UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Standardized total tract digestibility of calcium in growing pigs

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OUTLINE

- **Background**
- Endogenous losses of Ca
- Site of absorption of Ca
- Factors that affect digestibility of Ca

Ca:P ratio

- Absorption and retention of Ca and P are influenced by Ca:P ratio

  Total Ca: total P between 1:1 and 1.25:1
  Total Ca: STTD of P between 2:1 and 3:1

No STTD of Ca

Crenshaw, 2001; NRC, 2012.

Apparent total tract digestibility (ATTD)

Endogenous losses

Standardized total tract digestibility (STTD)

True total tract digestibility (TTTD)

OUTLINE

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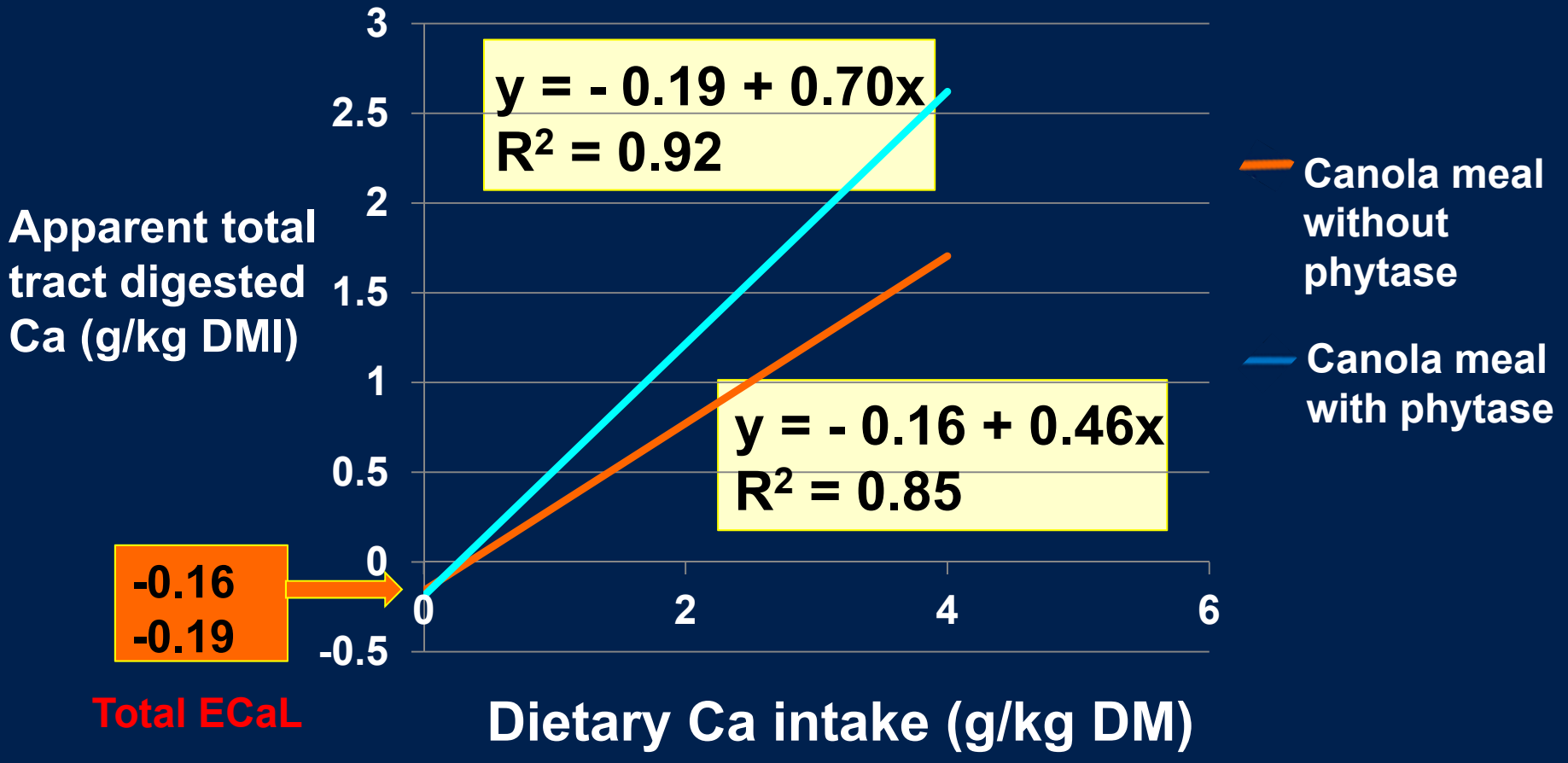
- Factors that affect digestibility of Ca

