

Feeding Beef Cattle with Distillers Grains

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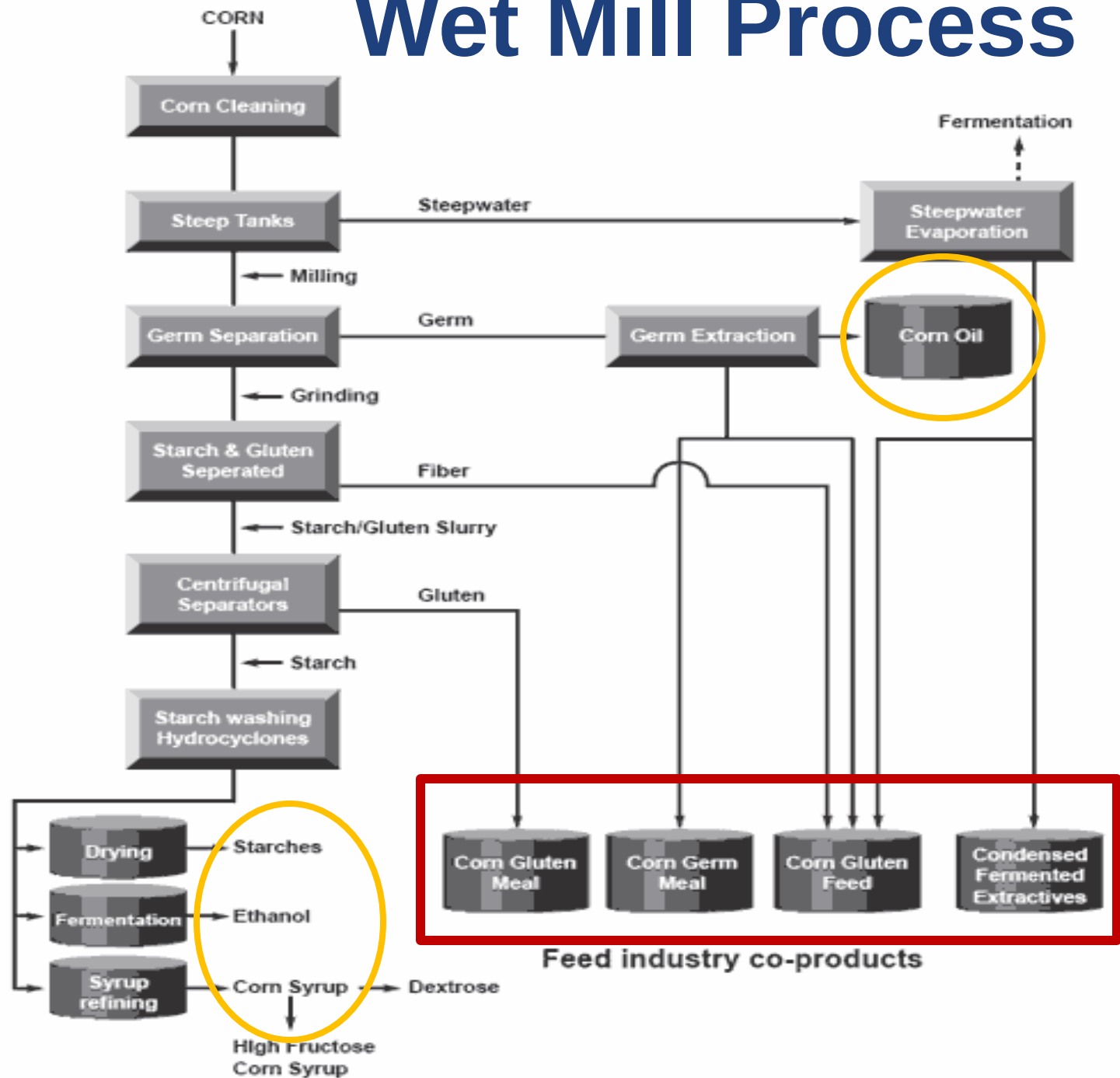
