

Effects of feeding high- and low-fibre fractions of air-classified, solvent-extracted canola meal on diet nutrient digestibility and growth performance of weaned pigs

Xun Zhou, Matthew.A. Oryschak,
Ruurd.T. Zijlstra, and Eduardo Beltranena[©]

Solvent-Extracted Canola Meal (CM)

- Second most world-traded protein meal for animal feeding after SBM (Newkirk, 2009).
- Dietary energy availability is limited by its relatively high fibre content (Fan et al., 1996).
- Processing could potentially reduce fibre content and enhance energy and nutrient digestibility.

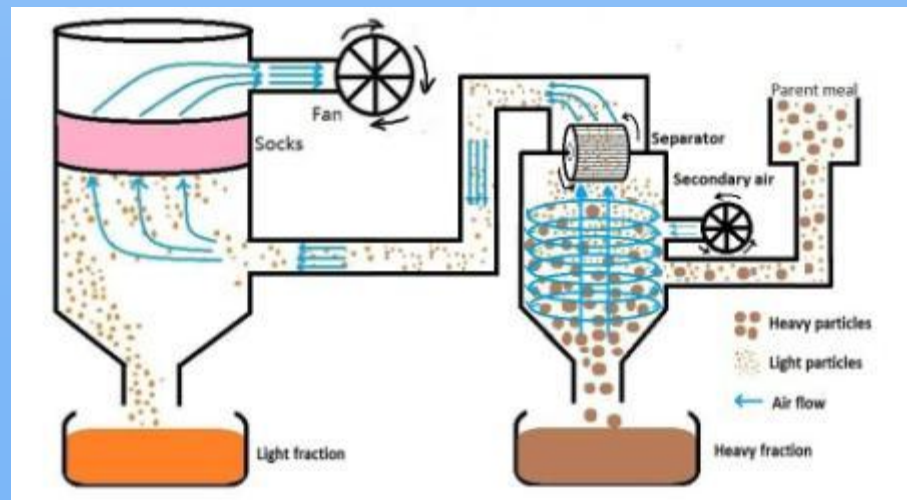


Air-Classification of SE Canola Meal

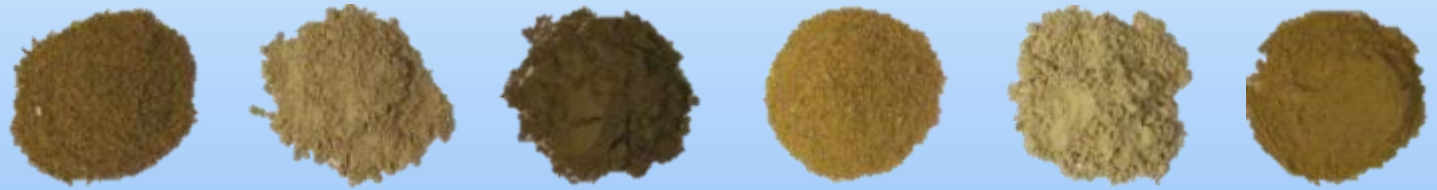
- Constant, dry fractionation process that separates air-suspended particles according to shape and mass.
- It separates CM into a fine, light, low-fibre fraction and a coarse, heavy, high-fibre heavy fraction.



Alpine Turboplex ATP 20 classifier



Air-Classified CM Fractions



	<i>B. napus</i>				<i>B. juncea</i>		
<i>Nutrient, %</i>	Parent meal	Light fraction	Heavy fraction		Parent meal	Light fraction	Heavy fraction
Moisture	10.55	7.73	8.32		11.07	7.79	8.55
Crude Protein	39.21	41.92	37.33		38.39	40.99	37.20
Crude Fat	2.20	4.10	2.07		1.81	3.18	1.71
Crude Fiber	9.72	0.26	8.73		6.81	0.37	8.35
ADF	20.12	13.13	25.58		12.88	8.58	16.52
NDF	27.22	20.60	31.52		20.36	13.64	23.48
Glucosinolates, $\mu\text{mol/g}$	6.39	4.71	3.92		11.69	9.83	8.97

Nursery Trial Objectives

- To determine diet apparent total tract digestibility (ATTD) of gross energy, crude protein, and dry matter. Calculate diet DE.
- To compare the growth performance of weaned pigs fed canola parents meals or their air-classified fractions.