Regression method



OUTLINE

- Background
- Endogenous losses of Ca
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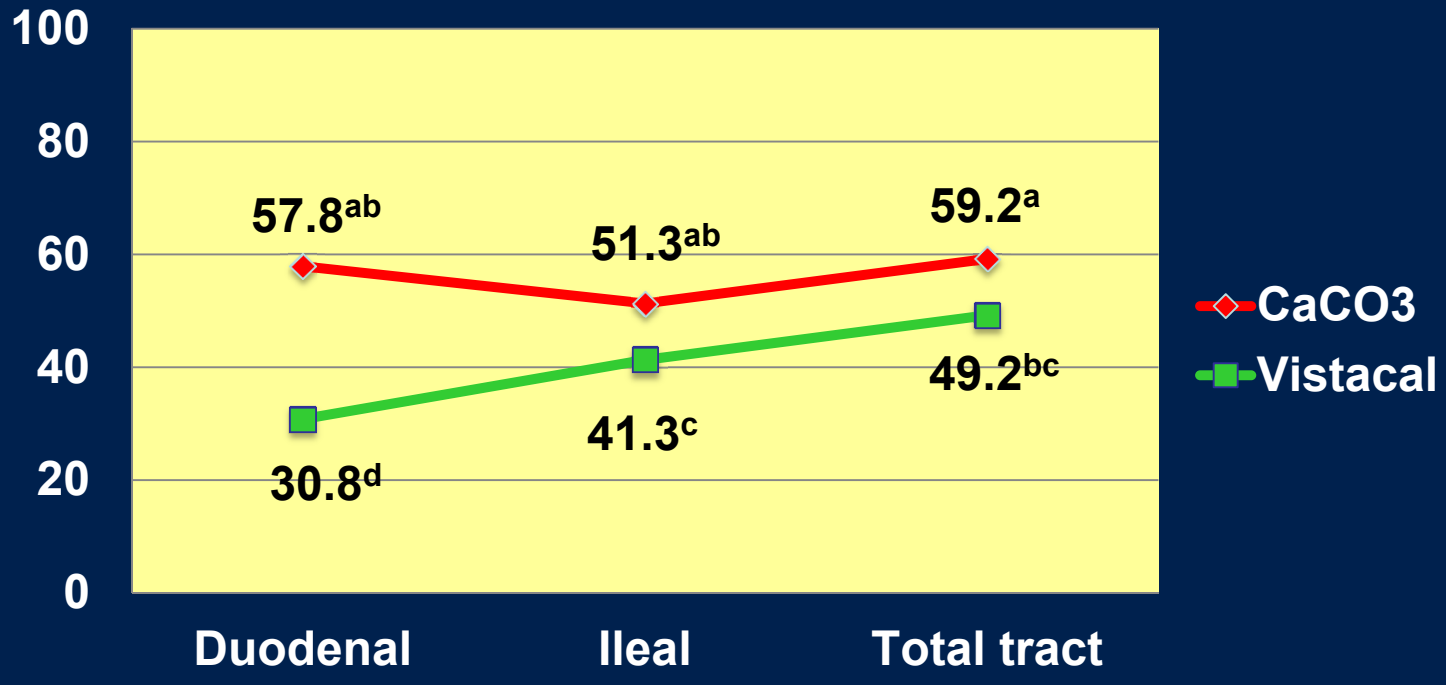
- Factors that affect digestibility of Ca

Standardized digestibility of Ca, %

Ca source × site of absorption: $P < 0.01$



OUTLINE

- Background
- Endogenous losses of Ca
- Site of absorption of Ca
- **Factors that affect digestibility of Ca**

Factors:

Ca level	**Phytase**
Fiber	**Fat**

Digestibility of Ca

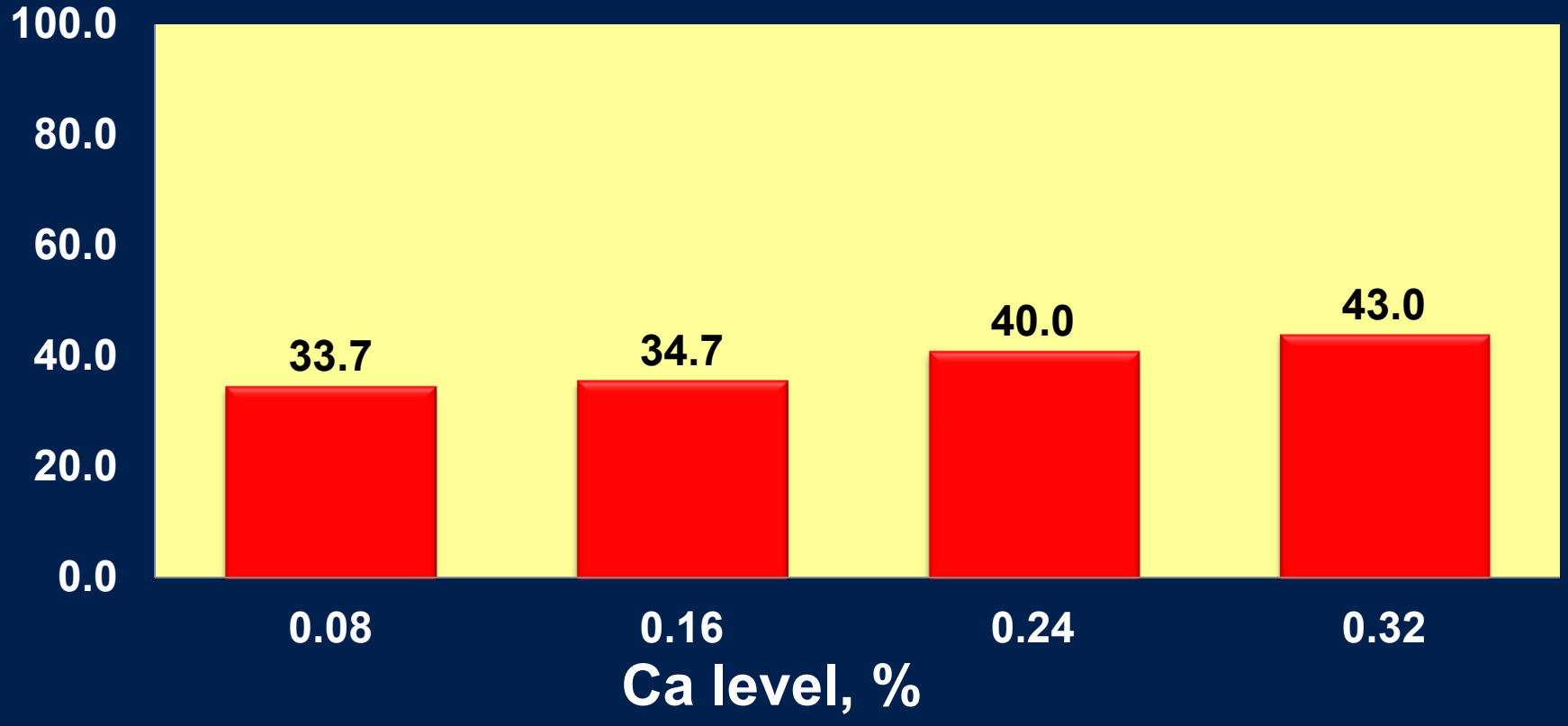
Factors:

Ca level	**Phytase**
Fiber	**Fat**

Digestibility of Ca

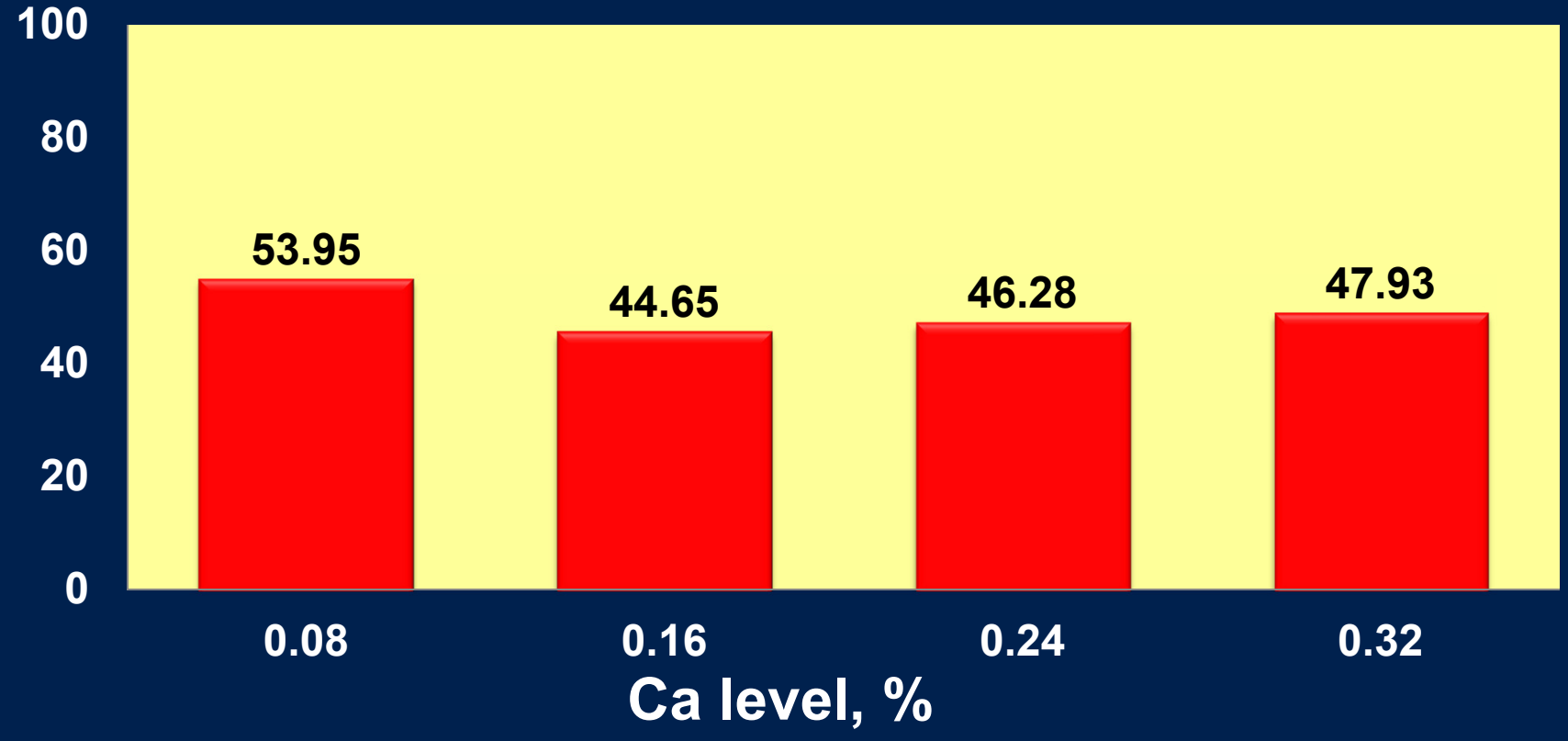
ATTD of Ca, %

Ca level: *P* <0.05



TTTD of Ca, %

Ca level: *P* = 0.86



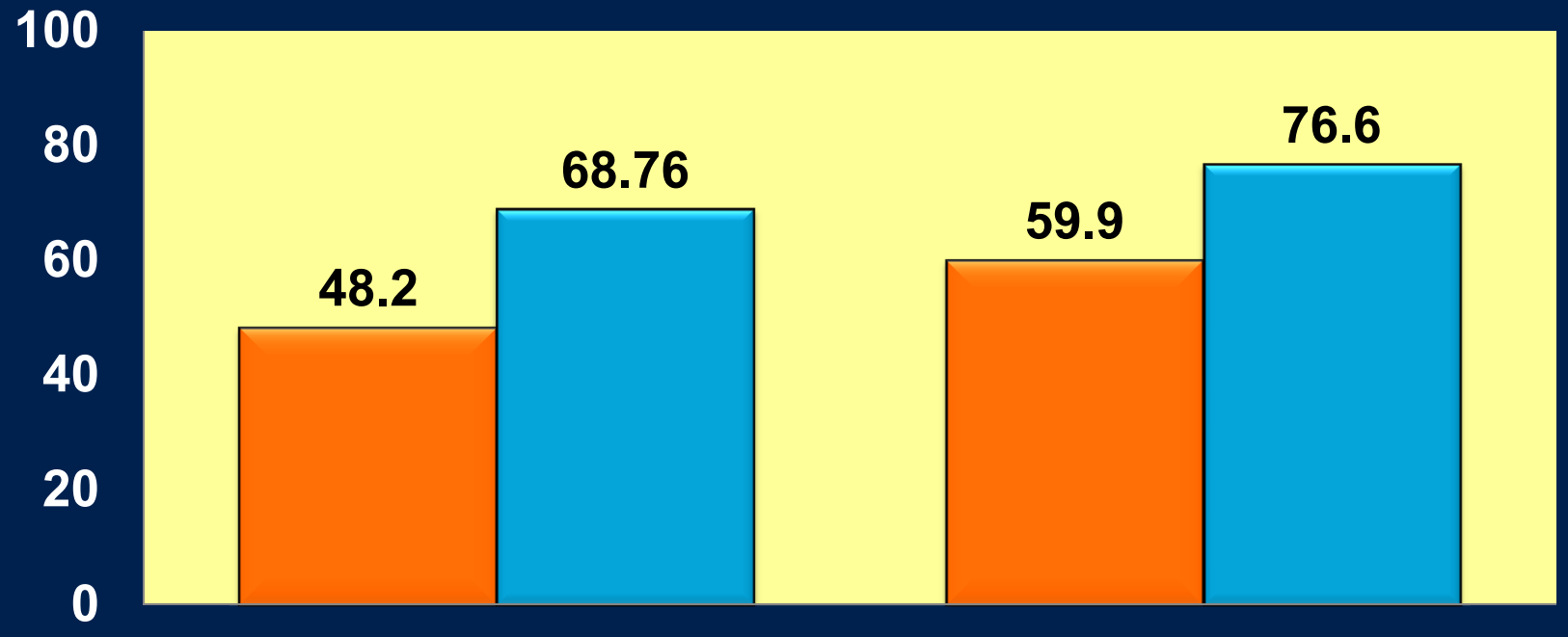
Factors:

Ca level	Phytase
Fiber	Fat

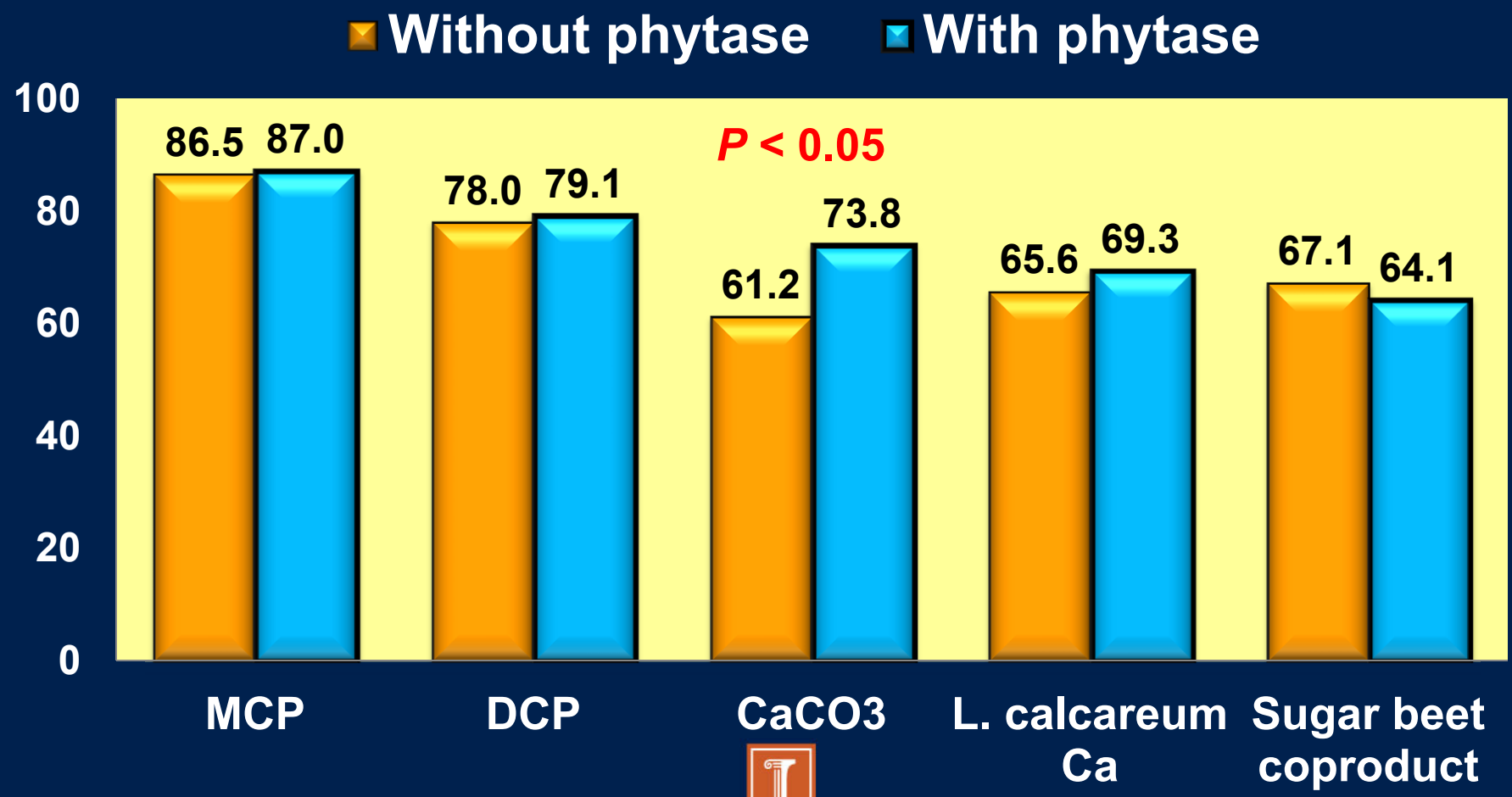
Digestibility of Ca

Canola meal

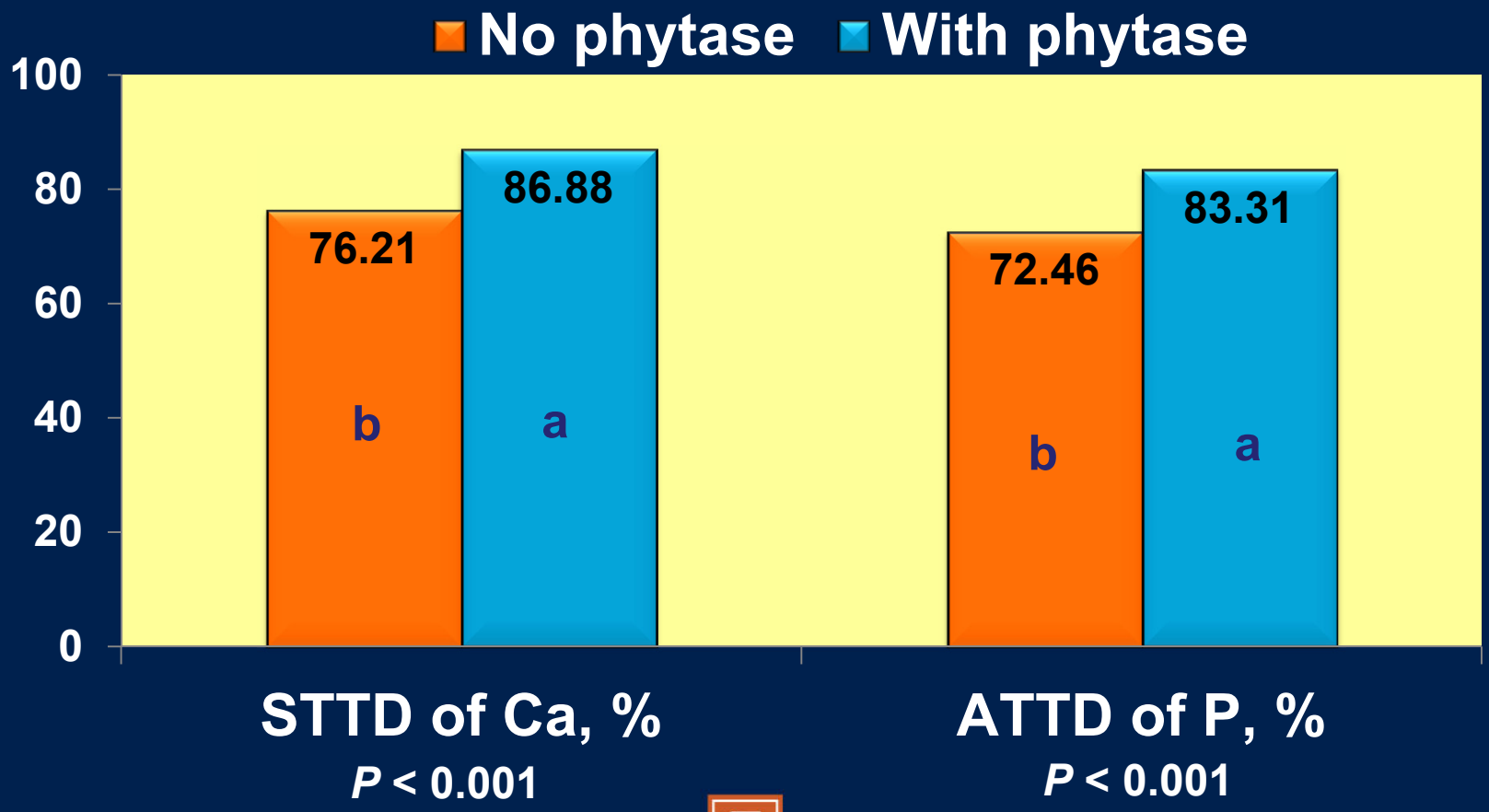
$P < 0.01$



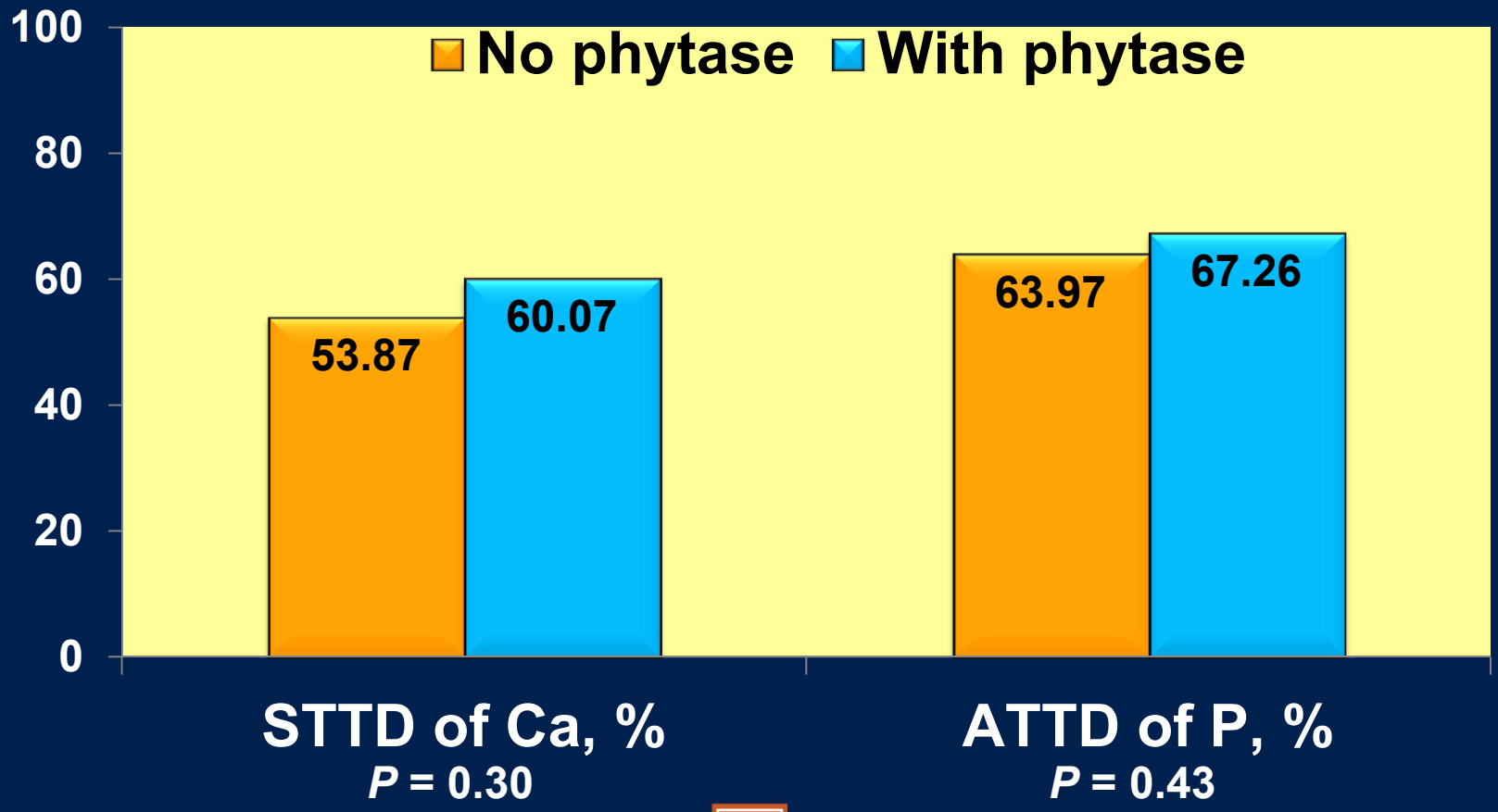
STTD of Ca (%) in Ca supplements



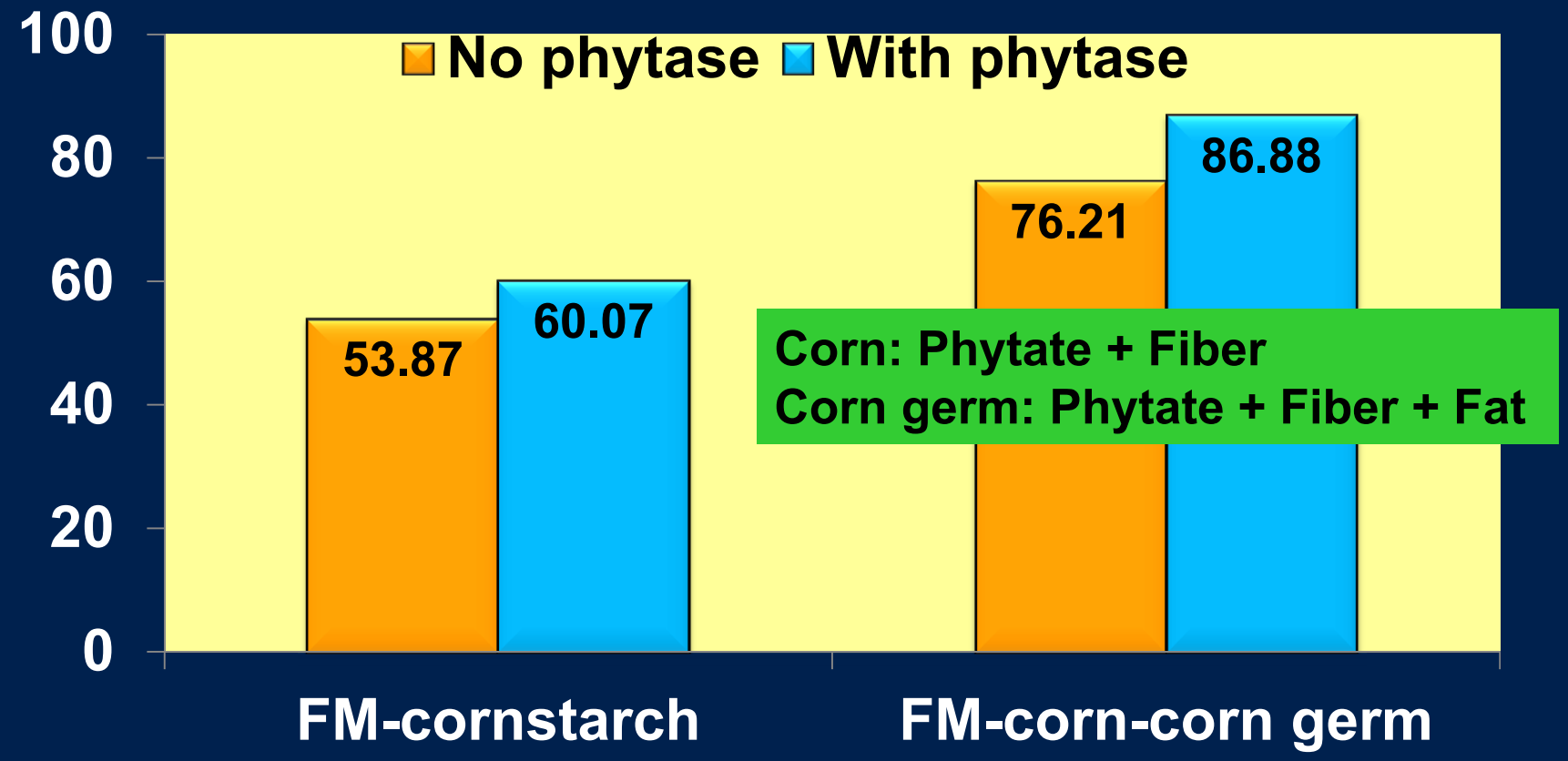
Fish meal-corn-corn germ



Fish meal-cornstarch



STTD of Ca, %



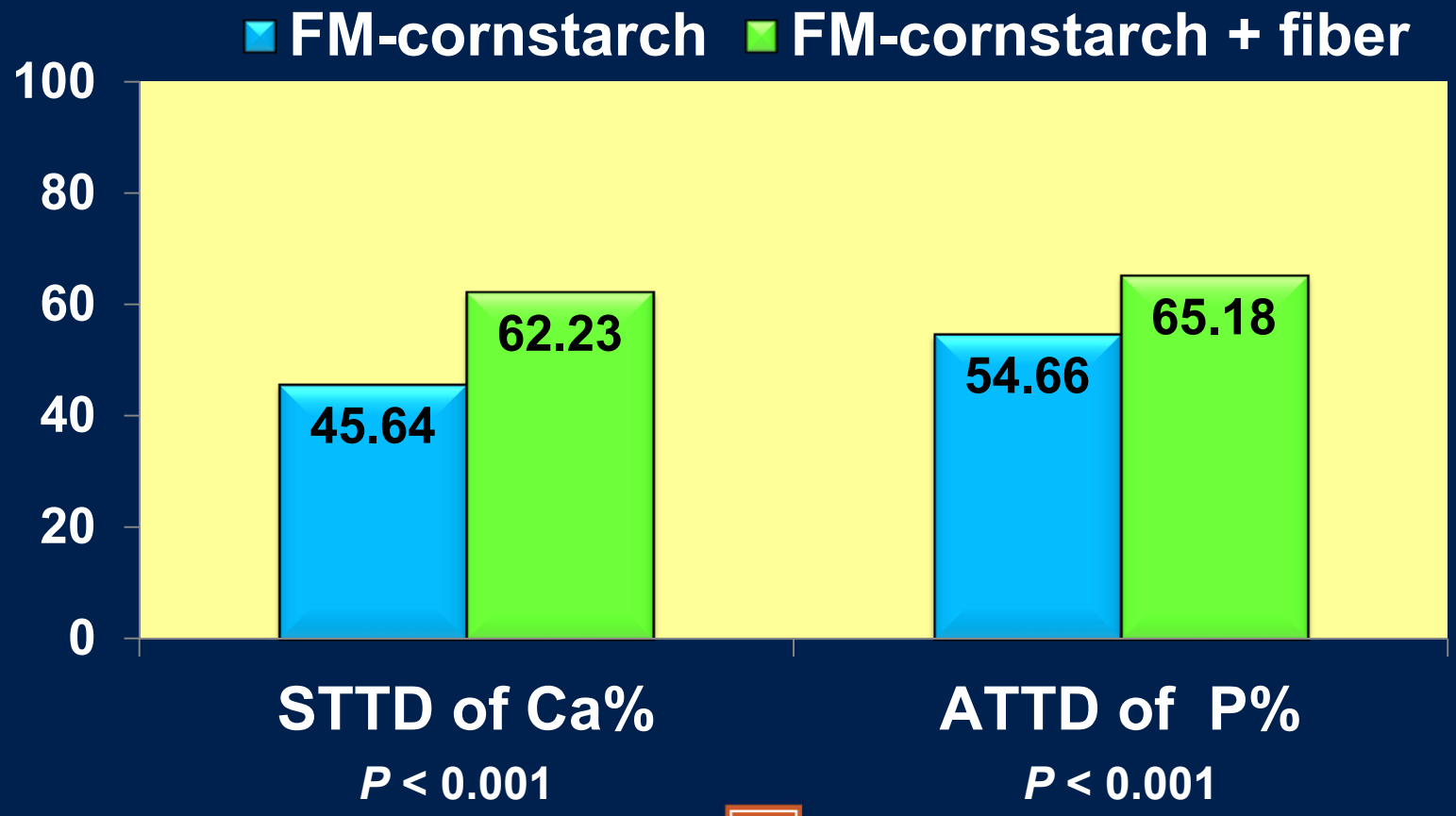
P < 0.001

Factors:

Ca level	Phytase
Fiber	Fat

Digestibility of Ca

Fiber

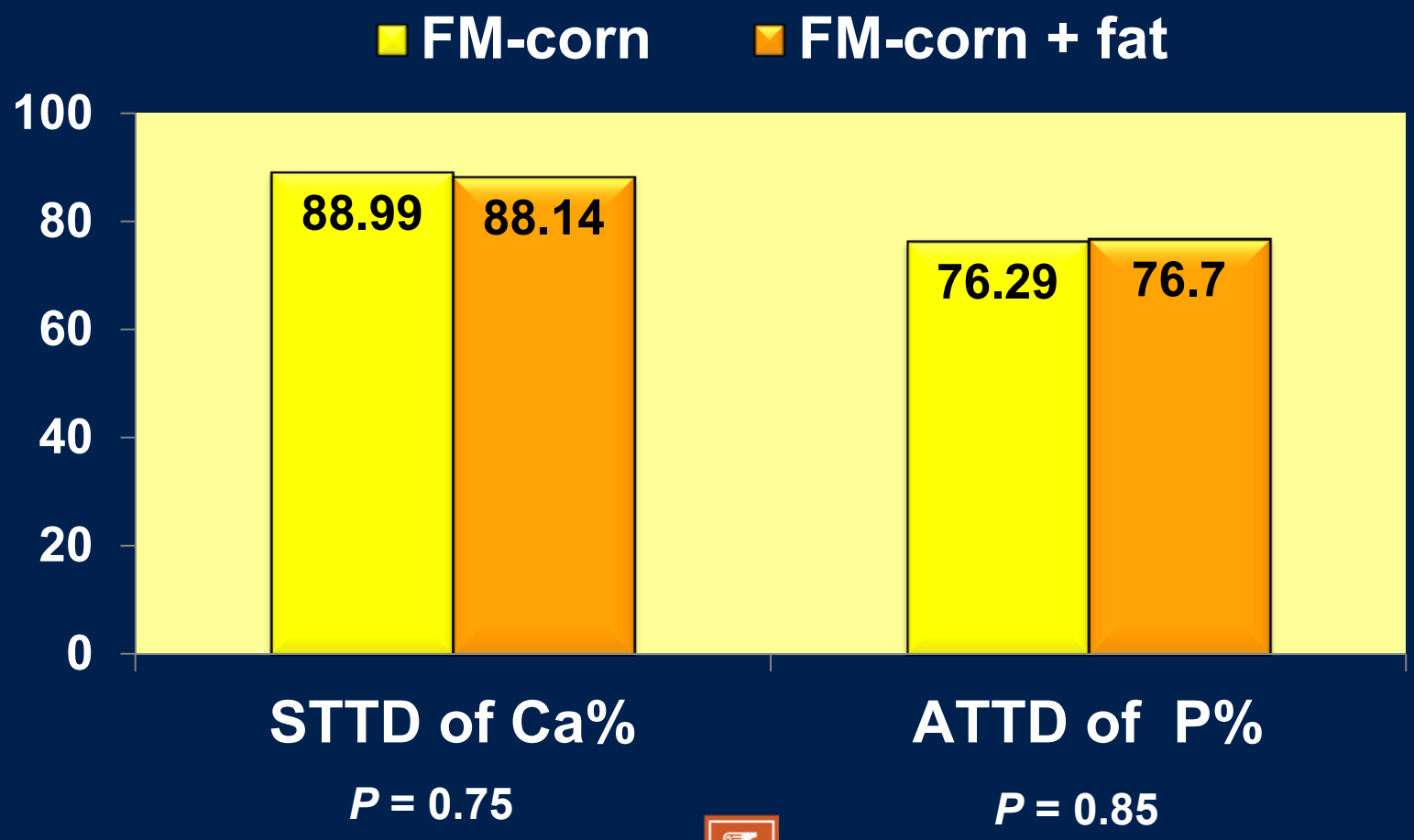

FM-cornstarch
FM-cornstarch + fiber
100
80
60
40
20
0
45.64
62.23
54.66
65.18
STTD of Ca%
P < 0.001
ATTD of P%
P < 0.001

Factors:

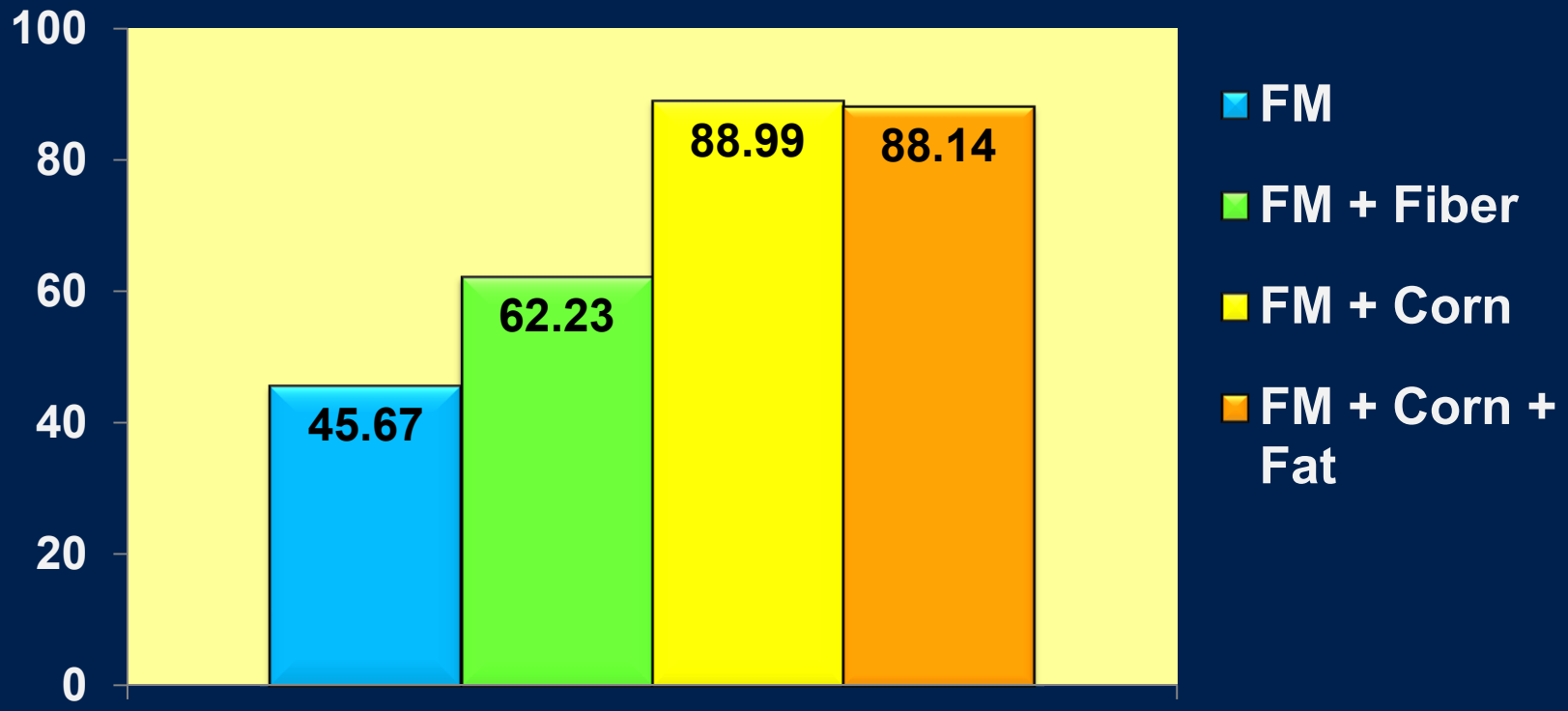
- Ca level
- Phytase
- Fiber
- Fat

Digestibility of Ca

Fat


FM-corn
FM-corn + fat
100
80
60
40
20
0
88.99
88.14
76.29
76.7
STTD of Ca%
P = 0.75
ATTD of P%
P = 0.85

STTD of Ca, %


100
80
60
40
20
0
45.67
62.23
88.99
88.14
FM
FM + Fiber
FM + Corn
FM + Corn + Fat

Conclusions

- **Endogenous Ca** is lost from the GIT
- **STTD or TTTD of Ca** are more accurate to formulate mixed diets

Conclusions

- STTD of Ca varies among Ca sources
- Phytase increased STTD of Ca in diets containing phytate
  - Different effect of phytase on STTD of Ca in Ca supplements

Conclusions

- **Fiber** increased the STTD of Ca
- **Fat** did not affect the STTD of Ca
- Semisynthetic (**cornstarch**) diets reduced the STTD of Ca and ATTD of P in fish meal

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Thank You

ABVista
Feed Ingredients

Hans H. Stein
Monogastric Nutrition Group

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