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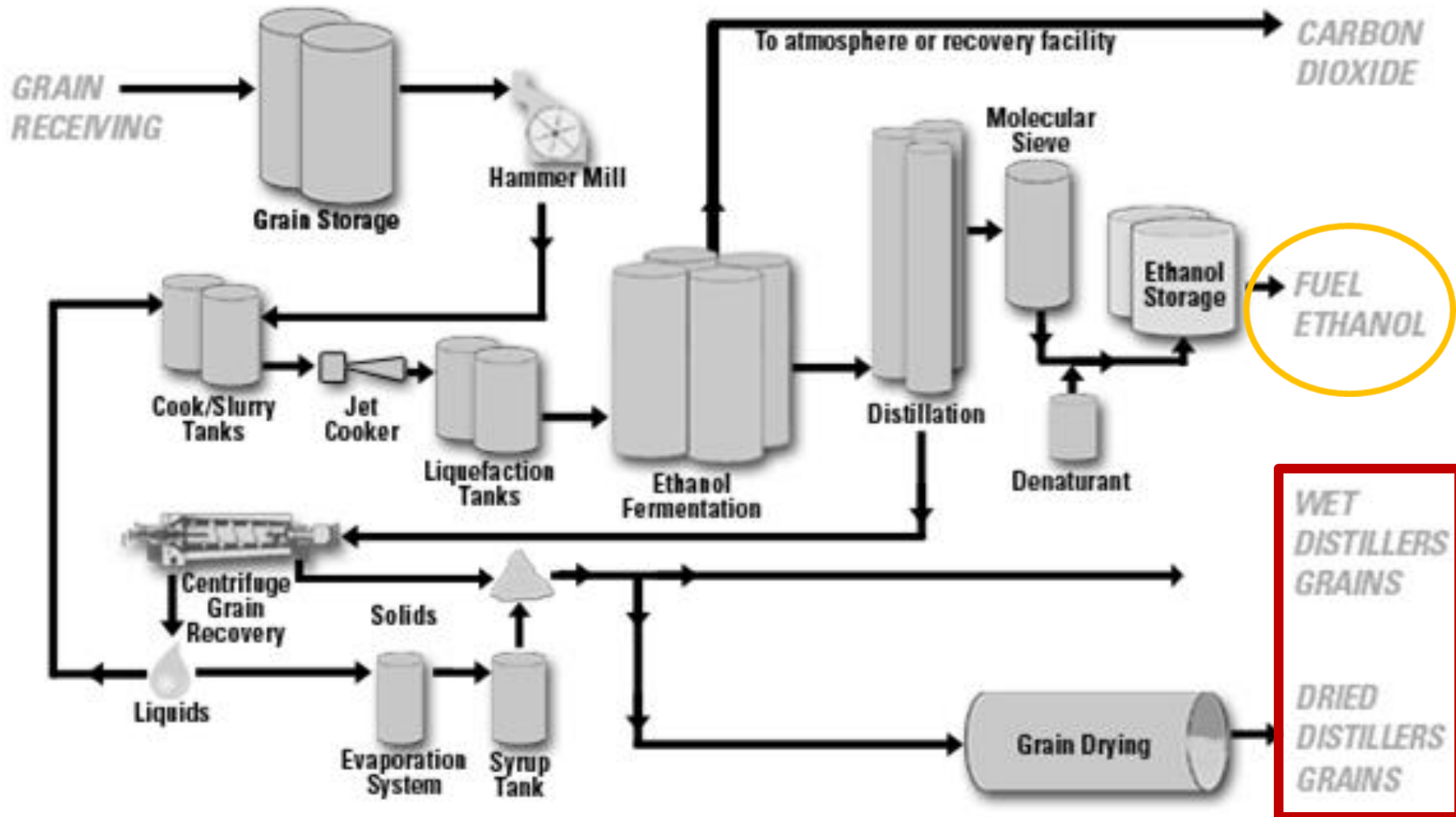
Corn-based ethanol production