Test Diets – Phase 2 (Day 0-9)

Ingredients, %	Diet A	Diet B	Diet C	Diet D	Diet E	Diet F
Wheat, ground	45.85	45.95	45.92	45.81	45.80	45.87
<i>B. napus</i> meal, solvent extracted	20.00					
<i>B. napus</i> fine fraction		20.00				
<i>B. napus</i> coarse fraction			20.00			
<i>B. juncea</i> meal, solvent extracted				20.00		
<i>B. juncea</i> fine fraction					20.00	
<i>B. juncea</i> coarse fraction						20.00
Lactose	10.00	10.00	10.00	10.00	10.00	10.00
Soybean meal	5.00	5.00	5.00	5.00	5.00	5.00
Nutri-Pea Propulse field pea isolate	2.50	2.50	2.50	2.50	2.50	2.50
Soy protein concentrate HP300	2.50	2.50	2.50	2.50	2.50	2.50
Herring fish meal	2.50	2.50	2.50	2.50	2.50	2.50
Canola oil	7.00	7.00	7.00	7.00	7.00	7.00
<u>Premix, %</u>						
Limestone	1.00	1.00	1.00	1.00	1.00	0.90
Mono-di-calcium phosphate	1.00	1.00	1.00	1.00	1.00	1.00
L-Lysine HCl	0.54	0.50	0.51	0.55	0.57	0.57
Vitamin premix	0.50	0.50	0.50	0.50	0.50	0.50
Trace mineral premix	0.50	0.50	0.50	0.50	0.50	0.50
Salt	0.50	0.50	0.50	0.50	0.50	0.50
L-Threonine	0.23	0.20	0.21	0.22	0.22	0.23
Choline chloride 60%	0.20	0.20	0.20	0.20	0.20	0.20
DL-Methionine	0.15	0.12	0.13	0.17	0.17	0.18
L-Tryptophan	0.03	0.03	0.03	0.05	0.04	0.05

Experiment Management



Pen 10	Block 3	Pen 11
Pen 9		Pen 12
Pen 8		Pen 13
Pen 7	Block 2	Pen 14
Pen 6		Pen 15
Pen 5		Pen 16
Pen 4	Block 1	Pen 17
Pen 3		Pen 18
Pen 2		Pen 19
Pen 1		Pen 20

