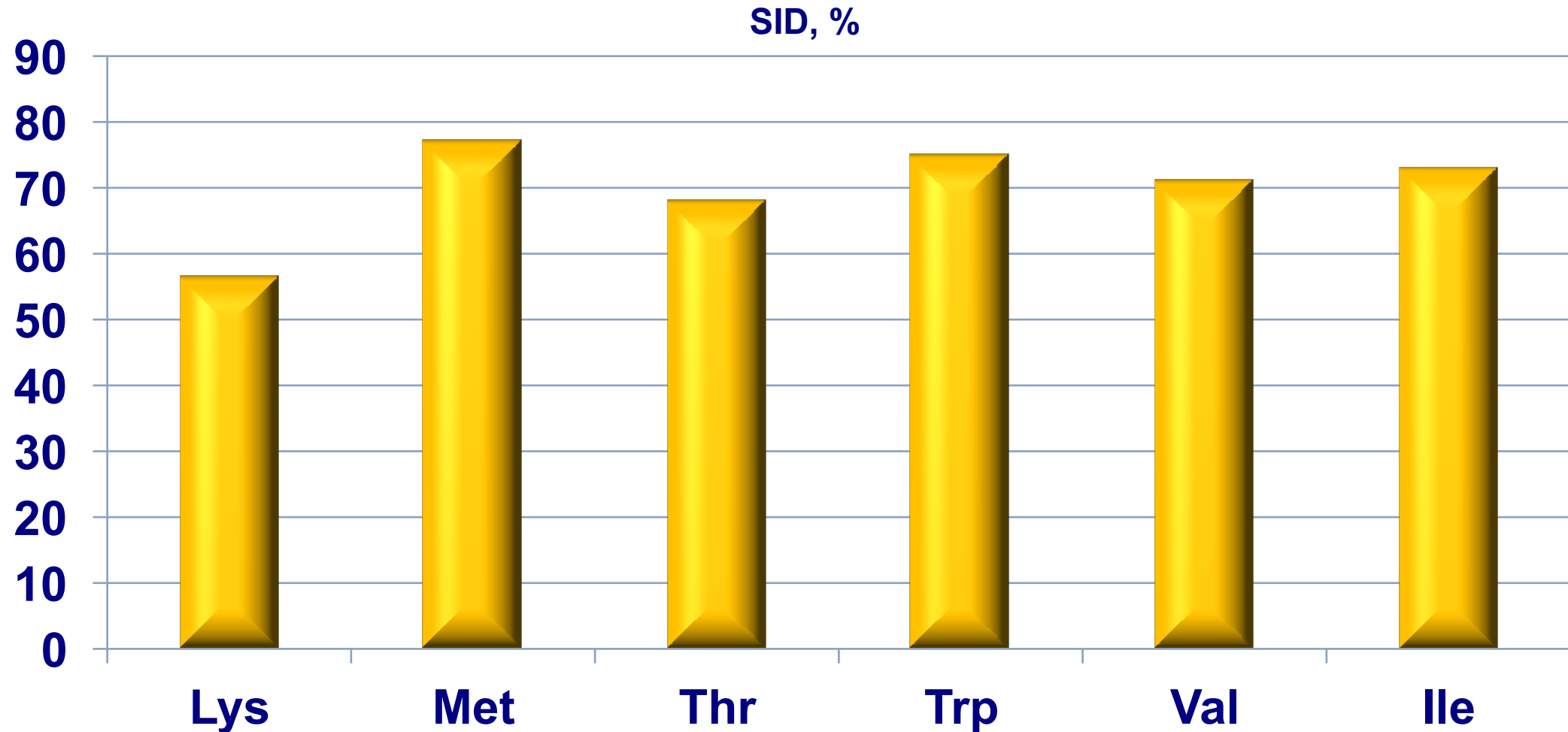
Liu et al., 2018

High conc. of Na in Bakery meal



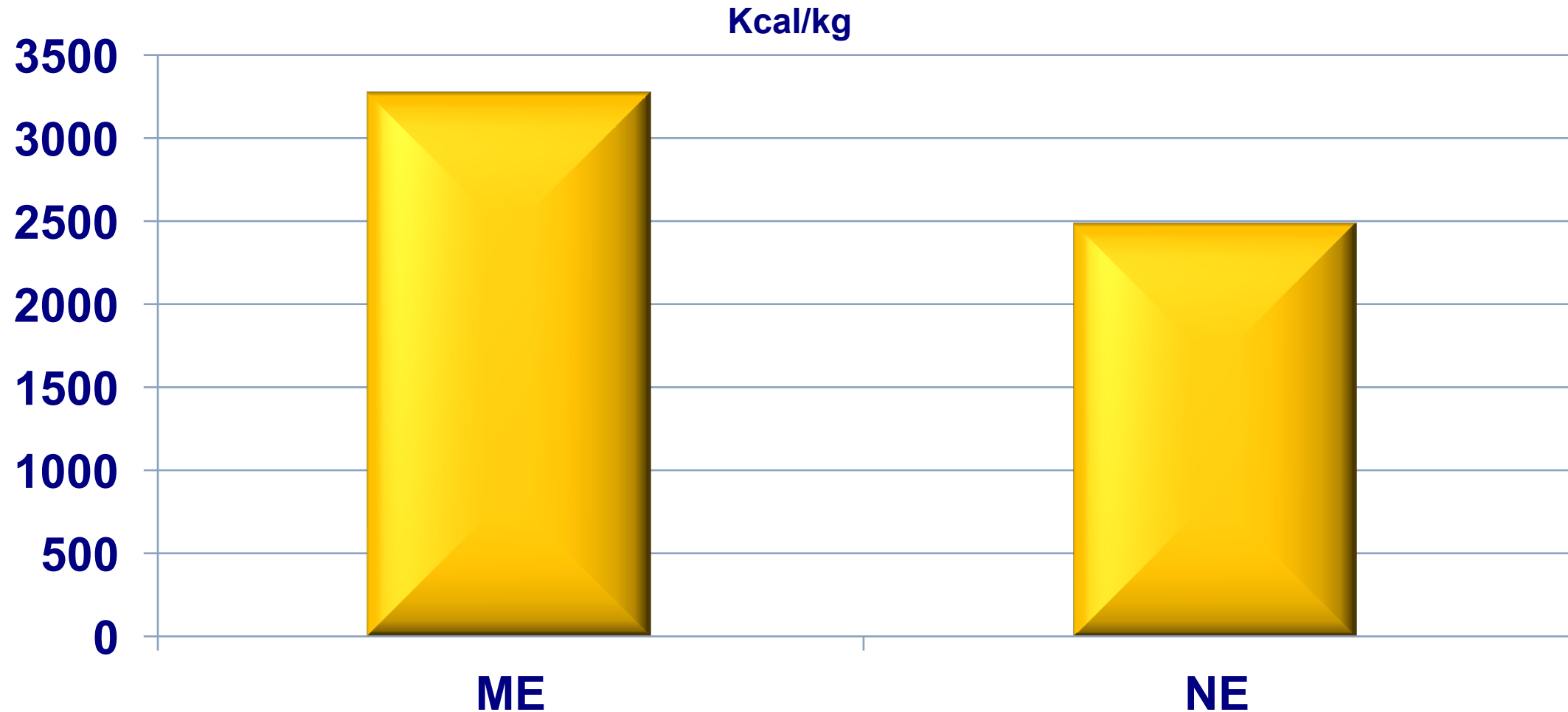
Liu et al., 2018

Bakery meal has low SID (%) of Lys



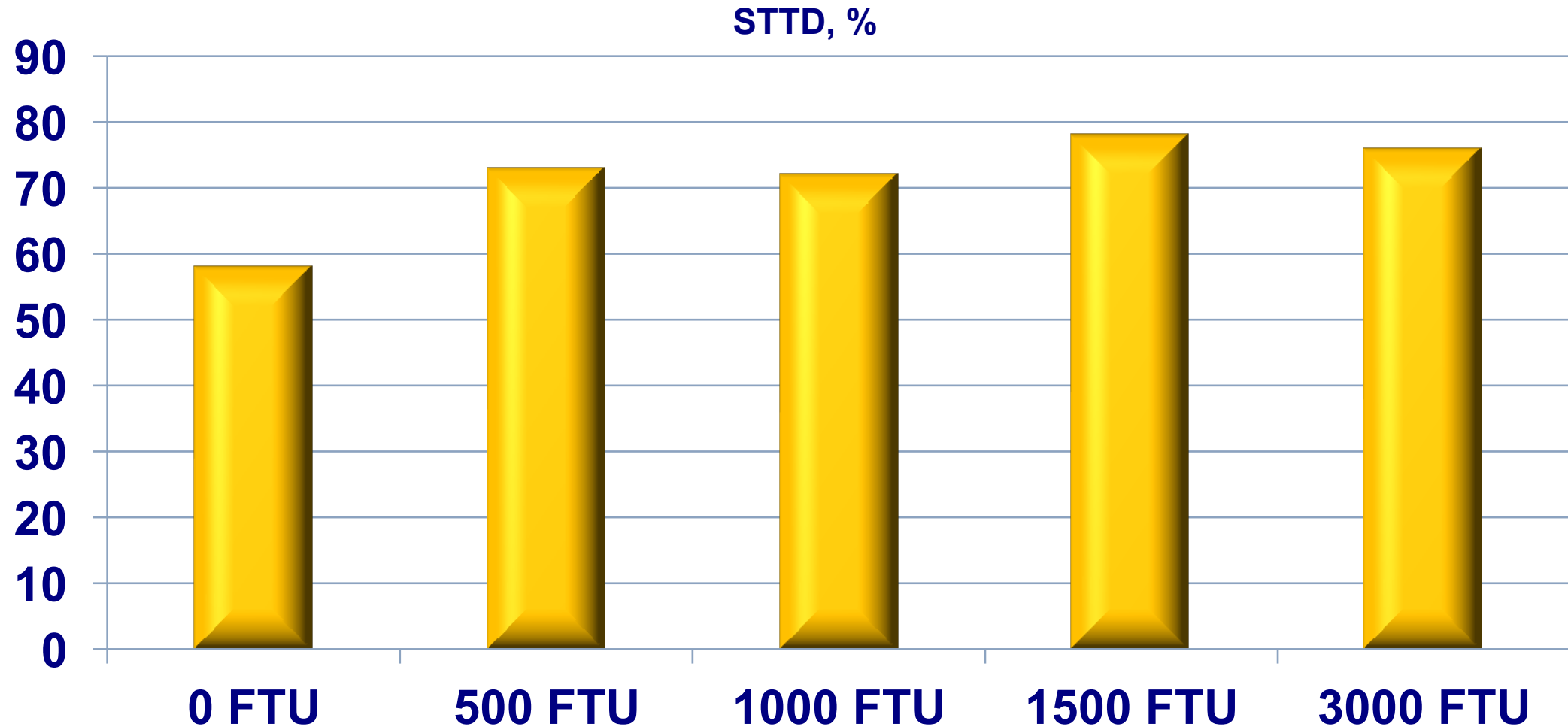
Stein et al., 2023a

Bakery meal, ME and NE, Kcal/kg



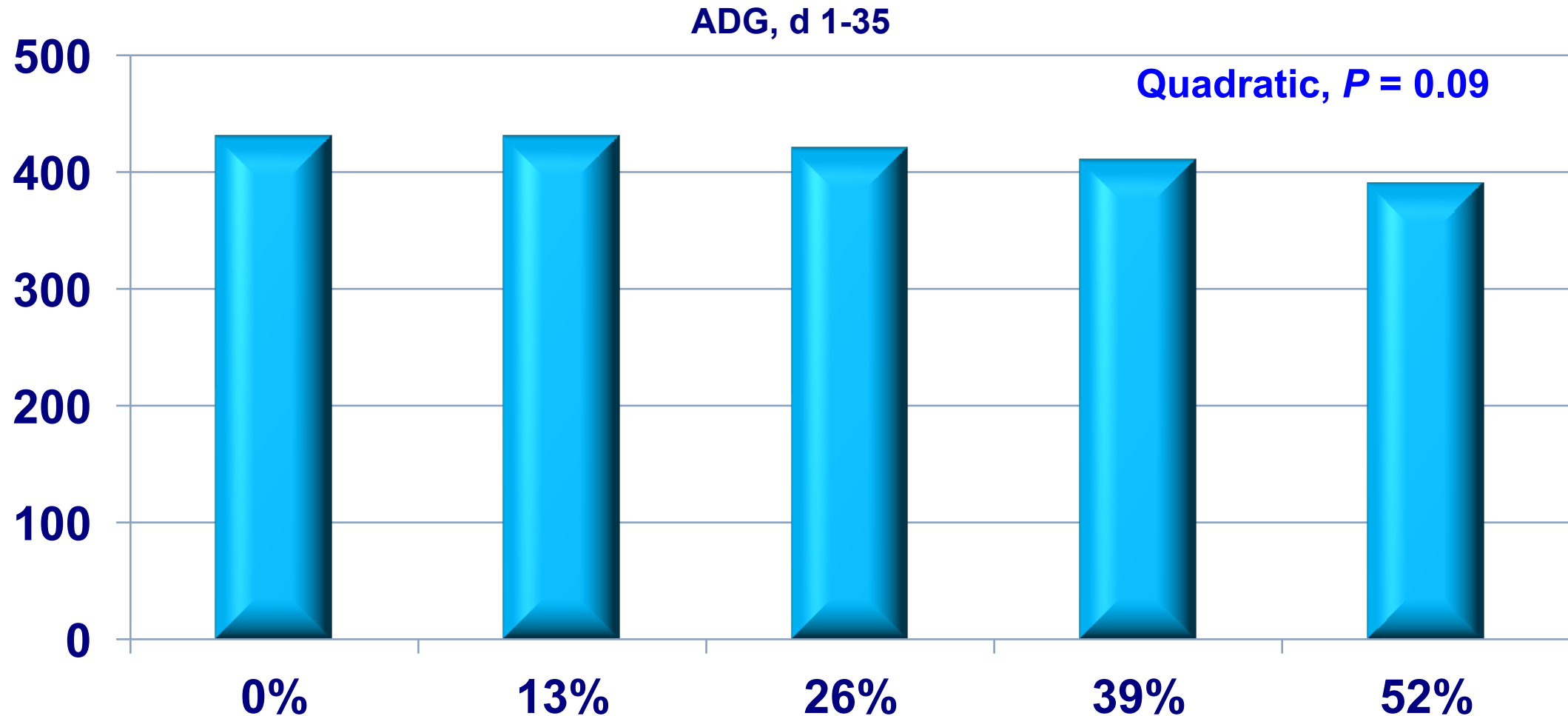
Stein et al., 2023b

Bakery meal, STTD P, %