Wet Mill Process



Dry Mill Process



Comparison of feed averages (dry matter basis, BR-Corte 3)

	Wet Distillers Grains	Dry Distillers Grains	Flint Corn (BR-Corte 3)
Dry matter, %	31.80	87.5	87.97
Protein, %	32.00	23.55	9.02
Fat, %	6.67	12.68	4.02
Metabolizable energy, Mcal/kg	?	3.36	3.22
NDF, %	16.00	42.45	13.06
Ca, %	0.05	0.05	0.03
P, %	0.35	0.32	0.26
S, %	0.65	0.66	0.05

Comparison of feed averages (range) (dry matter basis, industry samples)

	Wet Distillers Grains	Dry Distillers Grains	Flint Corn (BR-Corte 3)
Dry matter, %	39.3 (36.4 to 48.4)	89.3 (72.0 to 96.6)	87.97
Protein, %	13.1 (8.9 to 22.0)	28.67 (13.3 to 44.2)	9.02
Fat, %	5.5 (3.8 to 11.1)	9.75 (5.81 to 13.1)	4.02
Metabolizable energy, Mcal/kg	?	?	3.22
NDF, %	25.1 (n=1)	44.20 (27.3 to 56.7)	13.06
Ca, %	0.04 (n=1)	0.03 (0.02 to 0.06)	0.03
P, %	1.30 (n=1)	0.62 (0.06 to 1.93)	0.26
S, %	0.29 (n=1)	0.24 (0.19 to 0.31)	0.05



Maillard Reactions





Can they eat it and grow?

It depends.....



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When optimizing growth performance

- Wet DGS
 - Most USA research says 25%
 - Up to 40 to 50% for finishing cattle (Larson et al., 1993; Schingoethe, 2004))
- Dry DGS
 - Most USA research suggests 20%
- Why not more?

Historic limitations to feeding increasing levels of DGS to cattle

- Fat
 - Being used in US, no longer an issue
 - 13.1% in DDGS and 11% in WDGS...could be concerning



Historic limitations to feeding increasing levels of DGS to cattle

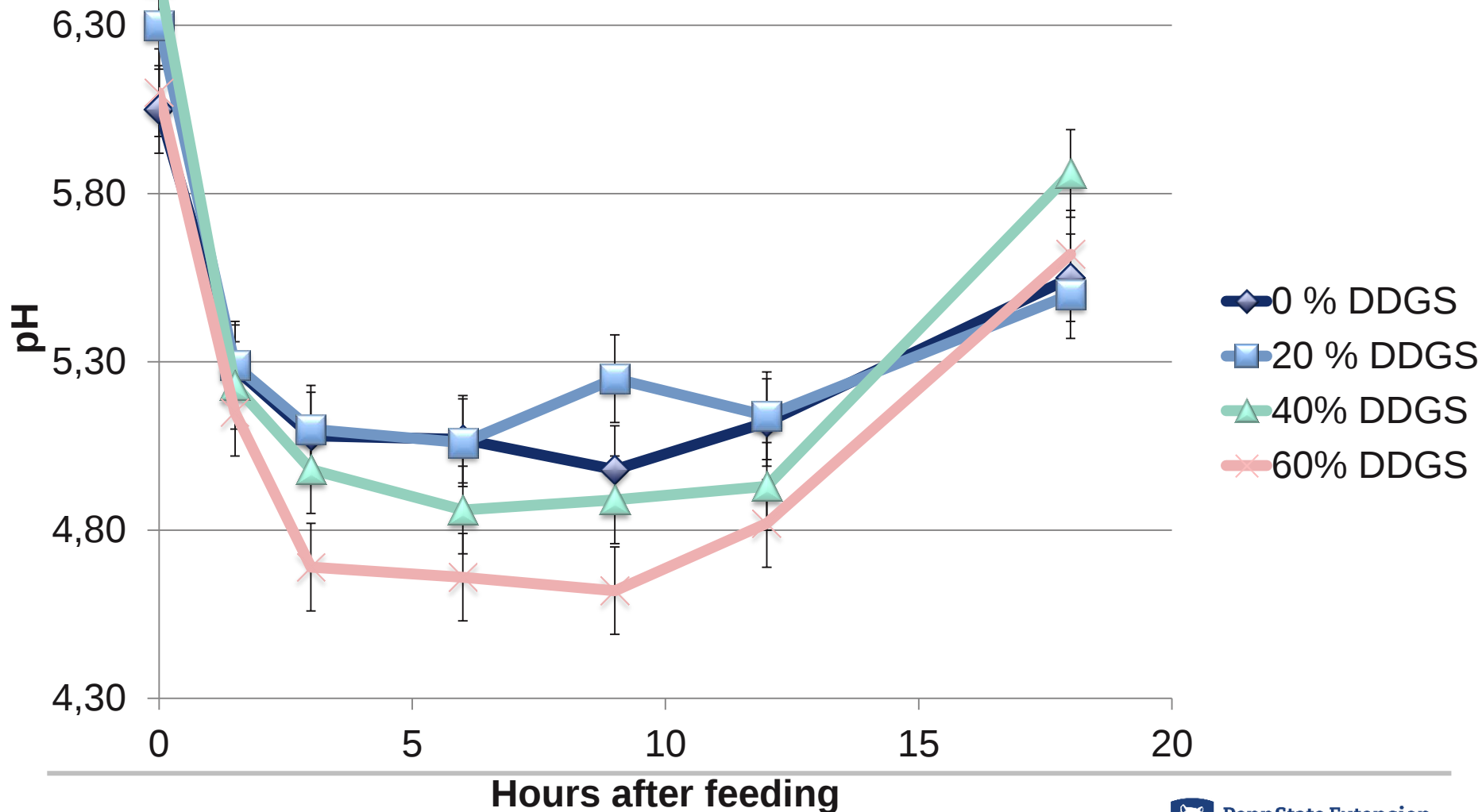
- Nitrogen
 - Cost of excretion
 - Cost of metabolism
 - Environment
- Phosphorus
 - Ca:P ratio
 - Environment



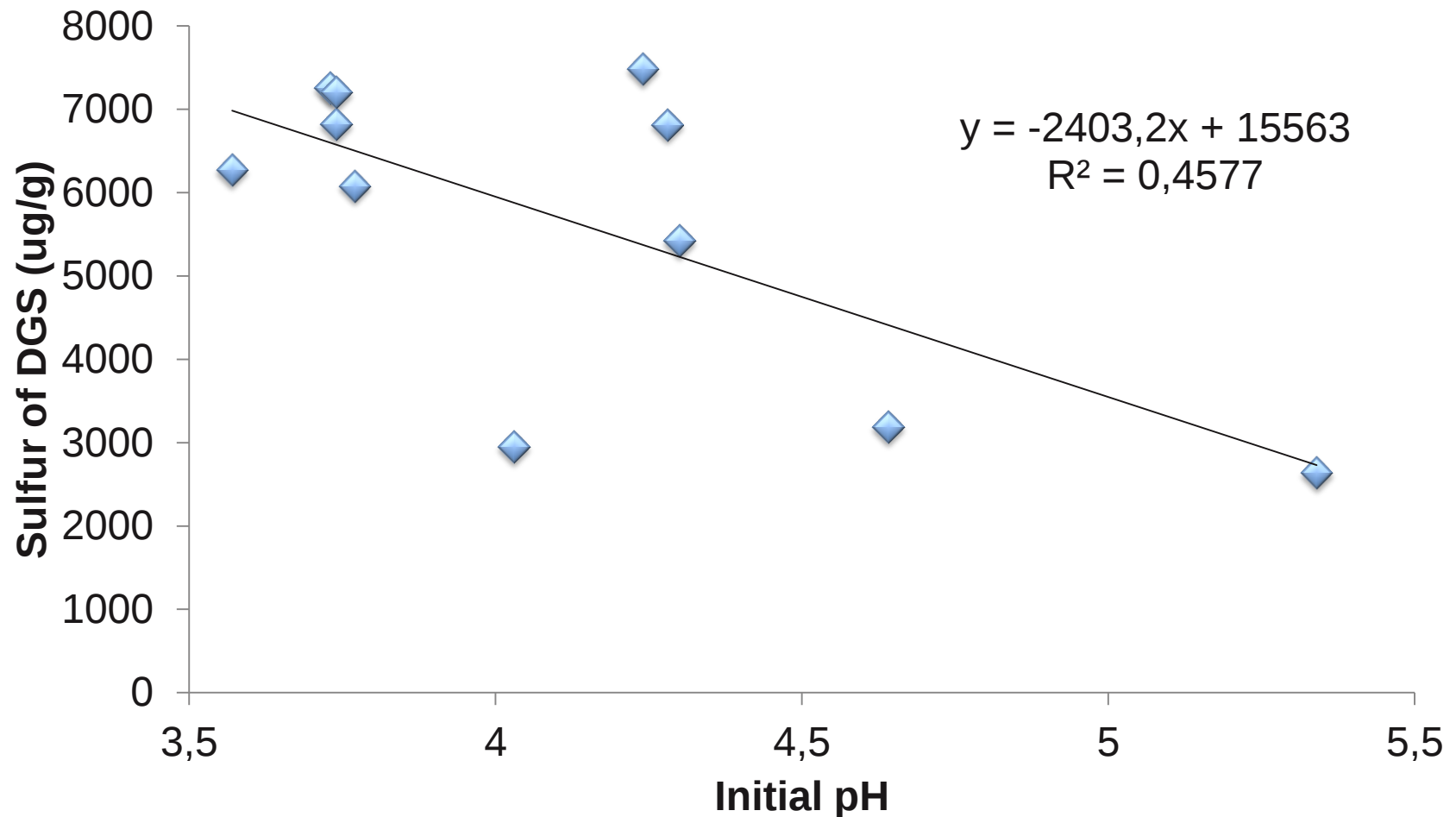
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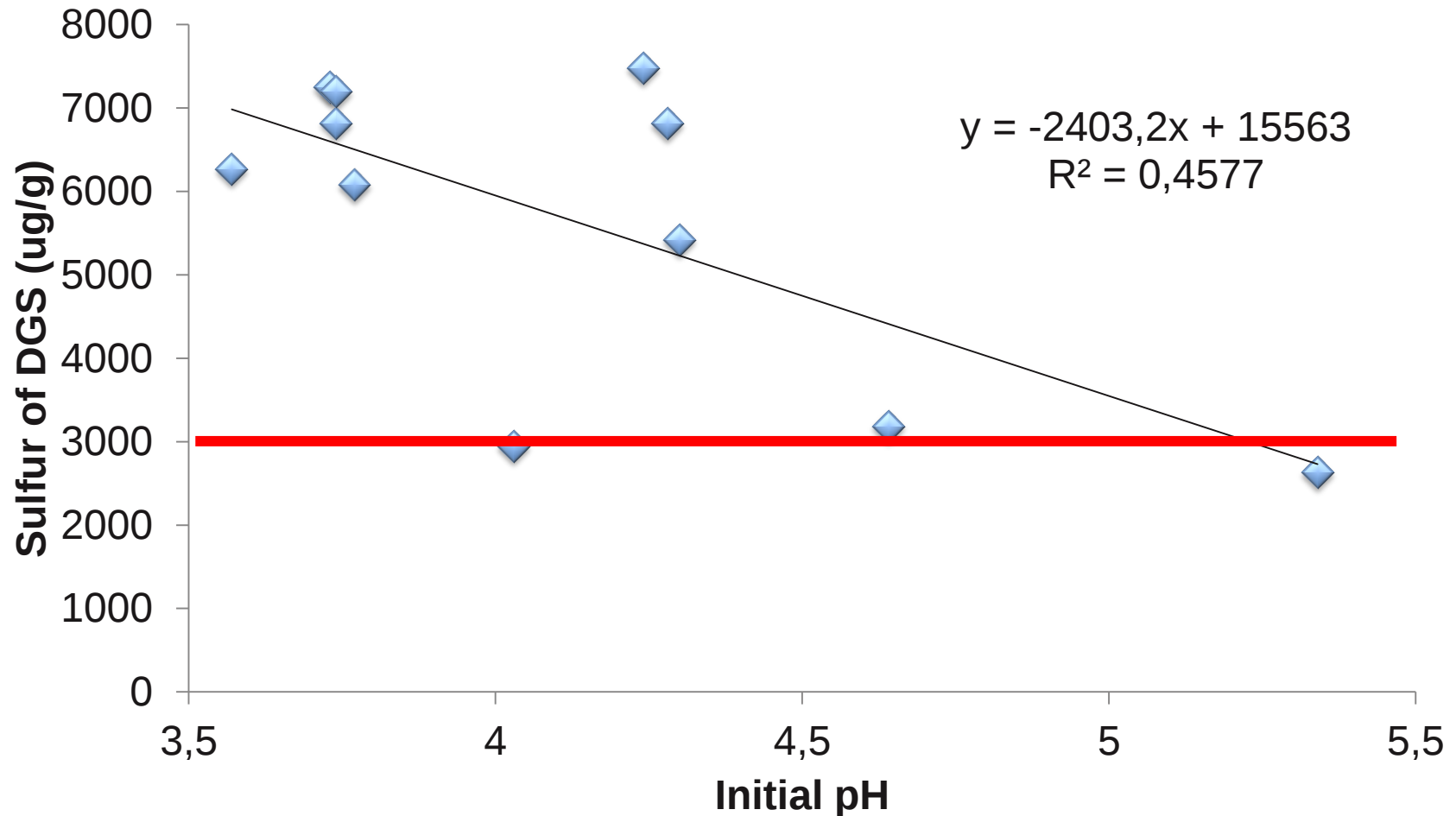
Increasing DDGS in the diet tends ($P = 0.07$) to decrease ruminal pH linearly



Correlation between pH and S in distillers grains



Correlation between pH and S in distillers grains



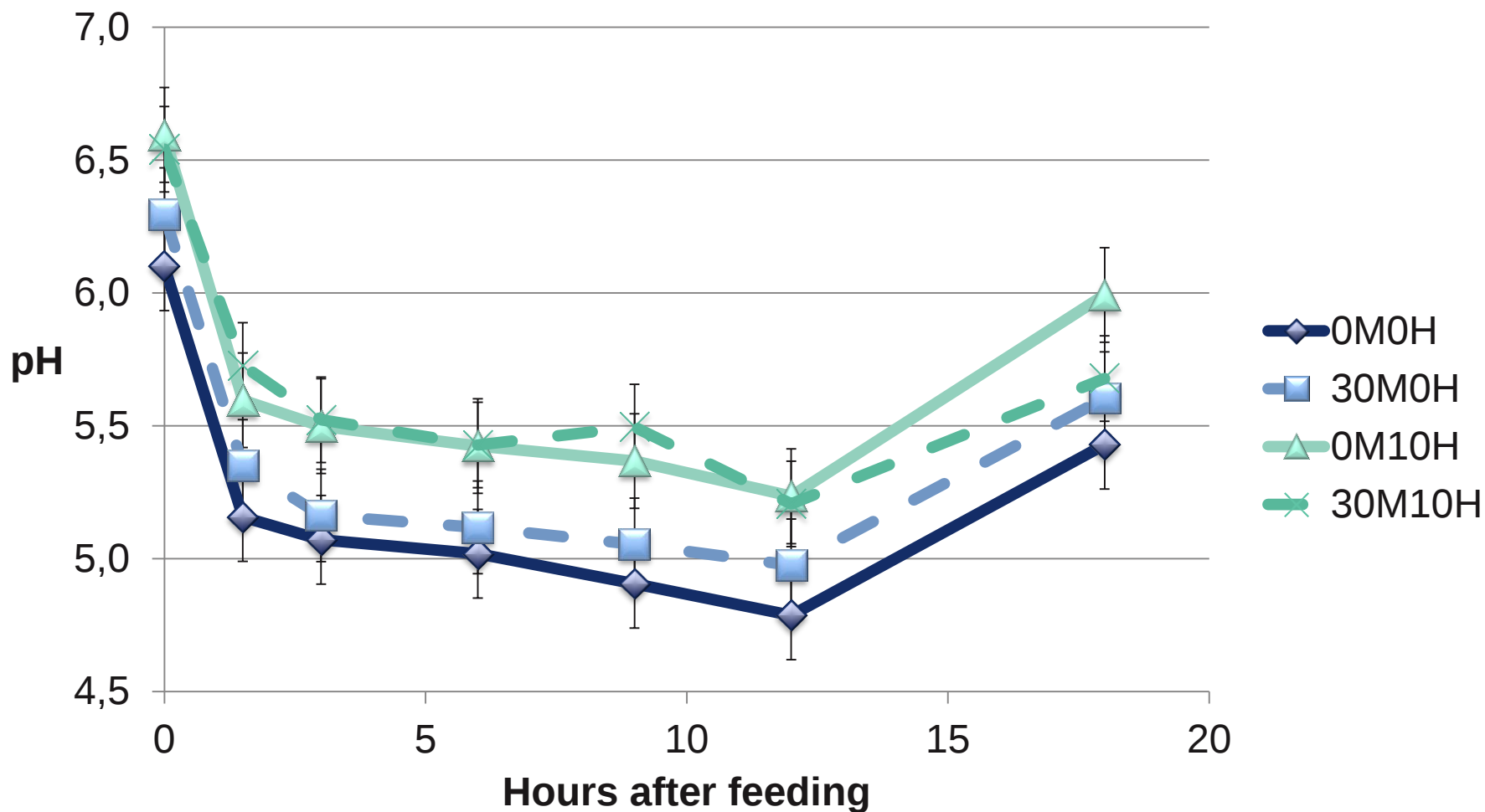
Methods:

