Effects of supplementing carinata meal compared with cottonseed meal on performance, intake, and digestibility in backgrounding beef heifers consuming a corn silage-based diet

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Introduction

- *Brassica carinata* (carinata) meal contains ~43% crude protein
  - Ideal for beef cattle supplementation
- Oil extraction methods have recently been modified
  - Glucosinolate content: <5.0 µmol/g
- Backgrounding, growing of cattle from weaning until feedlot entry, is challenging, both nutritionally and economically
- Replacing cottonseed meal, a commonly used protein source, with carinata meal in backgrounding beef heifers could increase the value of carinata in the SE U.S.
  - Economic relief to producers
  - Stability

Objective:

Evaluate the effects of supplementing carinata meal compared with cottonseed meal on performance, intake, and digestibility in backgrounding beef heifers consuming a corn silage-based diet

Materials & Methods

Angus crossbred heifers (337 ± 36 kg of initial BW) over a 75-d period

Stratified/blocked by BW, randomly allocated to treatment within pen (GRBD)

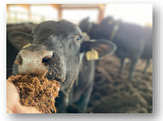
Performance: *n* = 84, 56 d; Digestibility: *n* = 28, 5 d

Treatments:

- CS = 99% corn silage (8.4% CP)
- BCM10 = 89% corn silage + 10% carinata meal (11.8% CP)
- BCM20 = 79% corn silage + 20% carinata meal (15.0% CP)
- CSM = 89% corn silage + 10% cottonseed meal (11.4% CP)

Protein supplements were mixed with corn silage and a vitamin-mineral premix (1% DM basis) prior to delivery. Diets were provided ad libitum. Individual intake was measured using the GrowSafe System.

Brassica carinata meal supplied by Nuseed.



Data were analyzed as a generalized randomized block design using the GLIMMIX procedure of SAS. Model for performance, intake, and digestibility data included fixed effects of treatment, with initial BW used as a covariate, and random effect of pen.

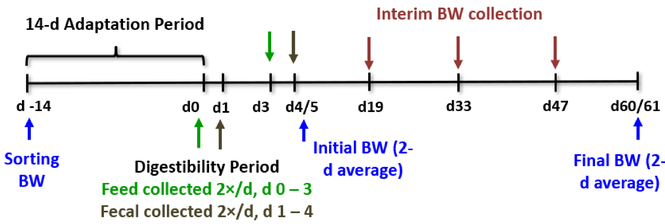


Figure 1. Schedule of 75-d experimental period.

All photos credited to Federico Tarnonsky

Results

Table 2. Effects of protein supplementation on performance parameters.

	Treatment					
Item	CS	BCM10	BCM20	CSM	SEM	*P*-value
ADG, kg	0.72[a]	1.37[b]	1.39[b]	1.34[b]	0.049	<0.01
DMI, kg/d	7.41[a]	9.47[b]	9.15[ab]	9.07[ab]	0.264	0.01
DMI, % of BW	1.97	2.29	2.21	2.07	0.060	0.35
G:F, kg/kg	0.10[a]	0.15[b]	0.15[b]	0.16[b]	0.005	<0.01
RFI, kg DM	0.24	0.47	-0.43	-0.28	0.506	0.94

ADG = Average daily gain; DMI = Dry matter intake; G:F = gain to feed ratio; RFI = residual feed intake

[a,b]Within a row, treatment means with different superscripts differ, $P < 0.05$.

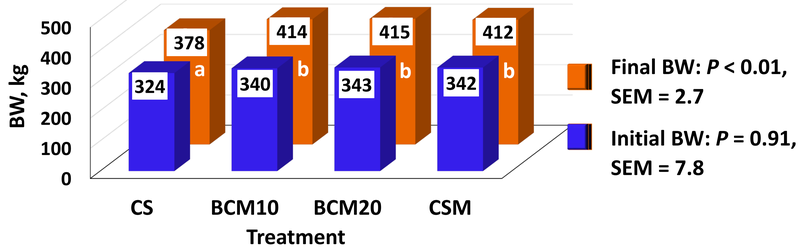


Figure 2. Effects of protein supplementation on initial and final body weight.

Table 3. Effects of protein supplementation on intake and digestibility of nutrients.

	Treatment					
Item	CS	BCM10	BCM20	CSM	SEM	*P*-value
Intake, kg/d						
DM	6.83[a]	8.26[a]	8.49[a]	11.30[b]	0.518	<0.01
OM	6.62[a]	7.84[a]	8.11[a]	10.75[b]	0.494	<0.01
CP	0.53[a]	0.88[b]	1.22[c]	1.08[c]	0.055	<0.01
NDF	2.34[a]	2.78[a]	2.64[a]	3.67[b]	0.169	<0.01
ADF	1.21[a]	1.42[a]	1.31[a]	1.93[b]	0.087	<0.01
Digestibility, %						
DM	54.47[a]	63.47[b]	70.61[c]	66.24[bc]	1.374	<0.01
OM	56.88[a]	64.96[b]	72.23[c]	67.56[bc]	1.314	<0.01
CP	29.88[a]	46.03[b]	64.34[c]	45.83[b]	2.480	<0.01
NDF	27.62[a]	41.73[b]	53.19[c]	43.04[b]	1.949	<0.01
ADF	28.03[a]	43.06[b]	51.52[c]	45.30[bc]	1.783	<0.01

DM = Dry matter; OM = Organic matter; CP = Crude protein; NDF = Neutral detergent fiber; ADF = Acid detergent fiber

[a,b,c]Within a row, treatment means with different superscripts differ, $P < 0.05$.

Conclusion

Carinata meal can be used as an alternative to cottonseed meal in backgrounding beef heifers consuming a corn silage-based diet, thereby increasing the value of carinata in the SE U.S.

Table 4. Feed cost of gain (FCOG) of protein supplements in a corn silage-based diet.

Diet	Total diet cost / ton of DM	FCOG, $/45 kg
CS	$104	$52.98
BCM10	$134	$45.88
BCM20	$164	$53.49
CSM	$137	$46.11

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