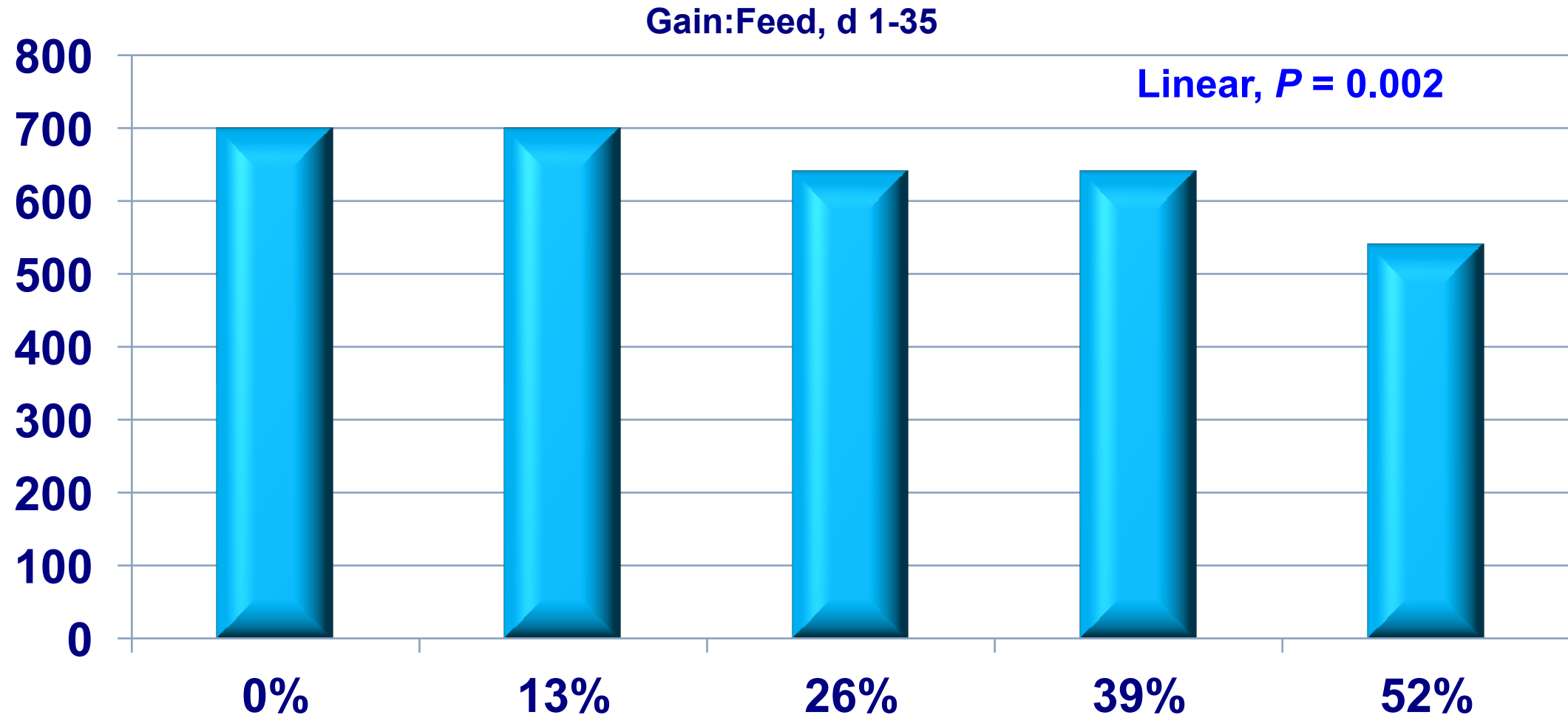
Luciano et al., 2022

Bakery meal for weanling pigs, ADG, g/d



Luciano et al., 2022

Bakery meal for weanling pigs, gain:Feed



Luciano et al., 2022

Other recycled ingredients

2

Blood proteins
incl. blood
plasma

4

Recycled kitchen
left-overs

1

Meat and bone
meal

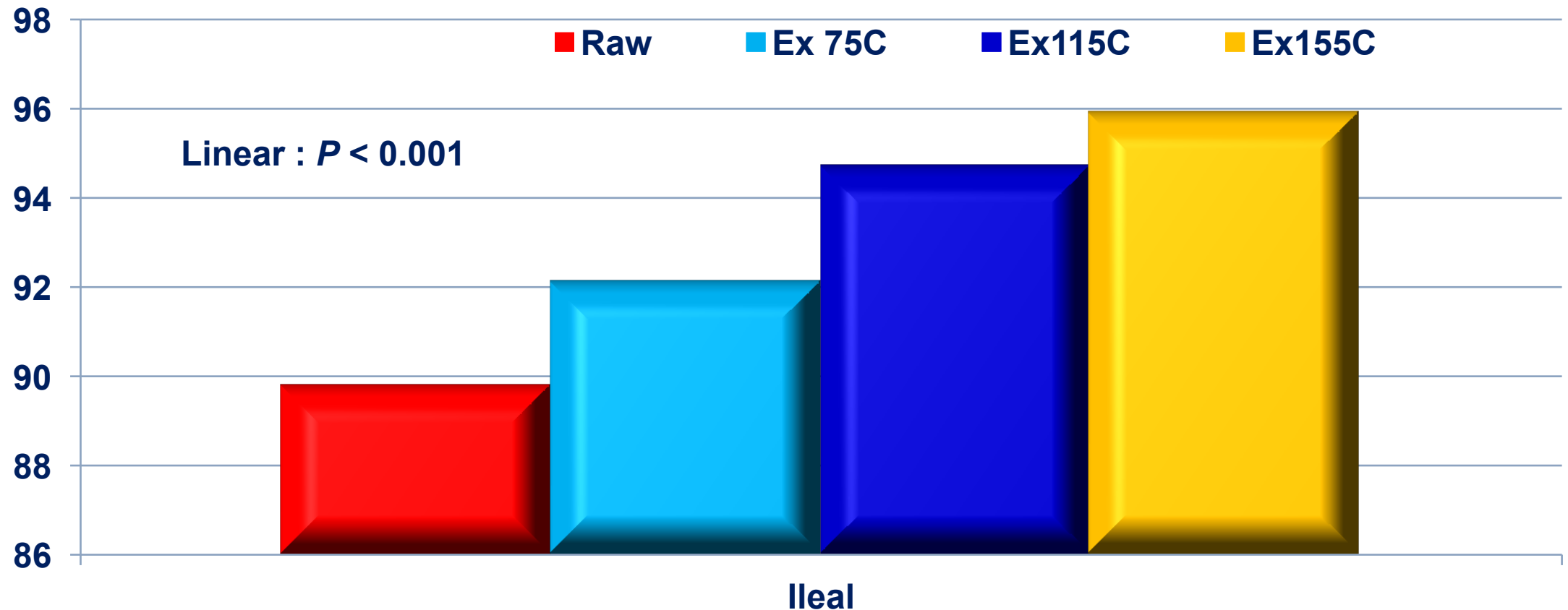
3

Recycled milk
products

Field peas in diets for pigs

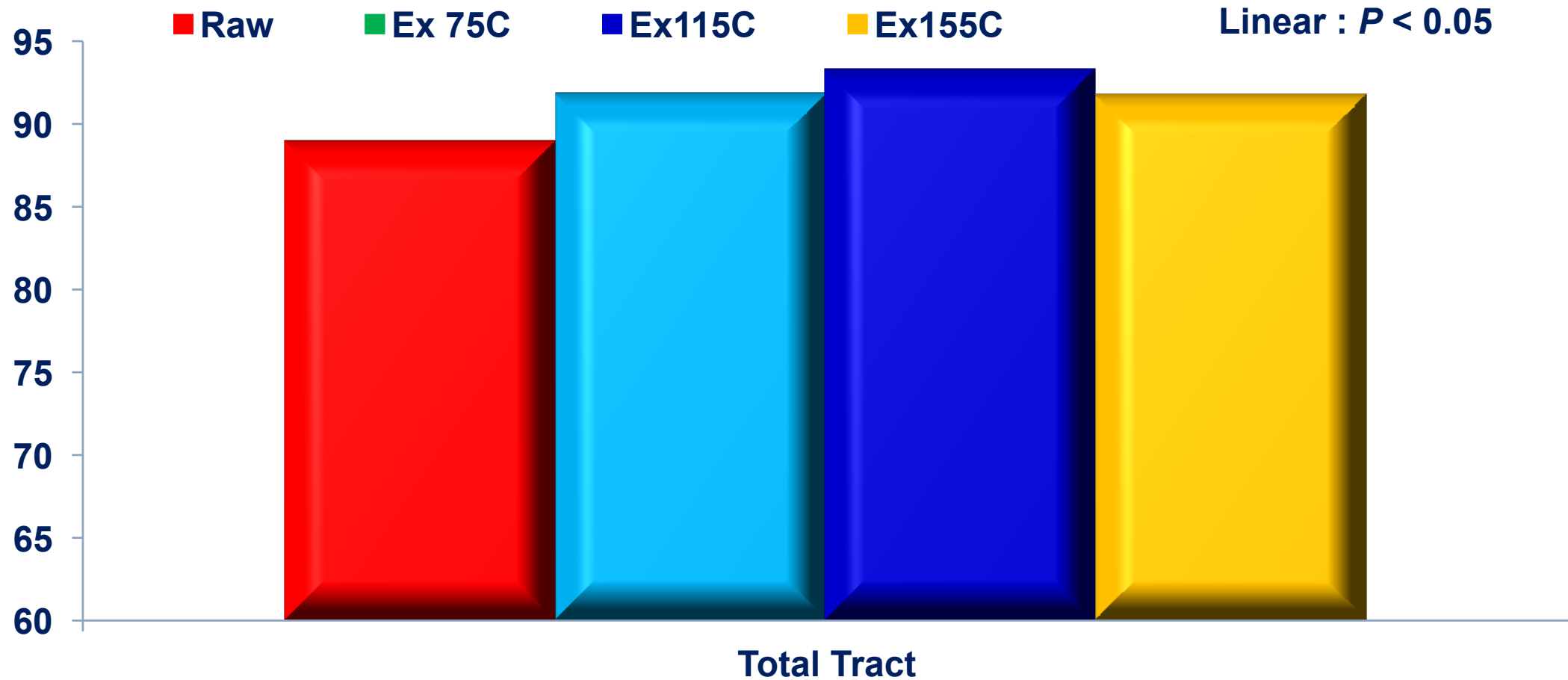


Digestibility of Starch in Extruded Field Peas



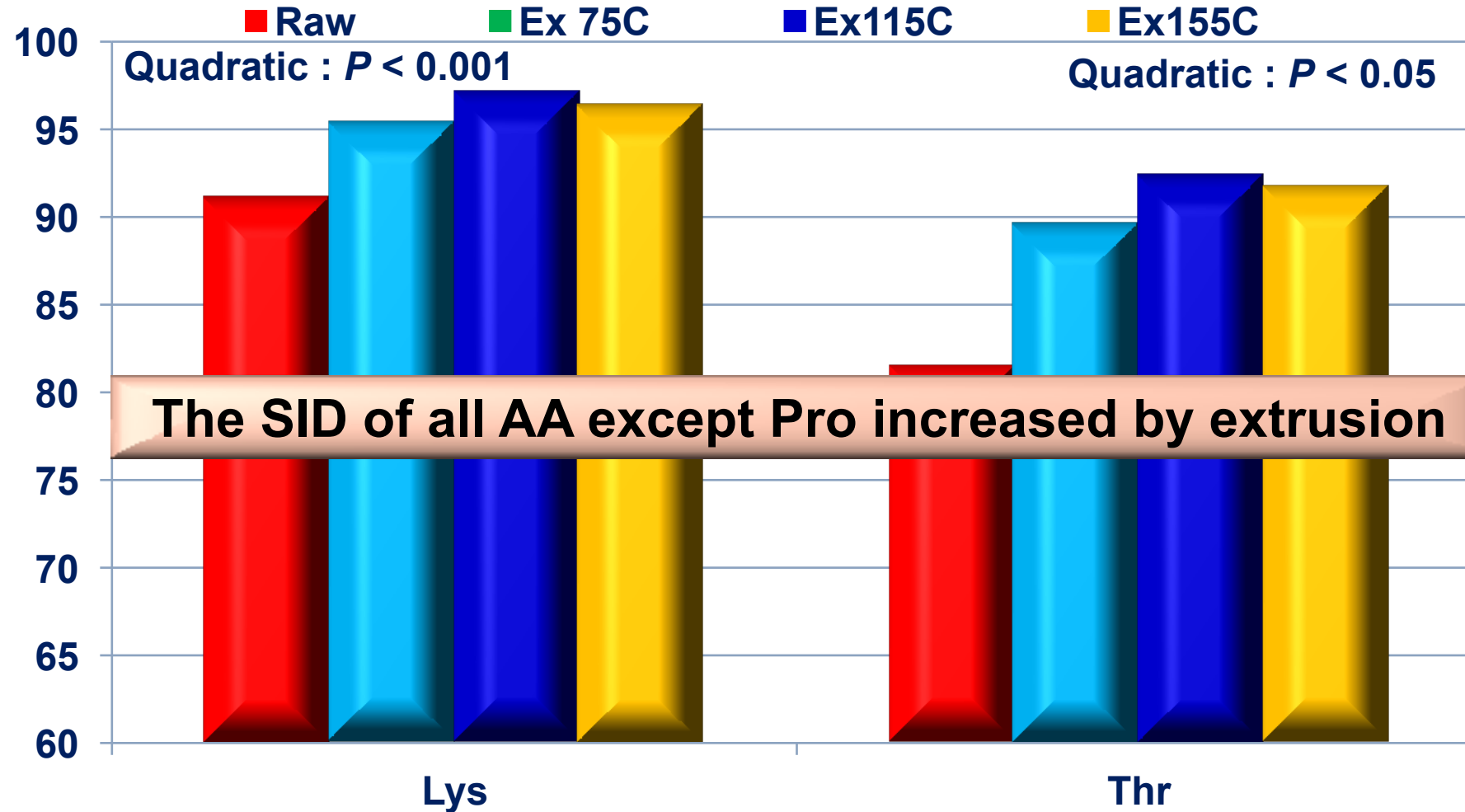
Stein and Bohlke, 2007

Energy Digestibility in Field Peas



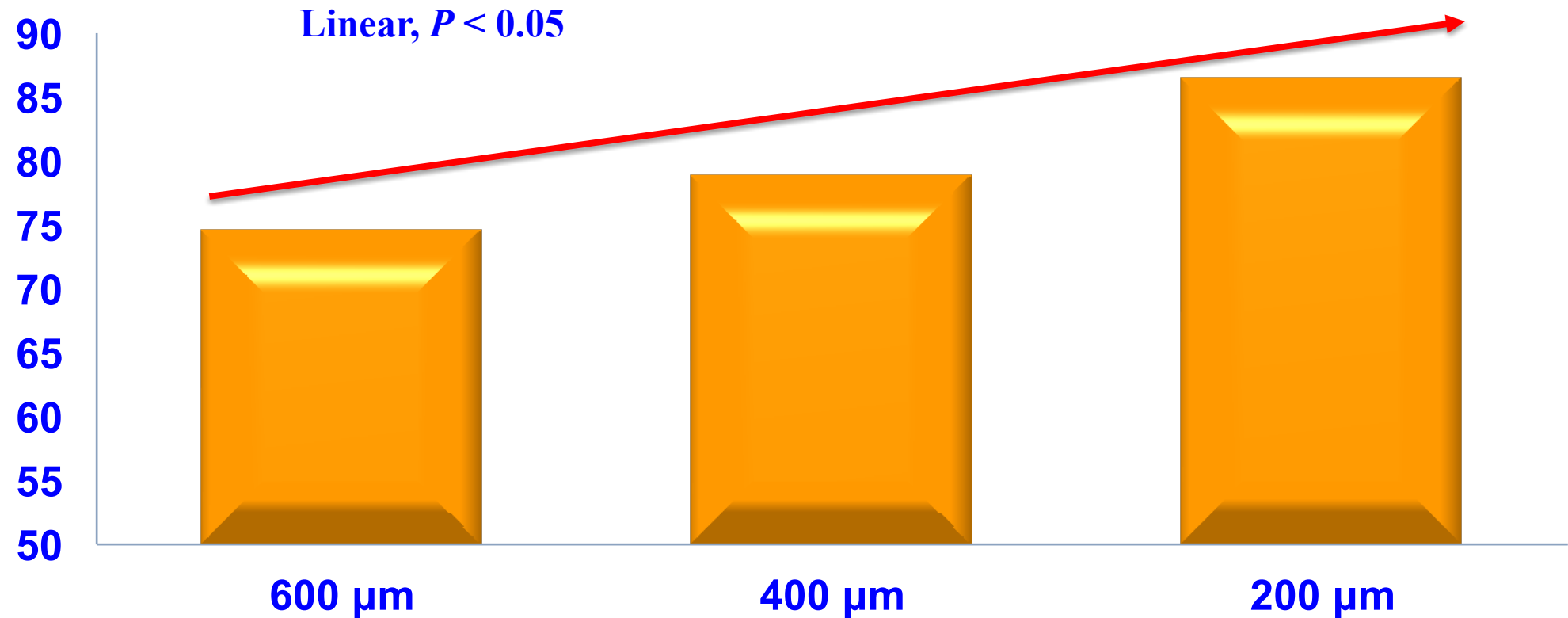
Stein and Bohlke, 2007

SID of AA in Field Peas



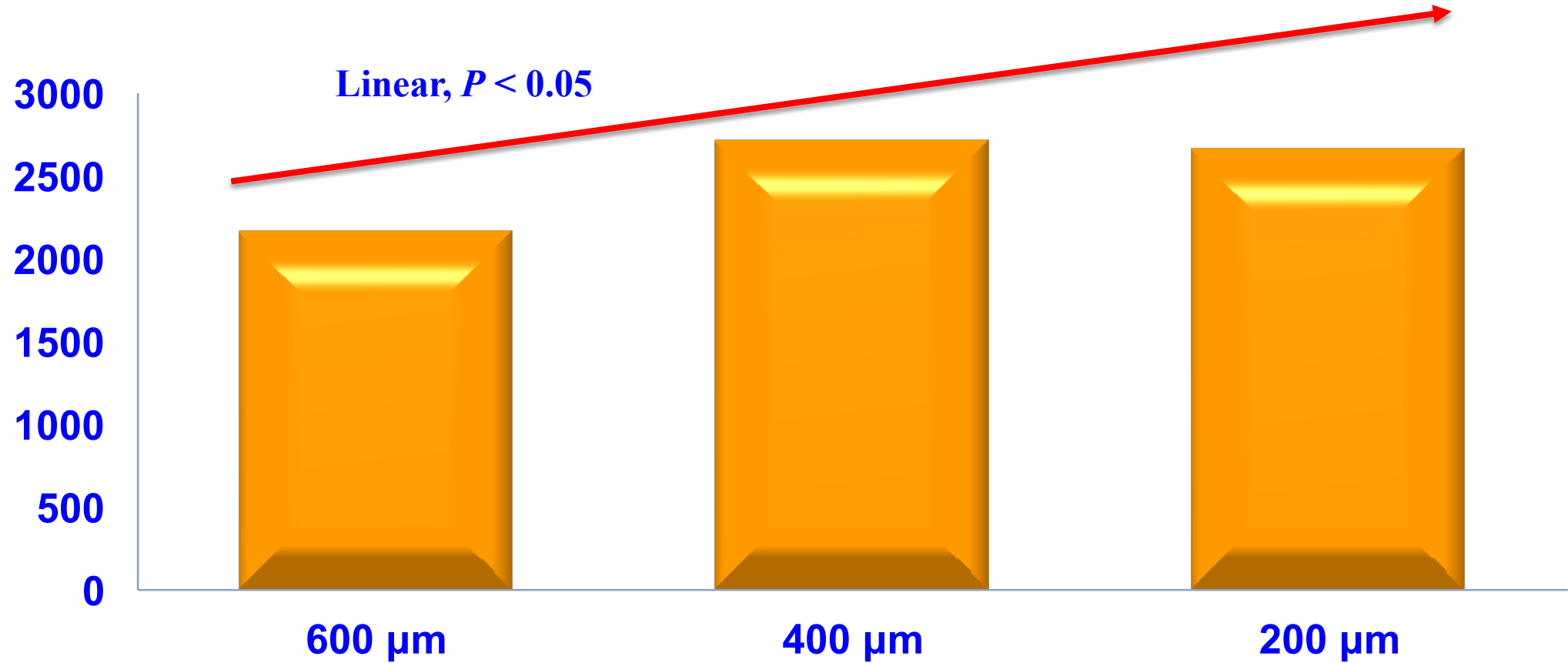
Stein and Bohlke, 2007

Particle size and ATTD of TDF, field peas



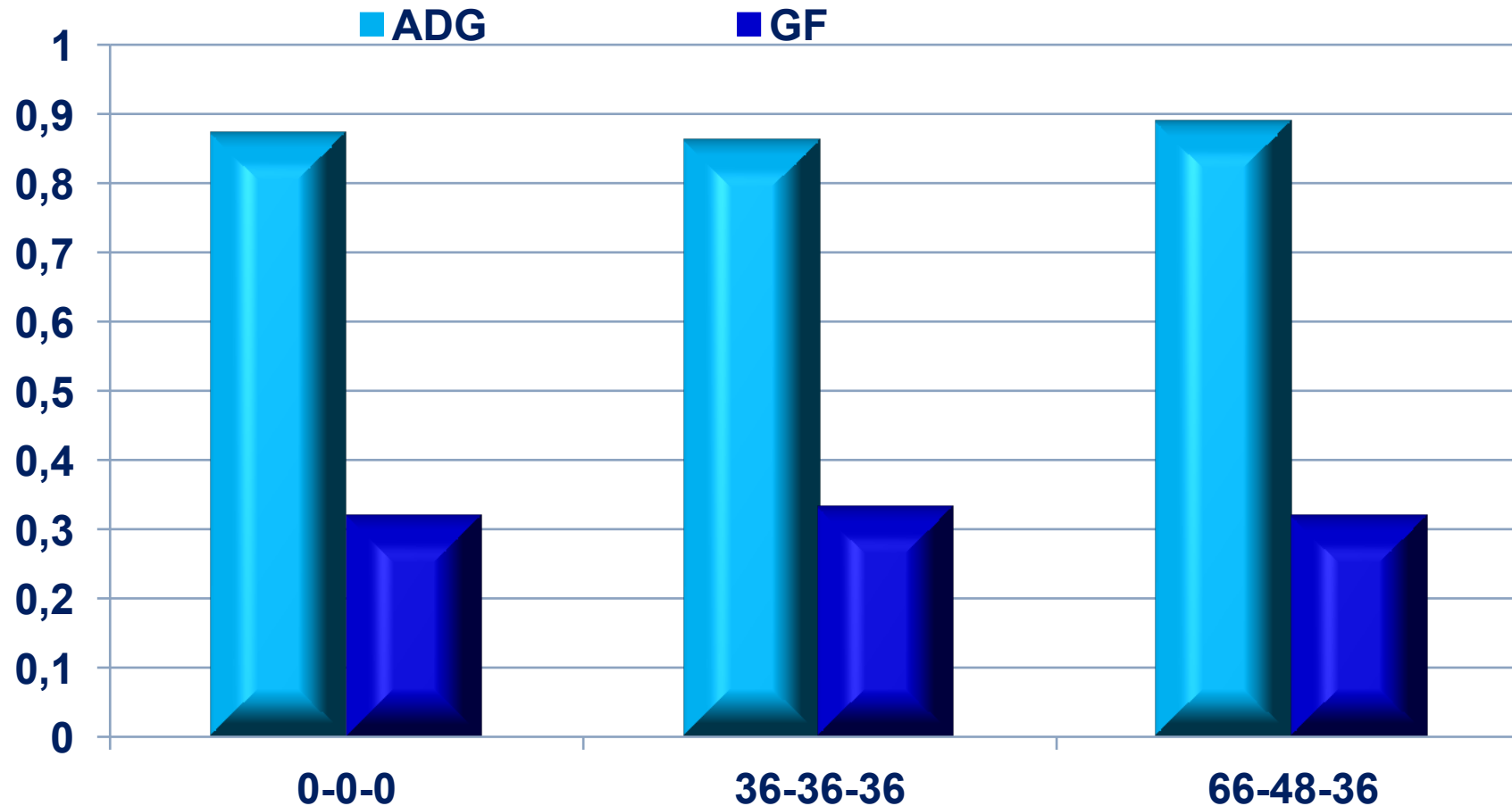
Ibagon, 2023

Particle size and NE, field peas



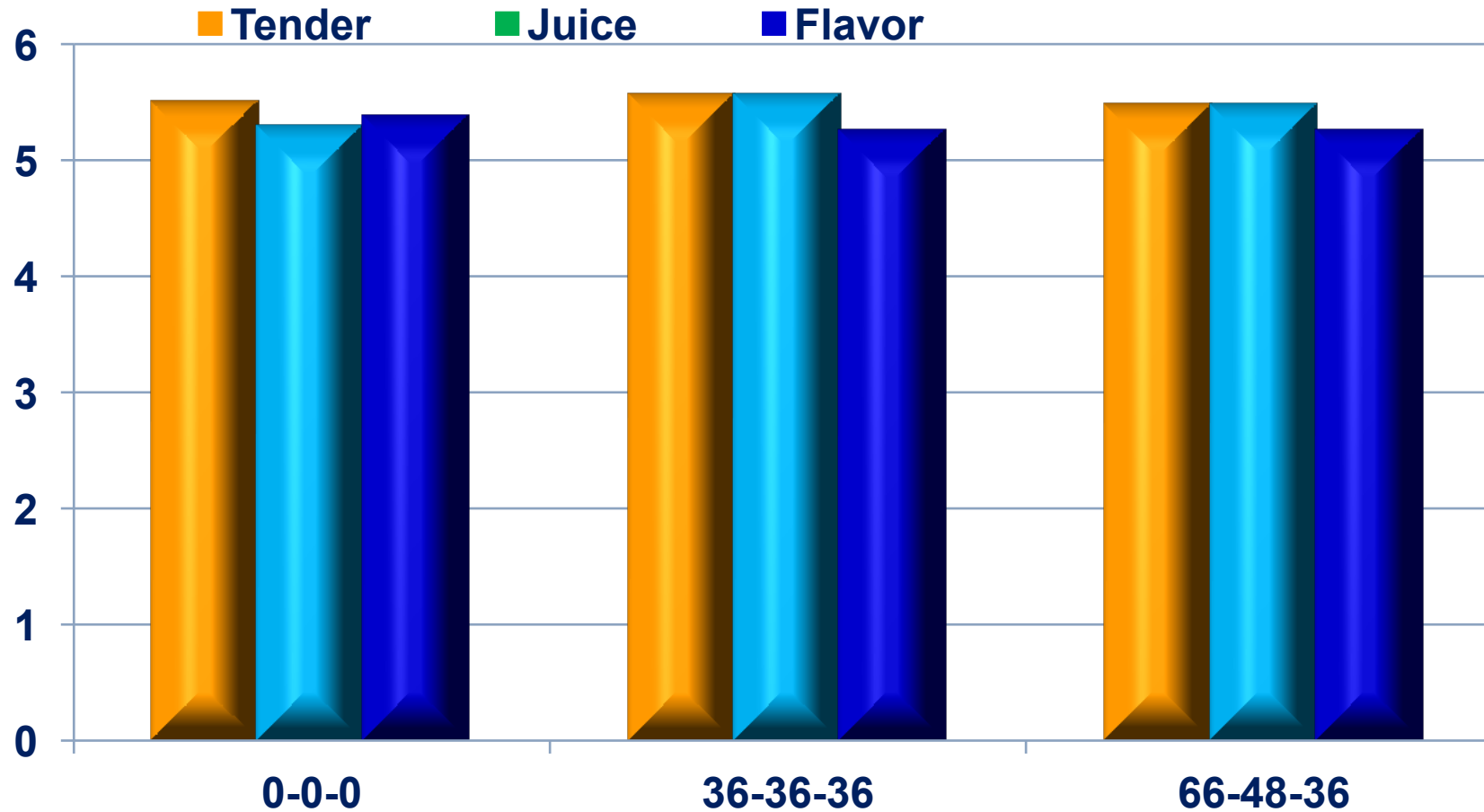
Ibagon, 2023

No impact of Field Peas on growth, 25-120 kg



Stein et al., 2006

No impact of Field Peas on pork chop palatability



Stein et al., 2006