Effects of haylage and monensin on cattle fed 60% DDGS diets

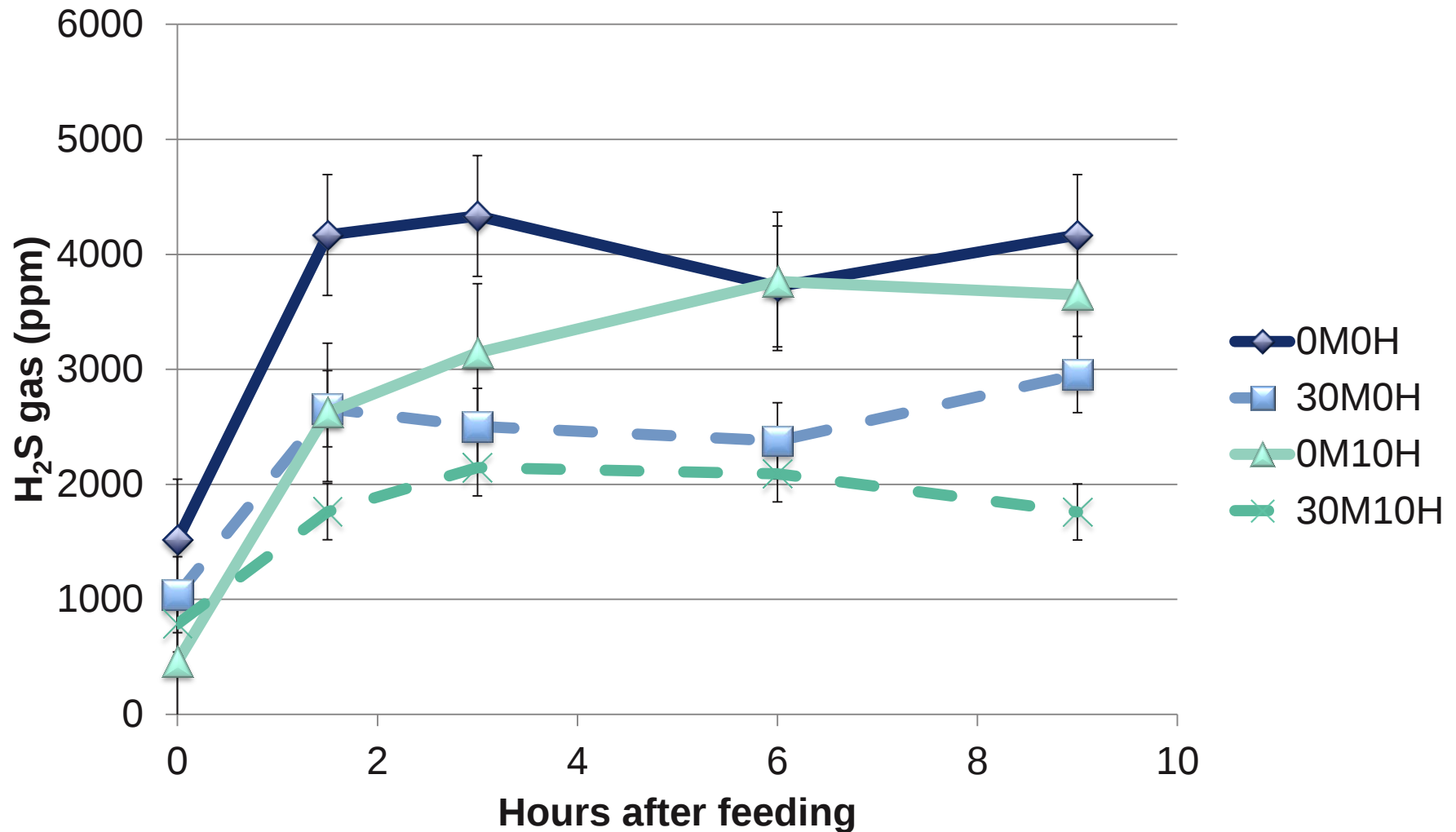
- 8 Angus-cross steers
 - Replicated 4x4 Latin Square
- 14 d feeding periods followed by 1 d collection
 - 0, 1.5, 3, 6, 9, 12 and 18 h after feeding



The effect of monensin and haylage on rumen fluid pH



The effect of monensin and haylage on rumen H₂S gas



Methods

- 165 Angus-cross steers
- 2x2 factorial
 1. 0 % Haylage, 0 g/ton Monensin
 2. 0 % Haylage, 30 g/ton Monensin
 3. 10 % Haylage, 0 g/ton Monensin
 4. 10 % Haylage, 30 g/ton Monensin
- All fed 10 % Corn Silage and 60% DDGS
- Average dietary S = 0.5 %

Feedlot performance

	0 % Haylage		10 % Haylage		P-value		
Mon:	0	30	0	30	M	H	M*H
Initial BW, kg	275	276	276	276	0.32	0.77	0.39
Final BW, kg ¹	526	520	540	553	0.39	<0.01	0.03
ADG, kg	1.57	1.54	1.66	1.74	0.27	<0.01	0.01
DMI, kg	8.5	8.3	9.9	10.1	0.92	<0.01	0.36
G:F	0.187	0.186	0.167	0.174	0.20	<0.01	0.12

¹ Same average DOF

Carcass characteristics

- No interactions
- Haylage effects on carcass:
 - 11 % increase in HCW
 - 7.5 % increase in REA
 - Tended to increase QG



Optimum Inclusion rates of DGs

- Dependent on:
 - Cost vs. corn
 - Source
 - Type
 - Roughage
 - Water
 - Production system



Questions on

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