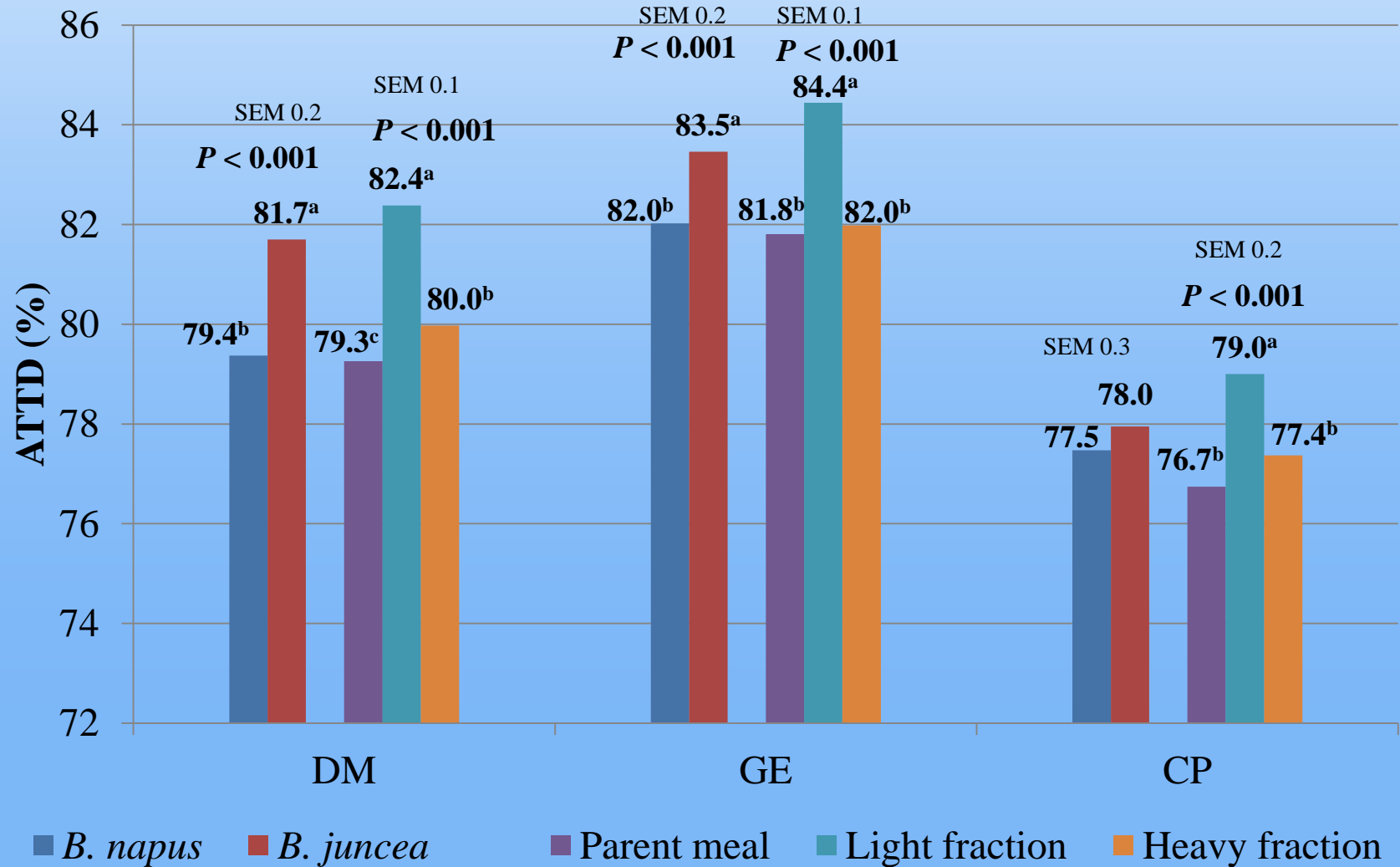


- ❑ 288 crossbred Hypor pigs were housed in 4 nursery rooms at SRTC, 2 barrows and 2 gilts per pen.
- ❑ Weaned (~19d of age) pigs were fed a common Phase 1 diet for 5d and started on trial at ~7kg BW.
- ❑ Test Phase 2 and 3 diets were offered ad libitum from Day 0 to 9 and Day 9 to 37, respectively.
- ❑ Individual pigs were weighed weekly. Pen feed added and weekly-end weighbacks were recorded.
- ❑ Pen faecal samples were collected on Day 17, 18.

