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Part III: Digestibility of eight hybrid sorghum grains and three hybrid corns

Abstract

Apparent coefficient of digestion (COD) was determined for eight hybrid sorghum grains and three hybrid corns named in Part I.

Keywords

Cattlemen's Day, 1972; Report of progress (Kansas State University. Agricultural Experiment Station); 557; Beef; Digestibility; Hybrid sorghum; Hybrid corn

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Part III
Digestibility of Eight Hybrid Sorghum Grains
And Three Hybrid Corns

R.L. McCollough and B.E. Brent

Introduction

Apparent coefficient of digestion (COD) was determined for eight hybrid sorghum grains and three hybrid corns named in Part I.

Material and Methods

The apparent COD was determined for the 11 hybrid grains described in Part I, using the 49 individually fed Angus steers previously described. Chromic oxide was used as a digestion indicator.

After a 63-day preliminary period and seven days before collections were started, each individual steer was adjusted to a constant feed intake that approximated free choice consumption. That intake was maintained through the collection period. Starting one week before collection, 100 grams of a pelleted chromic oxide premix (88 gm ground sorghum, 7 gm of dried molasses, 5 gm chromium oxide) was fed each morning. From each steer, 12 fecal samples were collected in 6 days. Sampling times were arranged to remove diurnal variation.

All means reported were calculated by least squares method.

Results and Discussion

Table 20 shows apparent digestibilities for the eight hybrid sorghums and three hybrid corns. Differences among hybrids for feed intake or digestibilities of crude fiber were not significant. Differences in digestibilities for crude protein were highly significant ($P < .001$) with BR-1023 (21.46) significantly lower than other hybrids. Hybrids differences for digestibility of NFE, dry matter and gross energy were significant ($P < .05$).

Table 21 shows percentages of digestible nutrients of the sorghum grain hybrids and corns. BR-1023 had less ($P < .001$) digestible crude protein than other hybrids. The corn tended to have more digestible crude protein than the sorghum grain. Digestible ether extract was higher for the corns than for sorghum because corns had higher ether extract contents. Corns tended to have more digestible NFE and TDN than sorghum grains, with BR-1023 ranking lowest.

Digestible energy (Kcal per gram) was less ($P < .01$) for R-109 (2.803) and BR-1023 (2.824) than for the other hybrids.

Summary

Chromic oxide was used to determine digestibilities of eight hybrid sorghum grains and three hybrid corns.

The digestibilities of crude protein were significantly lower ($P < .001$) for ACCO 1023 (bird resistant, 21.46) than for the others. In general, digestibilities were higher for hybrid corns than for hybrid sorghum grain, and Nc^+ RS-671 (white endosperm) grains tended to be lower than yellow endosperm grains. BR-1023 tended to be the least digestible of the hybrid sorghum grains.

Table 20. Apparent digestibilities of eight hybrid sorghum grains and three hybrid corns (least square means).

Hybrid	No. head	Daily feed intake, lb.	Apparent digestibilities					
			Crude protein	Crude fiber	Ether extract	Nitrogen free extract	Dry matter	Gross energy
G-766W	5	15.79	51.02 ^{bcd}	17.98	28.63 ^{bcd}	80.00 ^{abc}	71.18 ^{abcd}	68.77 ^{abc}
R-109	5	15.85	51.39 ^{bcd}	32.14	45.08 ^{ab}	71.34 ^{bc}	66.38 ^{cd}	60.47 ^c
62 E-57	5	14.96	49.40 ^{cd}	28.18	37.84 ^{bc}	76.61 ^{abc}	70.13 ^{bcd}	68.51 ^{abc}
NK-222	5	15.61	55.30 ^{abcd}	33.86	19.01 ^d	79.59 ^{abc}	72.40 ^{abcd}	69.91 ^{abc}
RS-671	5	16.16	46.01 ^d	19.59	59.82 ^a	70.79 ^c	64.30 ^d	64.85 ^{bc}
BR-1023	5	13.96	21.46	15.89	22.50 ^{cd}	77.16 ^{abc}	63.36 ^d	59.66 ^c
Jumbo-C	5	15.53	46.62 ^d	26.38	16.19 ^d	81.16 ^{abc}	72.61 ^{abcd}	70.24 ^{abc}
H. oil corn	5	12.96	57.77 ^{abc}	33.68	58.72 ^a	81.50 ^{ab}	74.07 ^{abc}	71.09 ^{abc}
Reg. corn	5	14.42	61.56 ^{ab}	45.00	61.45 ^a	86.52 ^a	79.78 ^a	78.13 ^a
H 2/3 waxy	2	16.37	57.66 ^{abc}	27.92	46.05 ^{ab}	84.41 ^a	76.62 ^{ab}	73.85 ^{ab}
H lys. corn	2	14.41	62.35 ^a	41.38	57.44 ^a	84.33 ^a	78.00 ^a	75.84 ^{ab}

a, b, c, d Means with different superscript differ significantly (P<.05).

Table 21. Percentages of digestible nutrients of eight hybrid sorghum grains and three hybrid corns (least square means).

Hybrid	Dry matter basis					Dig. energy Kcal/gm
	Crude protein	ether extract	Crude fiber	Nitrogen free extract	TDN	
G-766W	5.48 ^{ab}	.90 ^{cde}	.32 ^{cd}	65.92 ^{abcd}	73.74 ^{bc}	3.187 ^d
R-109	5.67 ^{ab}	1.28 ^{cd}	.52 ^{bcd}	59.00 ^{cd}	68.07 ^c	2.803
E-57	5.29 ^b	.87 ^{cde}	.48 ^{bcd}	63.94 ^{abcd}	71.67 ^{bc}	3.156 ^d
NK-222	6.85 ^a	.44 ^e	.79 ^{bcd}	65.30 ^{abcd}	73.93 ^{bc}	3.263 ^d
RS-671	5.43 ^{ab}	1.47 ^b	.48 ^d	57.92 ^d	67.14 ^c	2.929 ^d
BR-1023	3.02	.70 ^{de}	.38 ^{cd}	60.39 ^{bcd}	65.37 ^c	2.824
Jumbo-C	5.51 ^b	.46 ^e	.39 ^{cd}	66.79 ^{abc}	73.72 ^{abc}	3.172 ^c
H. oil corn	7.06 ^a	3.32	.74 ^{abcd}	63.67 ^{abcd}	78.94 ^{ab}	3.371 ^c
Reg. corn	6.58 ^a	2.25 ^{ab}	.99 ^a	70.63 ^a	83.26 ^a	3.468 ^a
2/3 waxy	6.90 ^a	1.31 ^c	.81 ^{abc}	67.66 ^{ab}	78.32 ^{ab}	3.253 ^{bc}
H. lys. corn	6.80 ^a	3.00 ^a	1.00 ^{ab}	67.03 ^{abc}	81.58 ^{ab}	3.401 ^{ab}

^{abcd} Means with different superscripts differ significantly ($P < .05$).

Summary of 1970-1971 Feedlot Performance and Digestibility of Eight Hybrid Grain Sorghums and Three Hybrid Corns

Acco 1023 (bird resistant) produced significantly poorer feed efficiency and lower dressing percentage than did other hybrids. Acco 1023 also had the lowest digestibilities for crude protein, nitrogen free extract, and gross energy. Regular yellow dent corn tended to have the best feed efficiency and highest digestibilities. Yellow endosperm hybrid grain sorghums tended to have better feed efficiencies than white endosperm hybrid sorghums. If different hybrid grains are compared using feed efficiency it would take 116.5 pounds of white endosperm and 105 pounds of yellow endosperm sorghum grain to produce the same grain as 100 pounds of regular yellow dent corn. Feed efficiency of the 4 yellow endosperm hybrid sorghums was 9.75% better than that of 2 white endosperm sorghums.

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Nc⁺ Hybrids, Hastings, Nebraska.
Frank Rudolph, Manhattan, Kansas.