Other alternative intact ingredients

2

Casava meal

4

High oil corn

1

Faba beans and
lupins

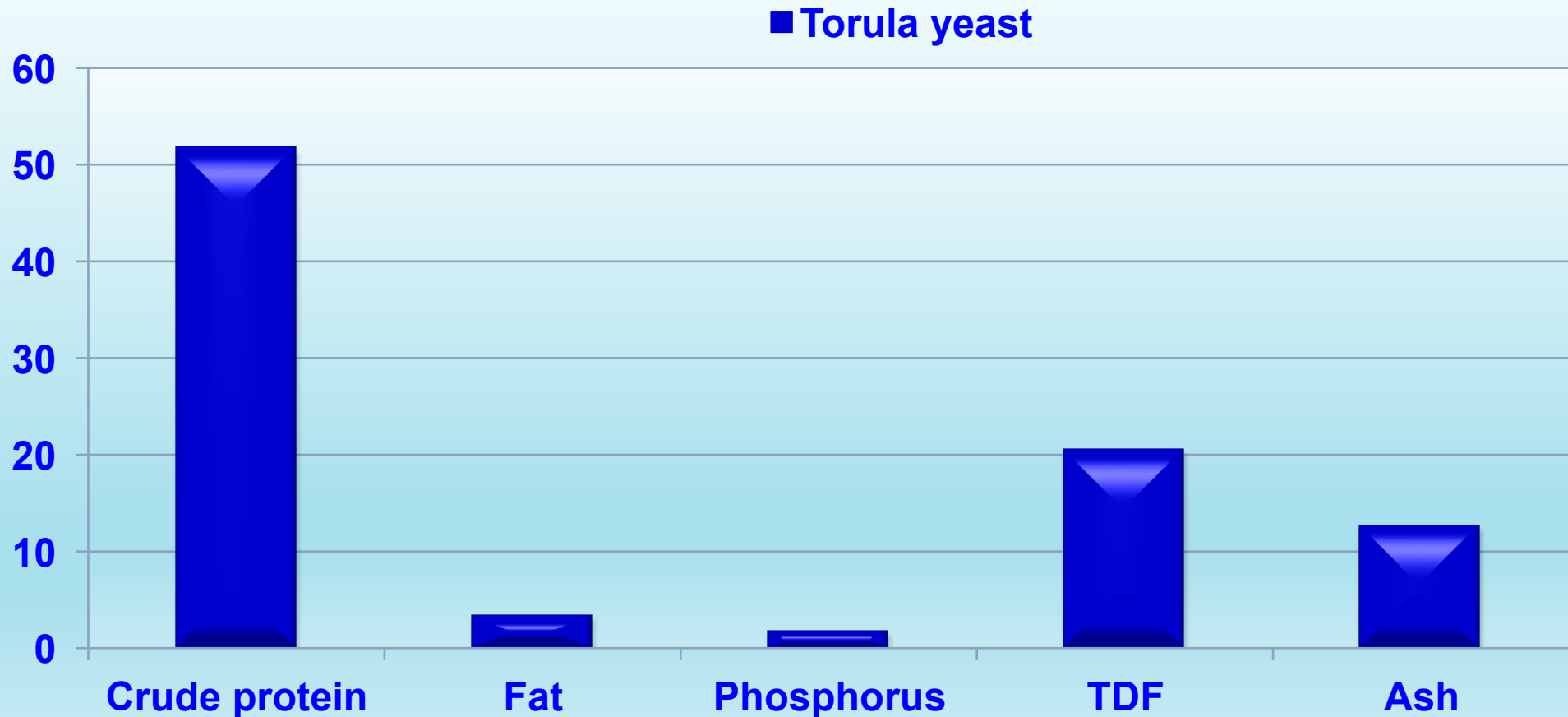
3

Hybrid Rye

Yeast in diets for weanling pigs

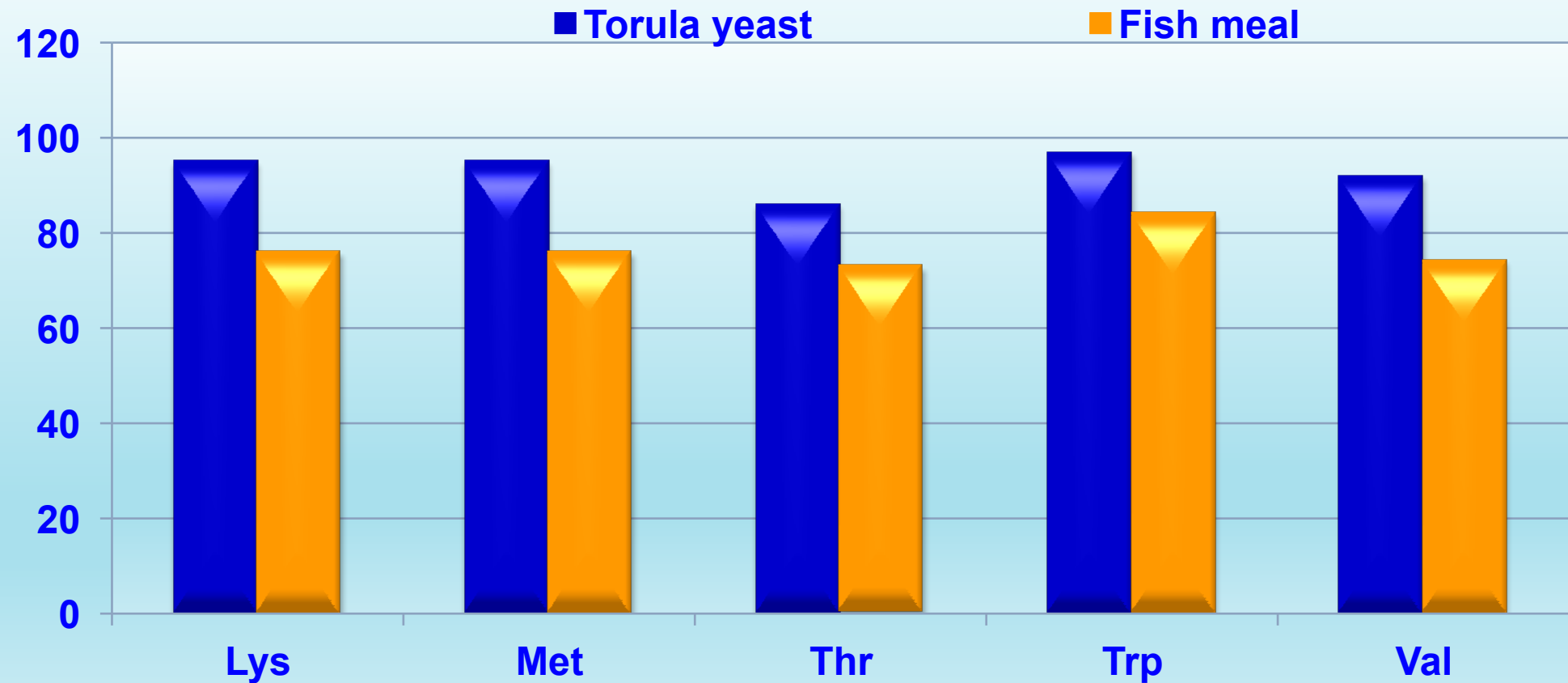


Yeast, chemical composition, %



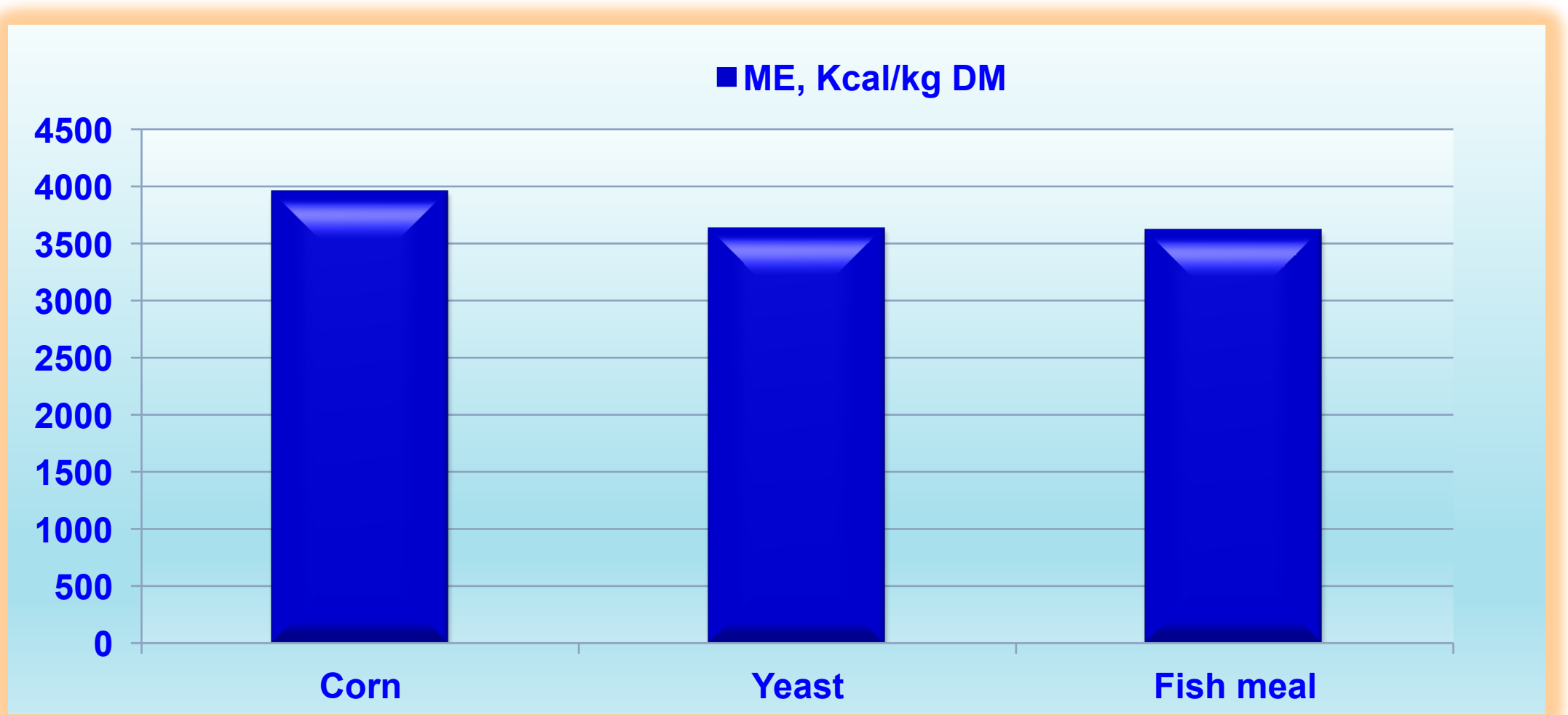
Lagos and Stein, 2020

SID AA, Yeast and fish meal, %



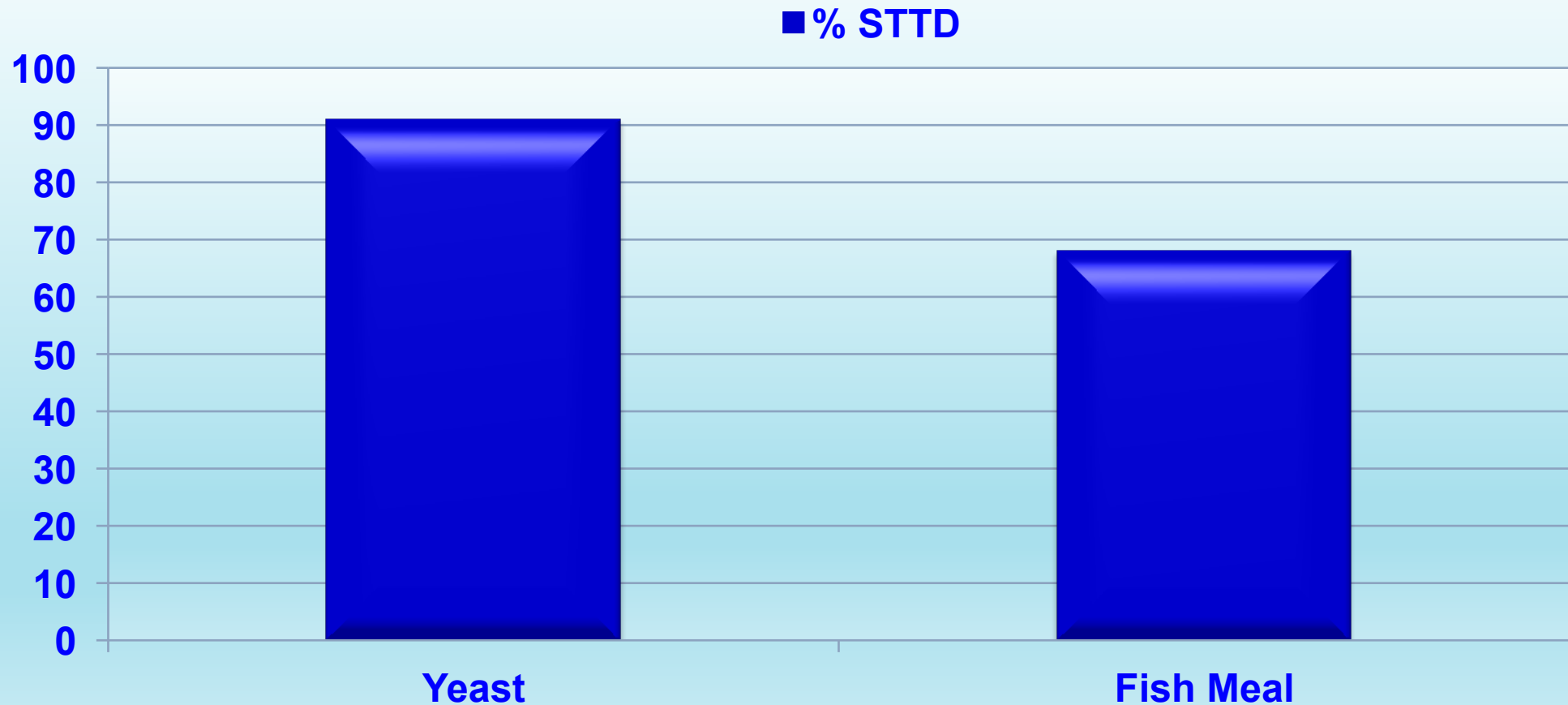
Lagos and Stein, 2020

ME in torula yeast and fish meal, %



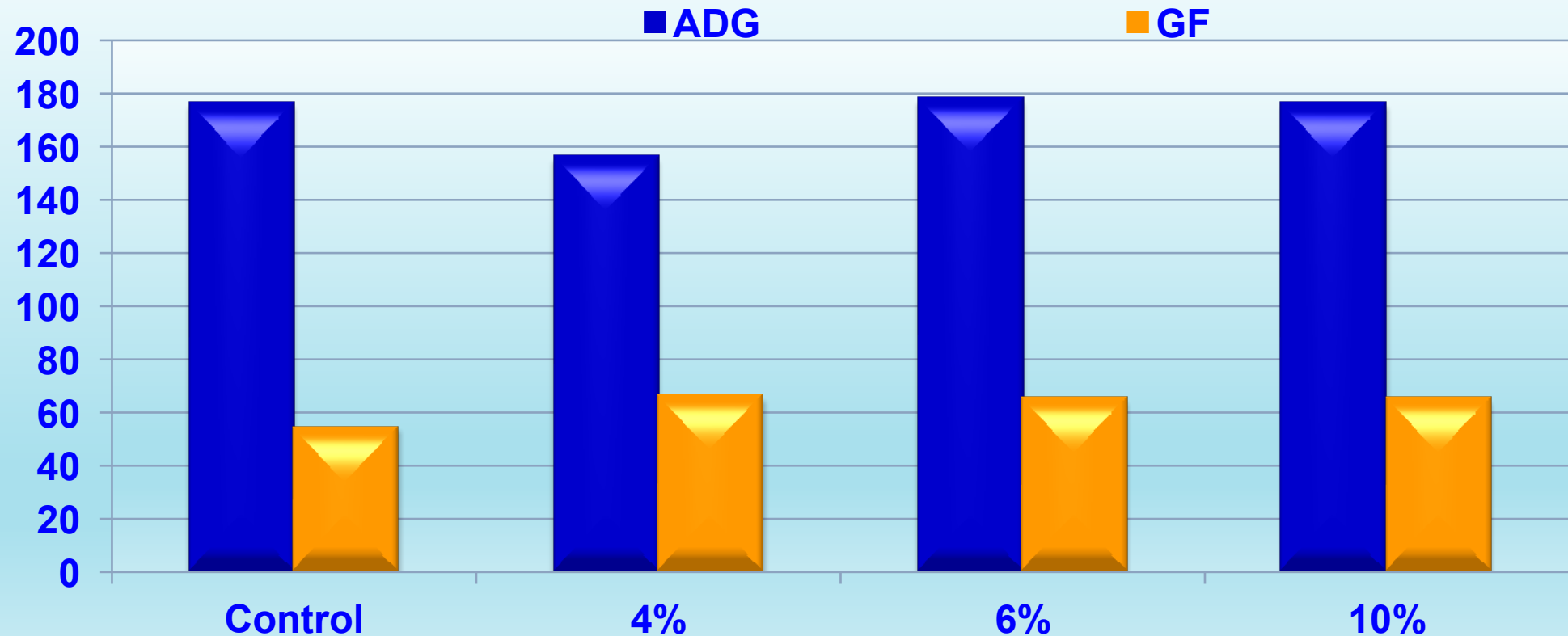
Lagos and Stein, 2020

STTD of P in torula yeast and fish meal, %



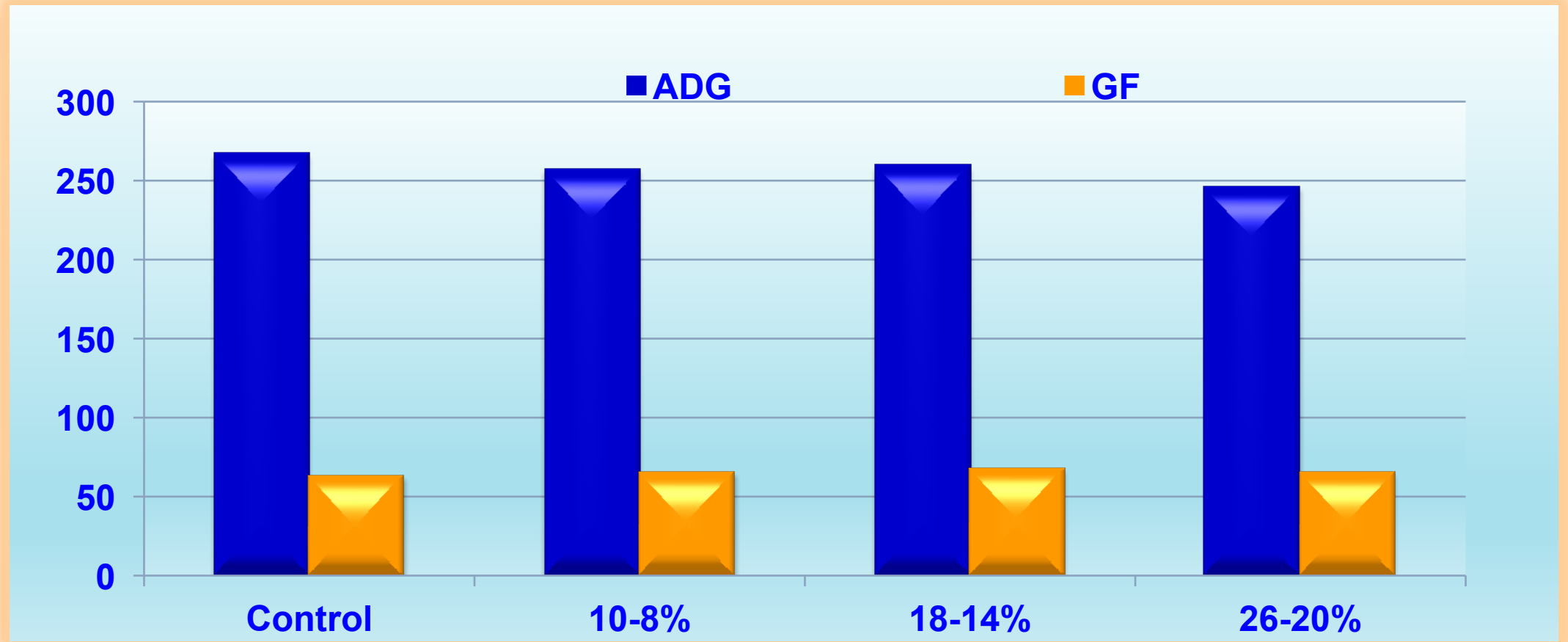
Lagos and Stein, 2020

Growth performance, d 1-14, not changed by yeast



Espinosa et al., 2020

Growth performance, d 1-28, not changed by yeast



Espinosa et al., 2020

Other new protein sources

2

Seaweed –
macro algae

4

Processed soy
protein

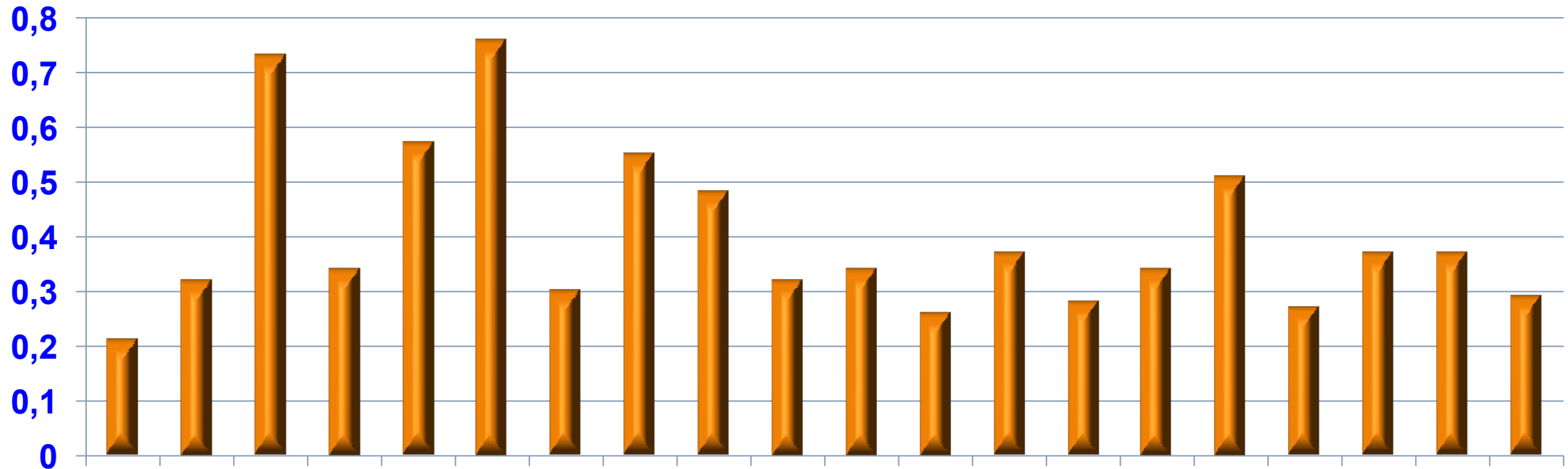
1

Insect meal

3

Potato protein

Consistency of composition: Ca in Soybean meal (%)



Sotak-Peper et al., 2016

Conclusions, Alternative ingredients

**Many
alternative
ingredients
available**

**Important
to
determine
nutritional
value**

**Consistency
always a
concern**

**Awareness
of minerals
and ANF
needed**

Perspectives

**Pigs need nutrients,
Not ingredients**

**The science of feed
ingredient
evaluation important**

**Money to be made
with correct use of
ingredients**

***Alternative
ingredients
for pigs***



Thank you for your attention



<http://nutrition.ansci.illinois.edu>