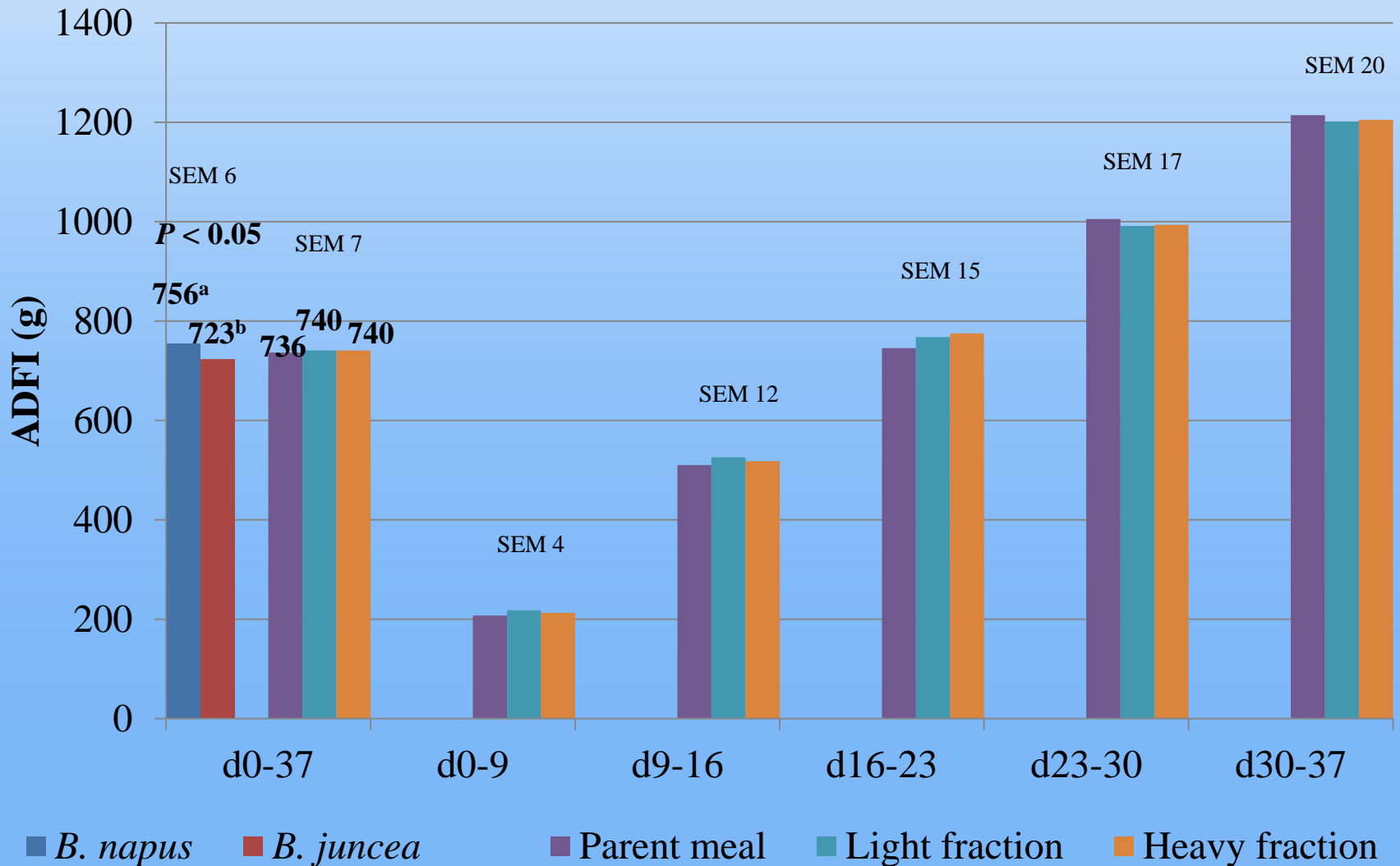
Statistical Analysis

- Digestibility and growth performance data were analyzed as a 2 x 3 factorial using the Mixed procedures of SAS.
- Models included: canola species (*B. napus*, *B. juncea*), parent meal or air-classified fractions and interactions. Block was the random term.
- For growth performance, weekly period was the repeated term.

