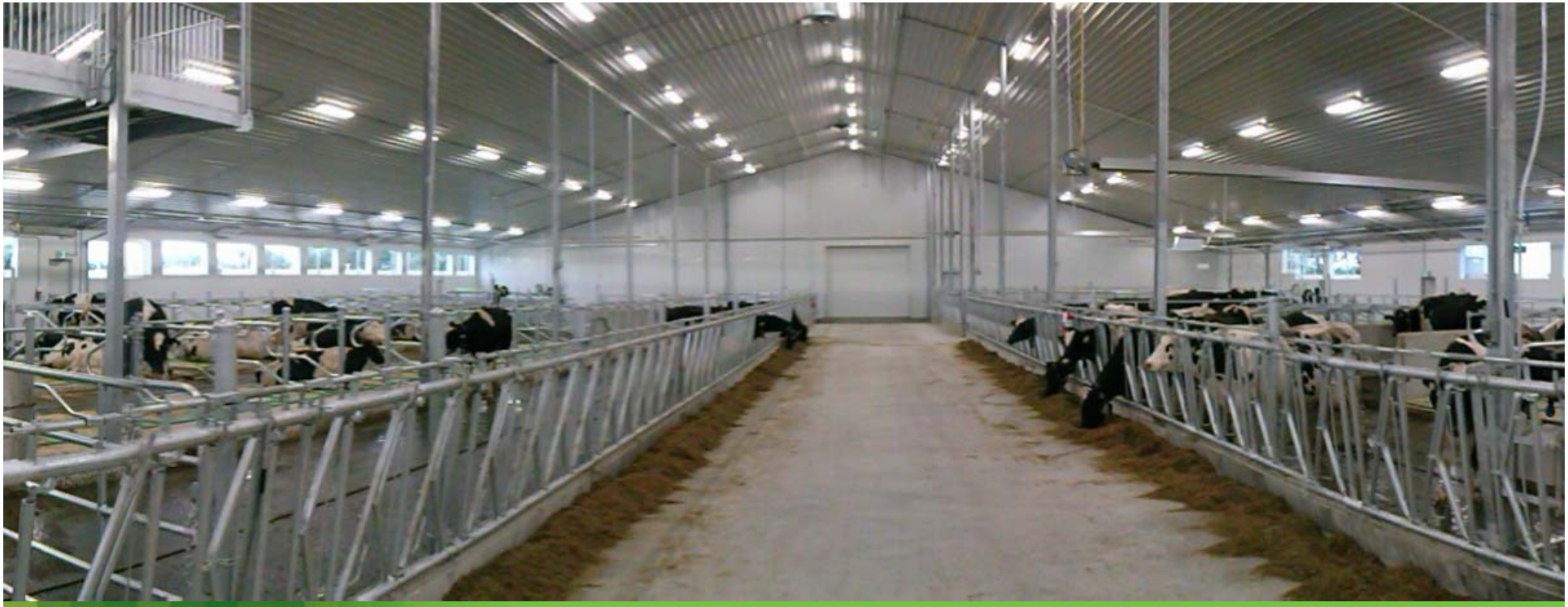


UNIVERSITY OF SASKATCHEWAN

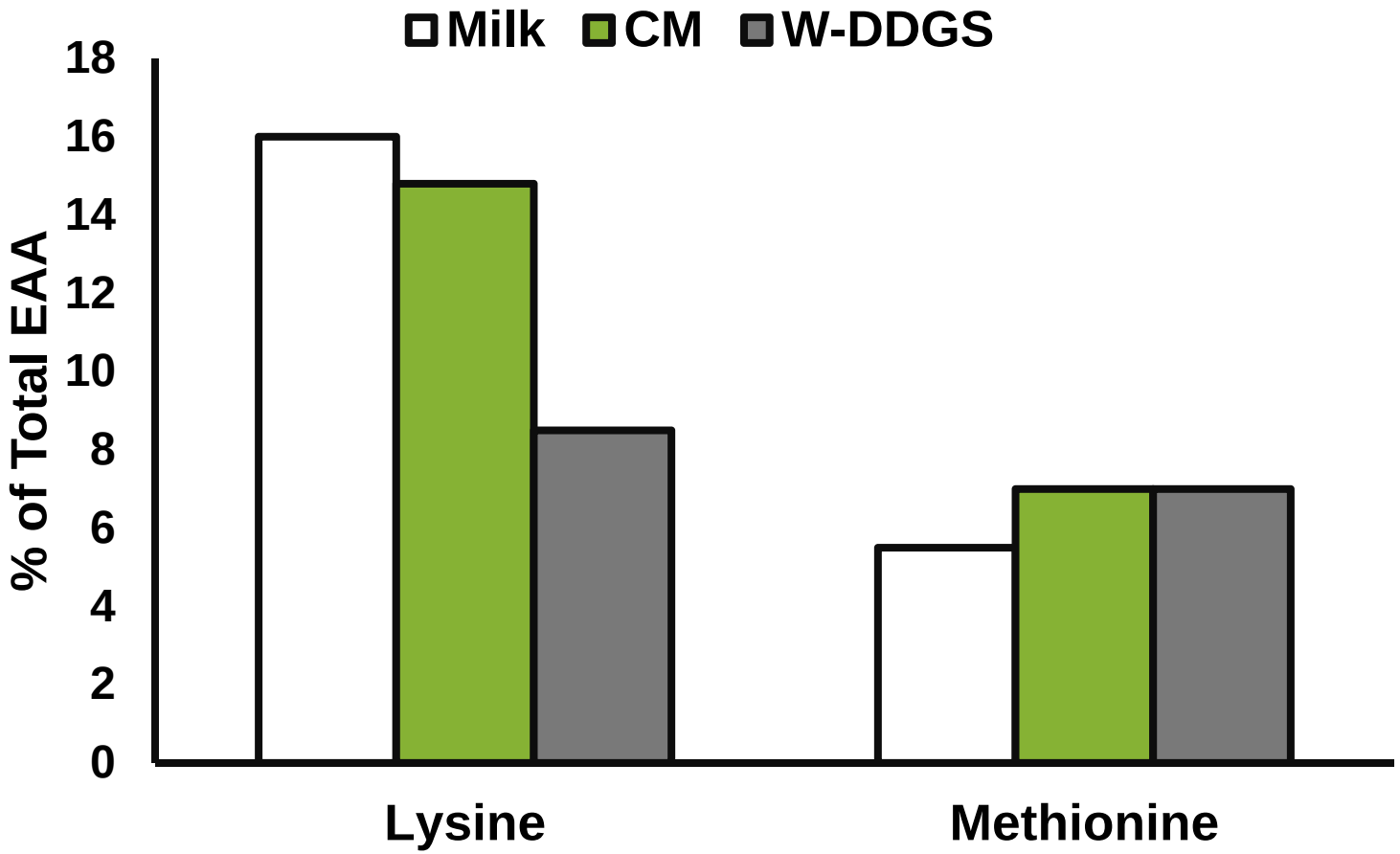
Comparing Canola Meal and Wheat Dried Distillers Grains as Sources of Dietary Protein in Dairy Diets

Matt Walpole, Kiran Doranalli, and Tim Mutsvangwa

Utilization of Canola Meal for Dairy Cows

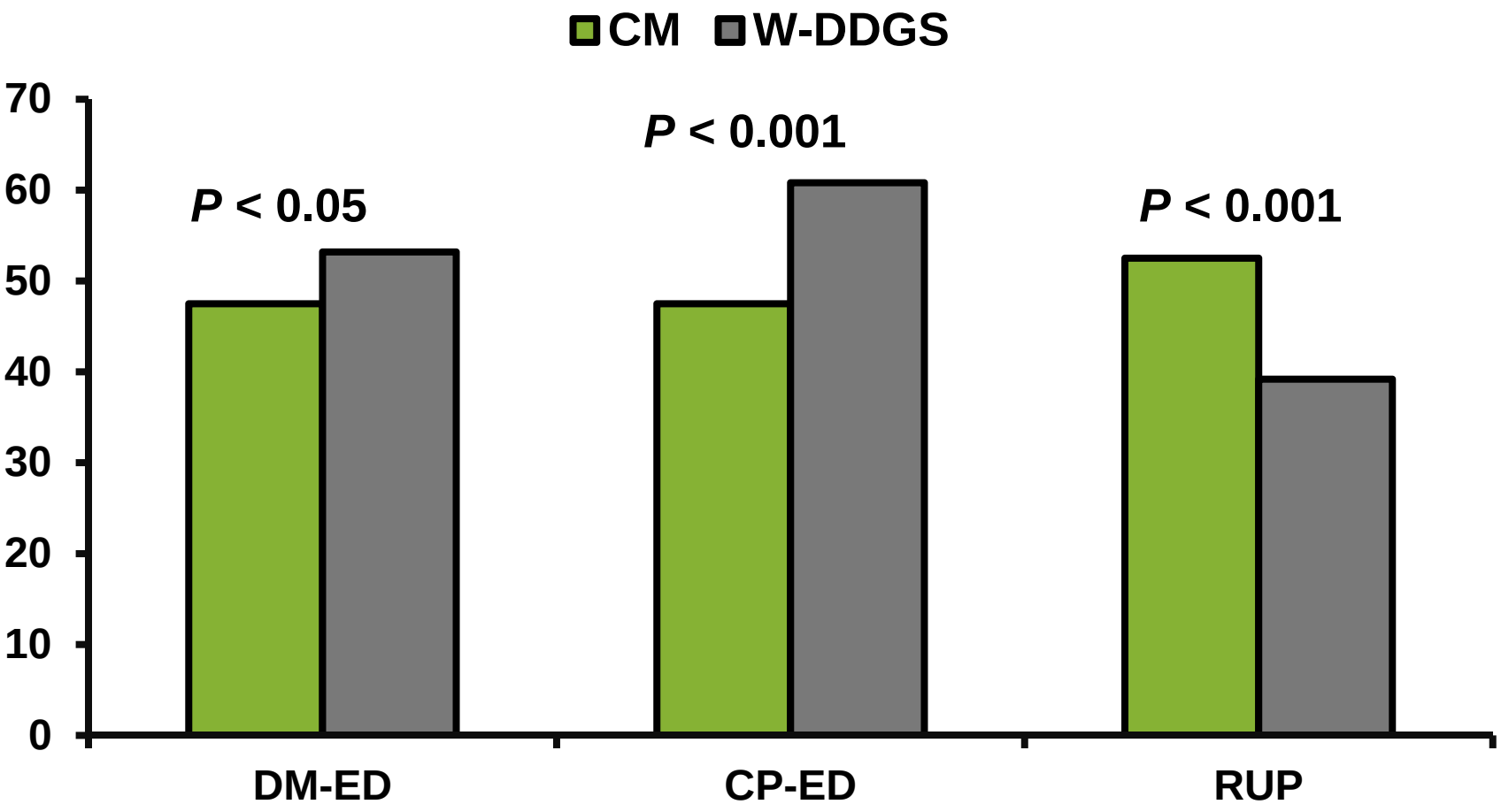
- Canola meal is high quality protein, readily available, used extensively in dairy cow diets in Canada
- Wheat DDGS now readily available
- $350/t CM versus $260/t W-DDGS

Comparison of LYS and MET Profiles



Maxin et al. 2013. J. Dairy Sci. 96:5151-5160; NRC, 2001

In situ Rumen degradation of CM versus W-DDGS (%)



Maxin et al. 2013. J. Dairy Sci. 96:5151-5160

EXPERIMENT 1

- To determine the effects of two levels of dietary protein when canola meal or W-DDGS is the major protein source
  - Ruminal fermentation
  - Microbial protein production
  - Omasal flow of amino acids
  - Milk production

Animals and Experimental Design

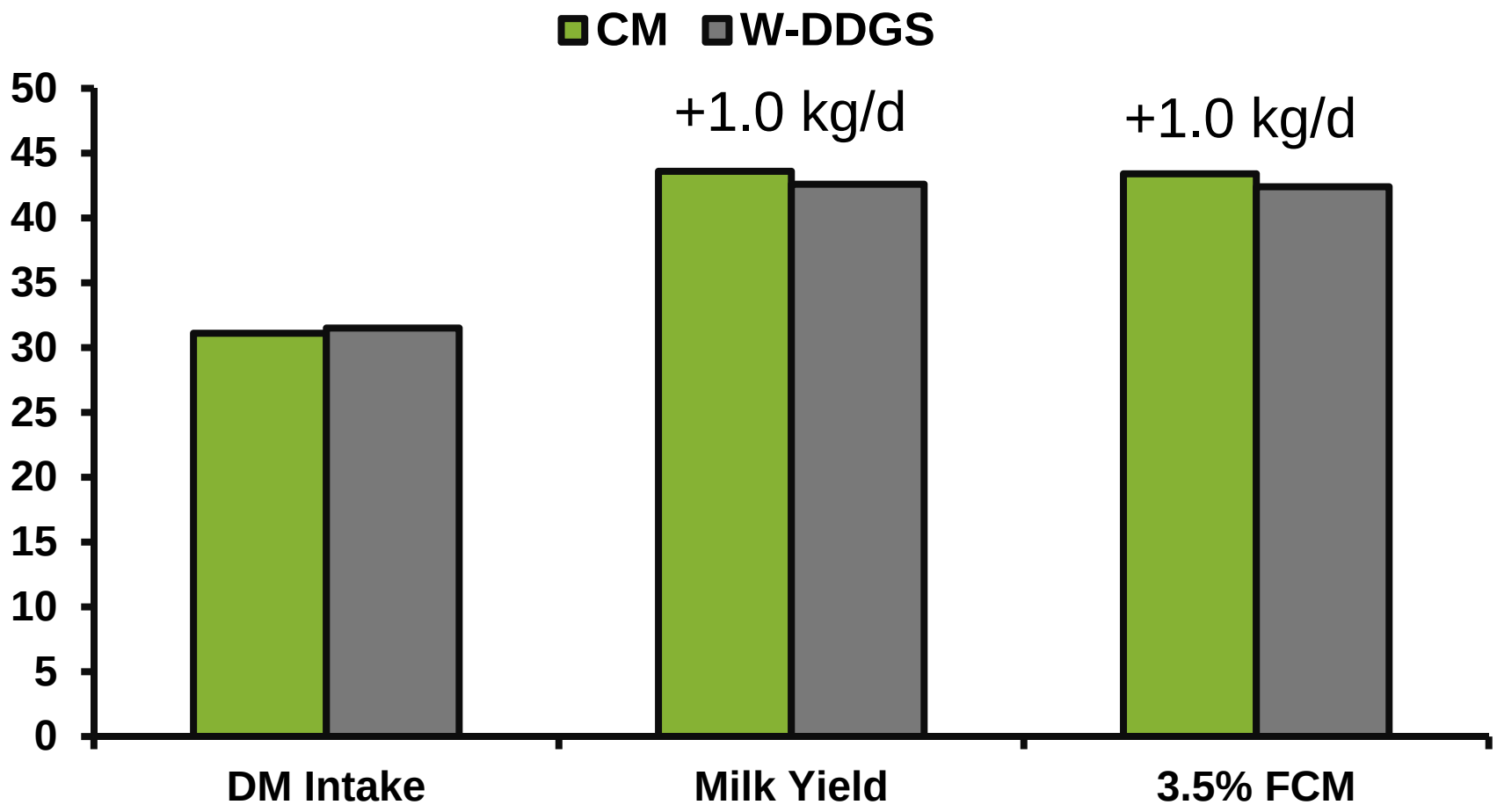
- 8 multiparous Holstein cows (109 ± 36 DIM)
  - 4 rumen-cannulated
- Replicated 4 × 4 Latin Square
  - Canola meal vs. W-DDGS
  - 15 vs. 17% dietary CP
- 28-d periods
  - (20 d adaptation + 8 d collection)

Cow 1	Cow 2	Cow 3	Cow 4
1	2	3	4
2	1	4	3
3	4	1	2
4	3	2	1

	Low CP		High CP	
Ingredients, % DM	Canola meal	W-DDGS	Canola meal	W-DDGS
Barley silage	33.33	33.39	33.10	32.67
Barley grain	29.78	28.94	28.69	28.31
Alfalfa hay	16.45	16.47	16.33	16.12
Canola meal	11.11	0.00	15.89	0.00
W-DDGS	0.00	12.02	0.00	15.68
Soybean hulls	3.11	3.56	0.44	0.44
Cotton seed hulls	2.22	1.34	0.44	0.44
Soybean meal	0.31	0.45	0.88	1.31
Corn gluten meal	0.31	0.45	0.88	1.74
Molasses, dried	0.24	0.24	0.24	0.24
Dynamate	0.17	0.17	0.17	0.17
Limestone, ground	0.24	0.24	0.24	0.24
Sodium bicarbonate	0.97	0.97	0.97	0.96
Dairy premix	1.76	1.76	1.76	1.76

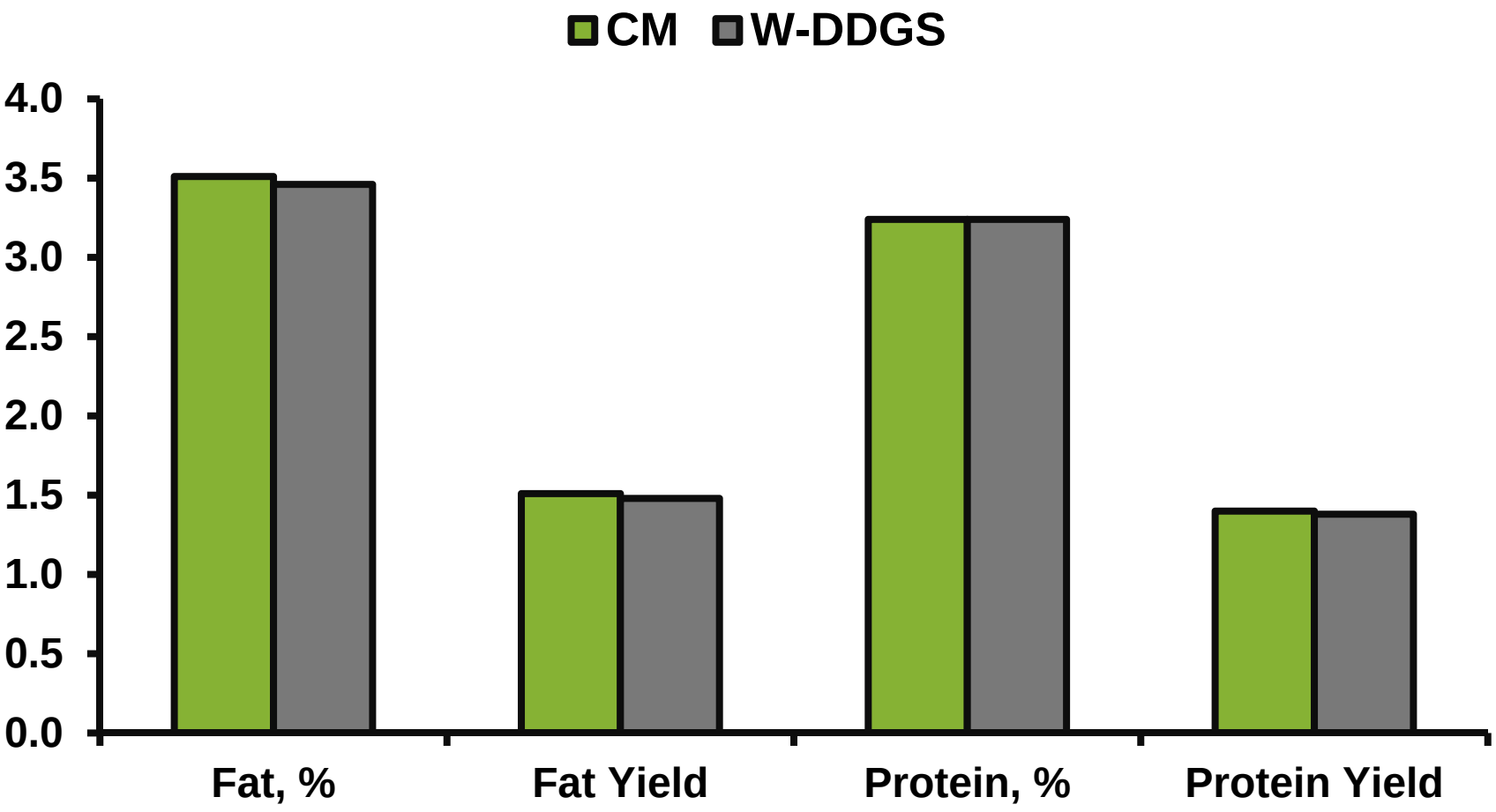
Item	Low CP		High CP	
	Canola meal	W-DDGS	Canola meal	W-DDGS
Chemical composition				
DM, %	55.7	55.6	55.7	55.9
OM, % of DM	91.6	91.8	91.6	91.6
CP, % of DM	15.3	15.2	16.9	17.1
NDF, % of DM	34.5	32.1	32.3	31.8
ADF, % of DM	20.1	17.8	18.7	17.4
EE, % of DM	2.85	3.68	3.15	3.98

DM Intake and Milk Yield (kg/d)



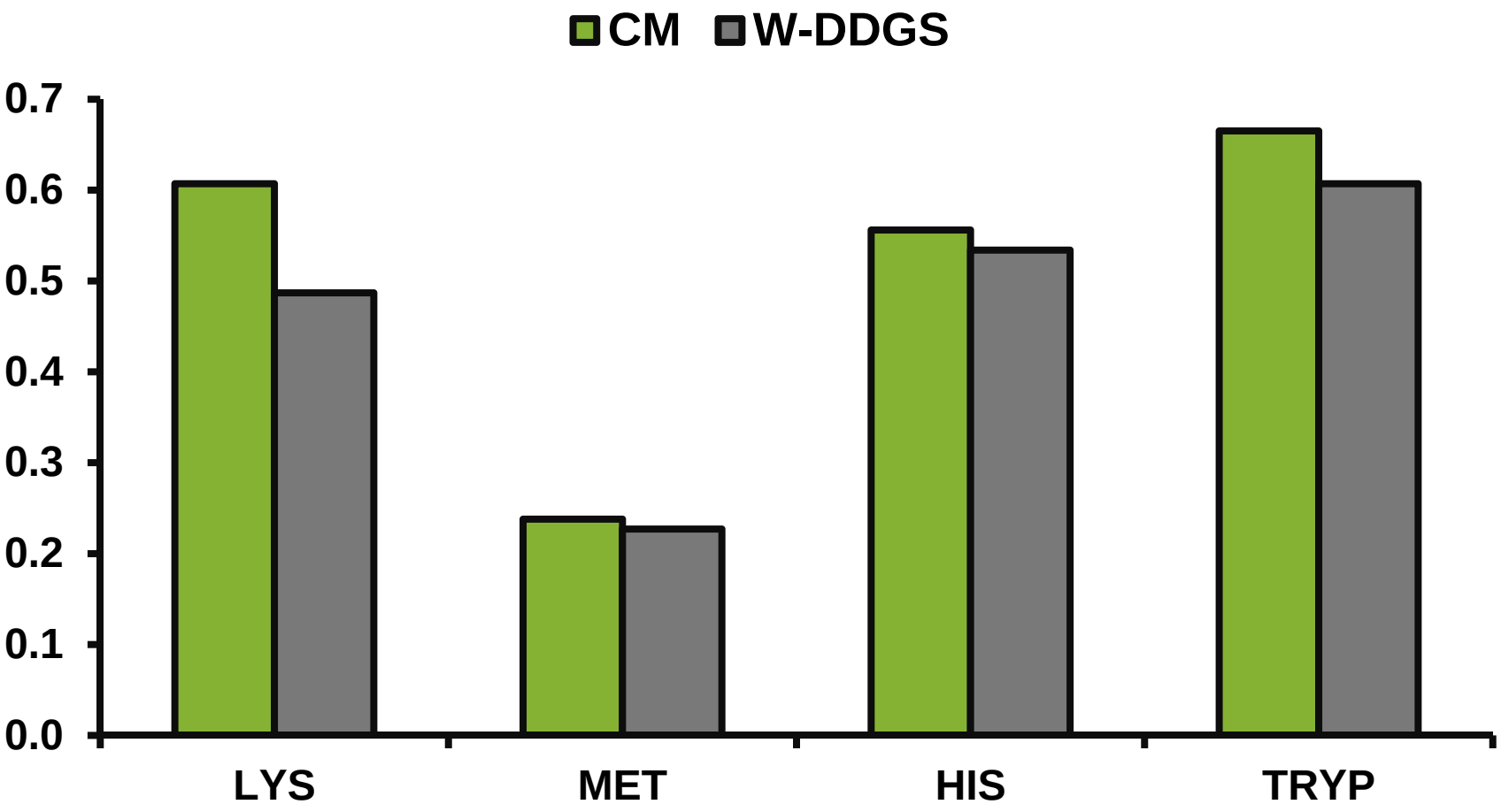
Kiran and Mutsvangwa, unpublished

Milk Components (%) and Yields (kg/d)



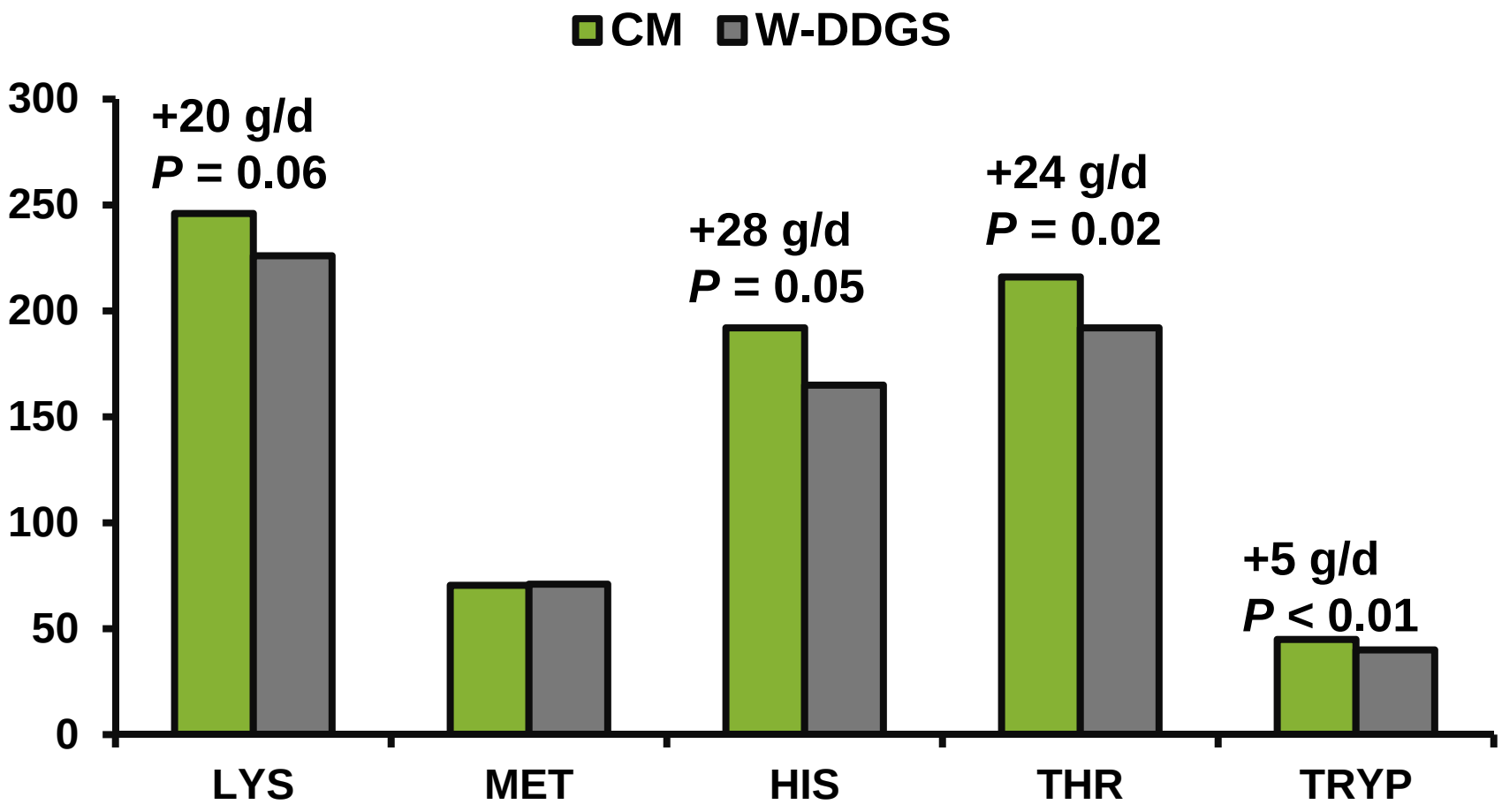
Kiran and Mutsvangwa, unpublished

EAA Composition of Experimental Diets, % of DM



Kiran and Mutsvangwa, unpublished

Omasal Outflow of Key Essential Amino Acids (g/d)



Kiran and Mutsvangwa, unpublished

EXPERIMENT 2

- To determine the effects of high or low forage:concentrate diets when the main protein source is Canola Meal or Wheat DDGS
  - Ruminal fermentation
  - Microbial protein production
  - Omasal flow of amino acids
  - Milk production

Animals and Experimental Design

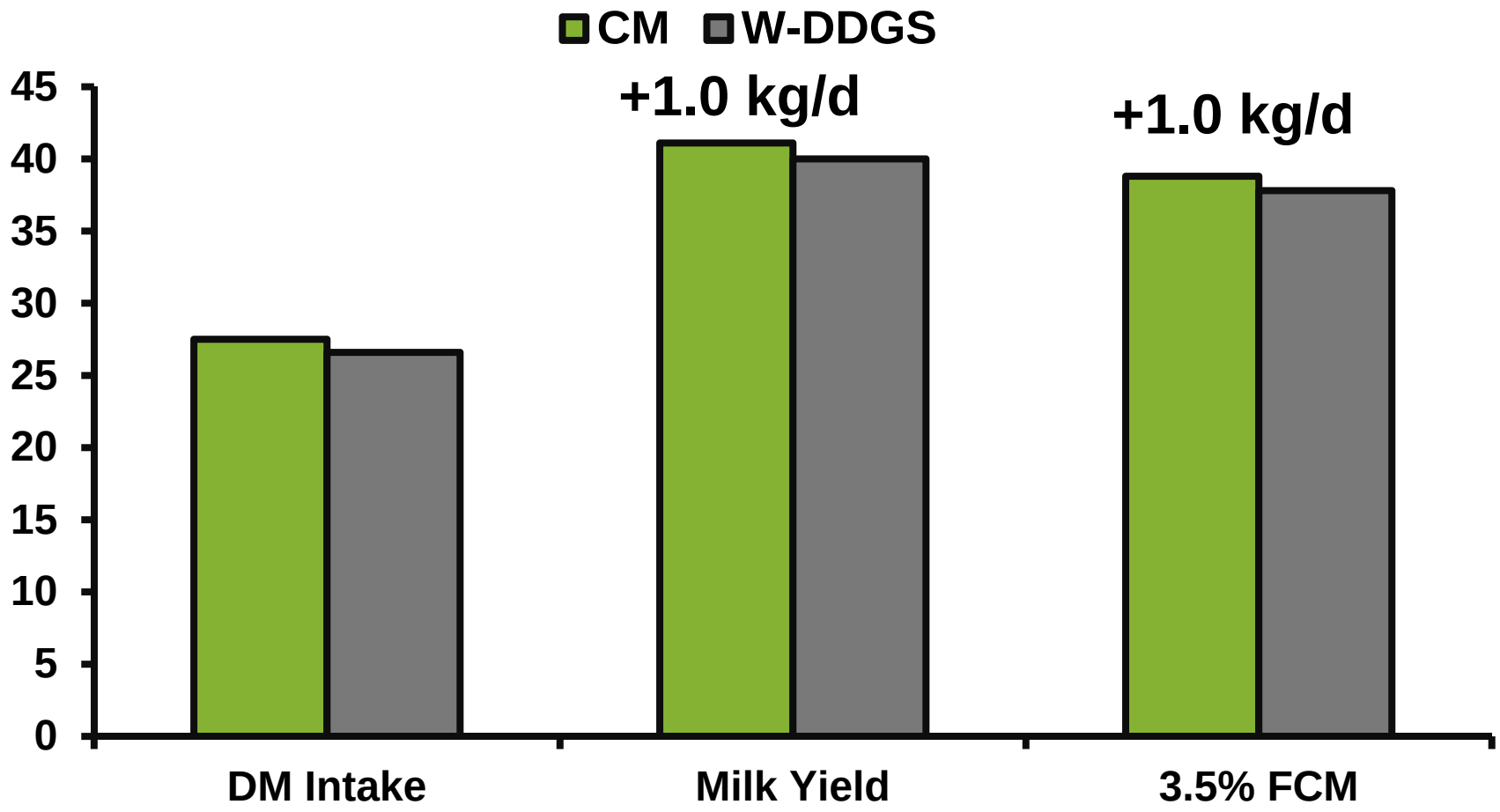
- 8 multiparous Holstein cows (100 ± 58 DIM)
  - 4 rumen-cannulated

- Replicated 4 × 4 Latin Square
  - Canola meal vs. W-DDGS
  - 45:55 vs. 55:45 forage:Concentrate ratio
  - 16% CP

	45:55 F:C		55:45 F:C	
Ingredients, % DM	Canola meal	W-DDGS	Canola meal	W-DDGS
Barley silage	31.61	31.31	38.74	38.46
Barley grain	35.62	34.44	25.82	25.05
Alfalfa hay	13.80	13.42	16.47	16.55
Canola meal	11.13	0.00	11.13	0.00
W-DDGS	0.00	12.97	0.00	12.08
Soybean hulls	2.23	2.24	2.23	2.24
Cotton seed hulls	1.34	1.34	1.34	1.34
Soybean meal	0.45	0.45	0.45	0.45
Corn gluten meal	0.45	0.45	0.45	0.45
Molasses, dried	0.24	0.24	0.24	0.24
Dynamate[1]	0.17	0.17	0.17	0.17
Limestone, ground	0.24	0.24	0.24	0.24
Sodium bicarbonate	0.97	0.97	0.97	0.96
Dairy premix[2]	1.76	1.76	1.76	1.76

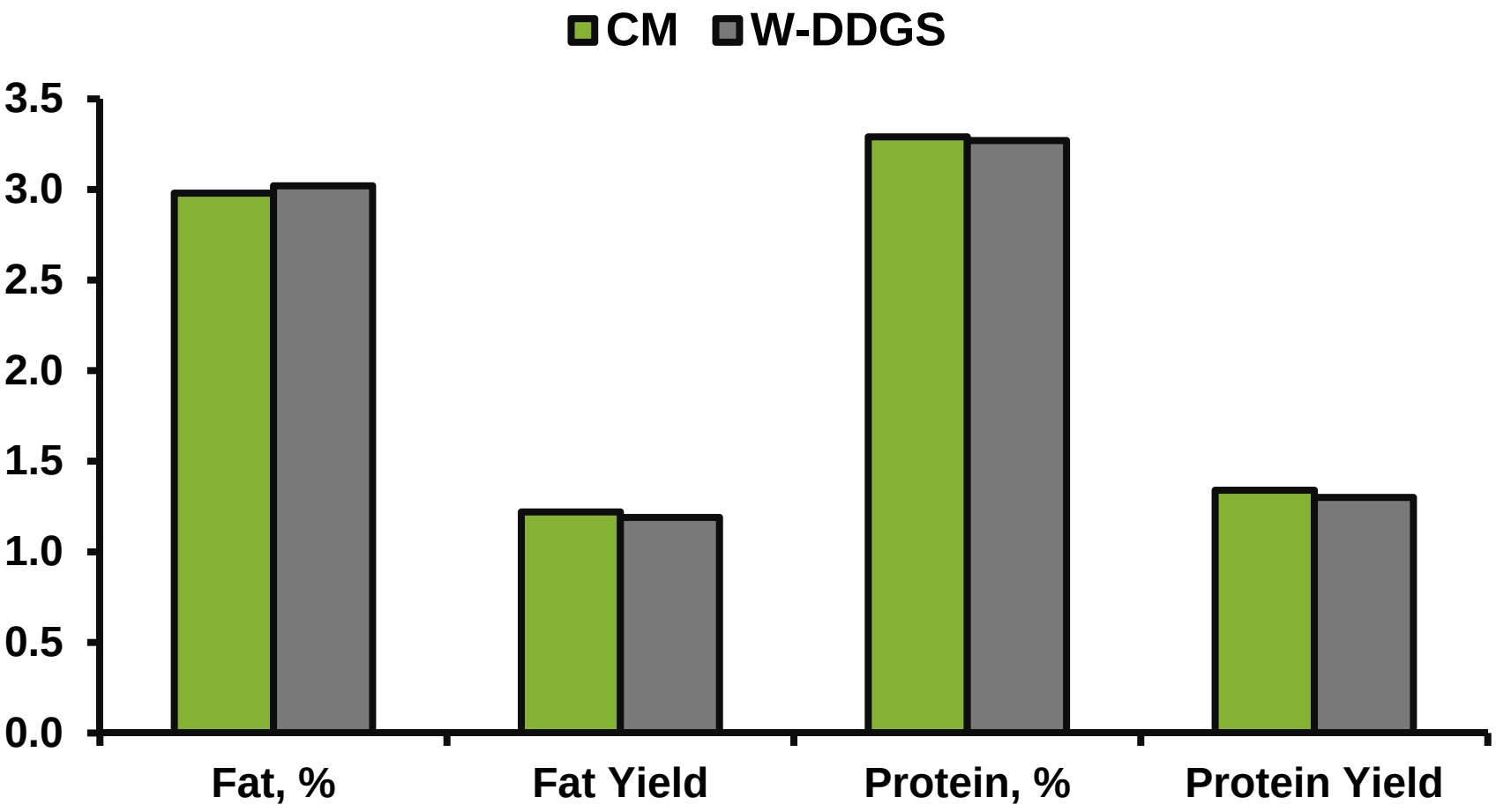
Item	Canola Meal		W-DDGS	
	45:55	55:45	45:55	55:45
Chemical composition				
DM, %	57.5	52.8	57.1	52.9
OM, % of DM	92.4	92.0	92.7	92.2
CP, % of DM	15.5	15.2	15.7	15.7
NDF, % of DM	33.9	32.2	32.9	32.6
ADF, % of DM	20.1	23.4	20.3	23.1
EE, % of DM	2.16	1.86	2.24	2.52

DM Intake and Milk Yield (kg/d)



Walpole, Doranalli and Mutsvangwa, unpublished

Milk Components (%) and Yields (kg/d)



Walpole, Doranalli and Mutsvangwa, unpublished

Acknowledgments

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