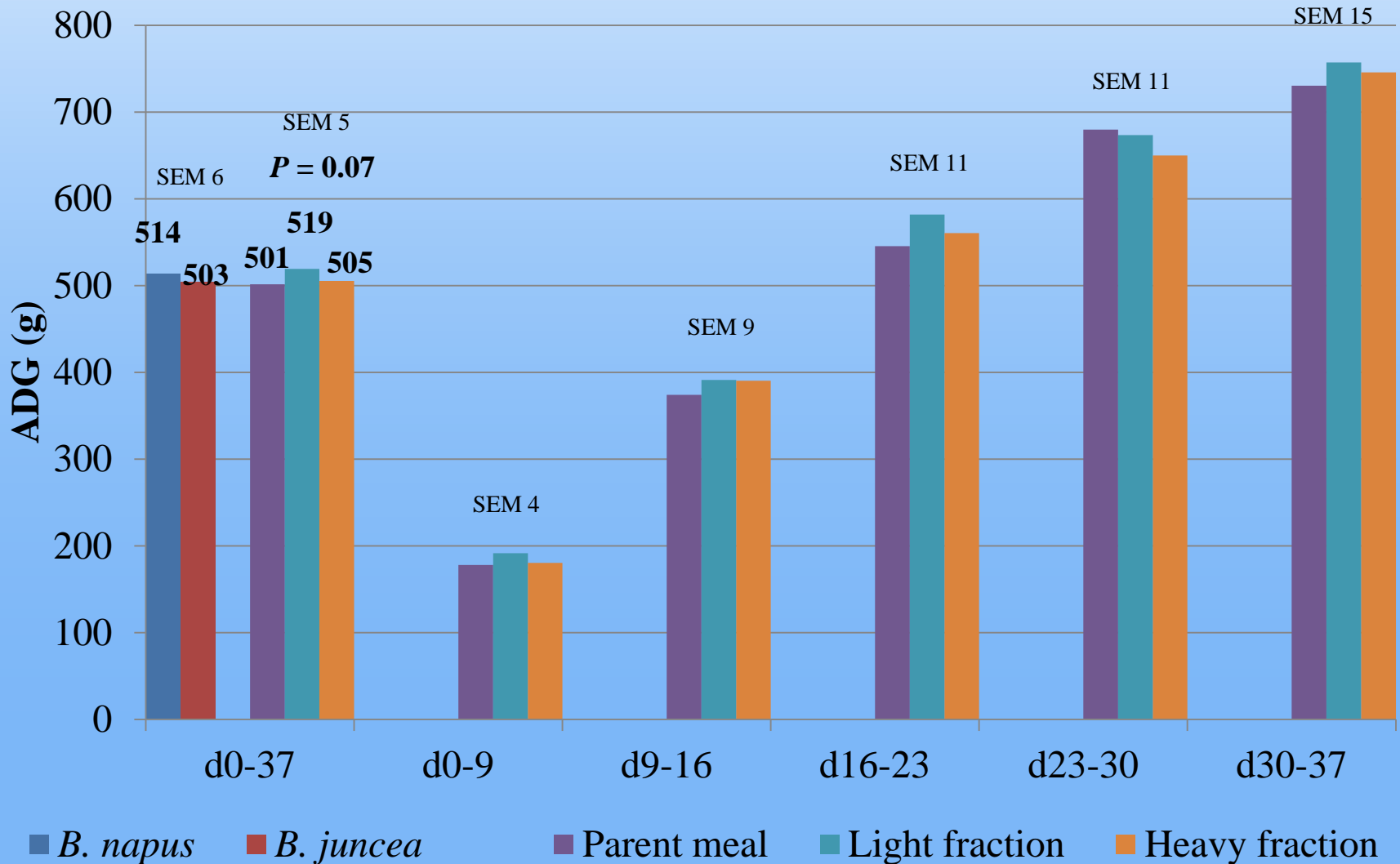
Apparent Total Tract Digestibility



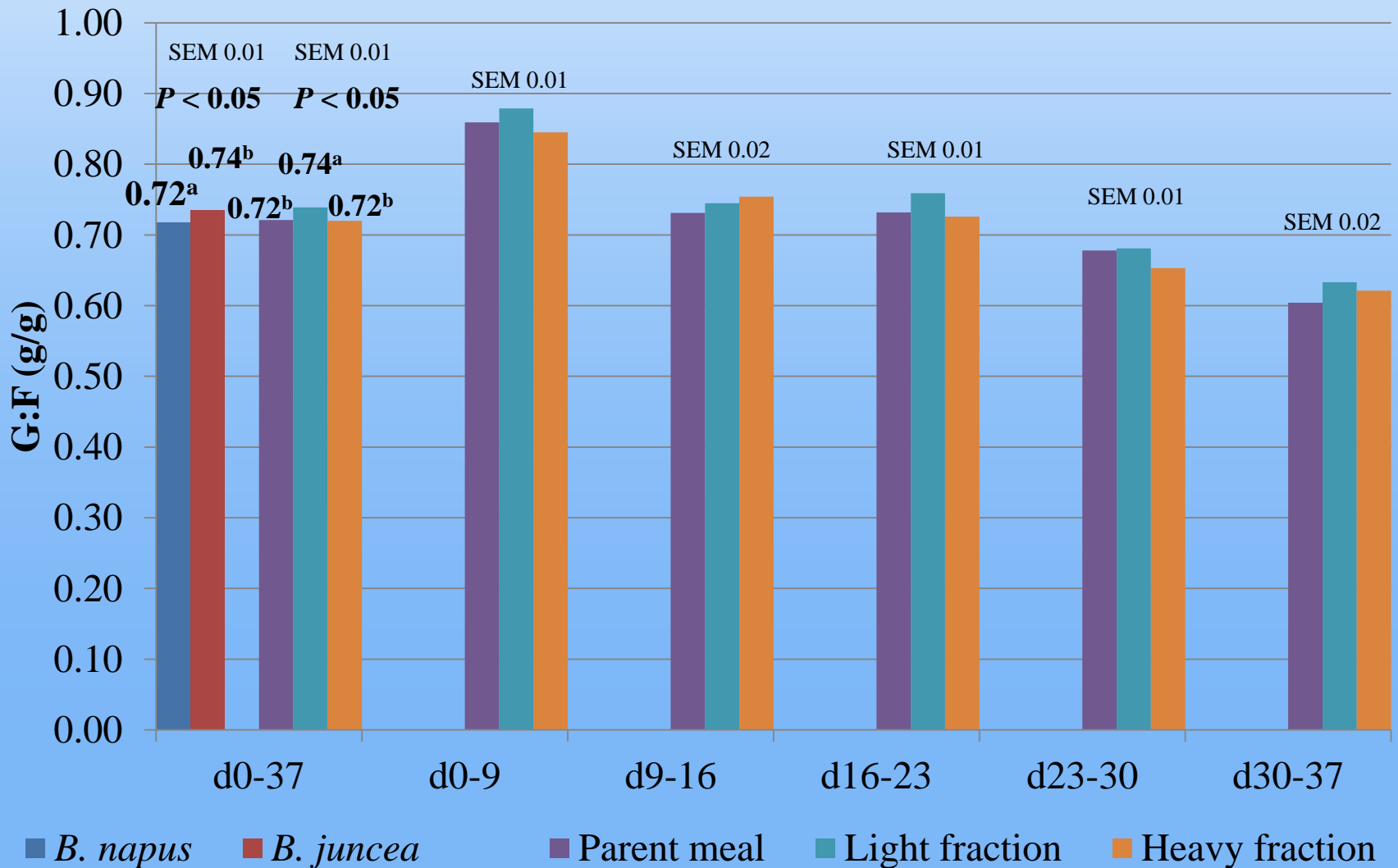
Feed Disappearance



Weight Gain



Gain:Feed



Conclusion

- Air classification reduced the fibre content and enhanced the nutritional value of canola meal.
- Compared to the parent meals, feeding the low-fibre fractions improved diet ATTD of DM, GE and CP, but only had a minor effect on growth performance of weaned pigs.

Thank you!



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada