

The Relative Feeding Value of Dried Molasses Beet Pulp Produced with Various Types of Saccharate Filtrates

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Recently there has been greatly increased interest in the nutritional value of certain saccharate filtrates which for many years have been, and, in many instances, are still being discarded in the process of manufacturing refined beet sugar.

While the recovery of specific substances of commercial value separable from these saccharate filtrates, such as potash and glutamic acid, have stimulated this interest, the growing need to reduce the amount of so-called waste end products from commercial plants has also emphasized the urgency of determining the value of these by-products.

The so-called saccharate filtrates referred to in these studies are most commonly called Johnstown "B" molasses or Johnstown feeder molasses; concentrated Steffen's Filtrate or C.S.F.; and "G.A." mother liquor, which consists of the end liquor derived from beet molasses in the glutamic acid extraction process, either neutralized with lime to 7.0 pH or at 3.2 pH, respectively.

For the cattle feeding tests described herewith, these four saccharate filtrates were all desalted and were then dried on beet pulp to provide 20 percent dry substance respectively of the dried molasses beet pulp produced for the trials, which pulp was designated respectively "B" Molasses pulp, No. 1 Hi-pro pulp for the "C.S.F." pulp, No. 2 Hi-pro pulp for the neutralized G.A. end liquor pulp, and M.C. 47² pulp for the acid G.A. end liquor pulp.

Johnstown "B" molasses, or Johnstown feeder molasses, as it is called at present, the saccharate filtrate recovered from the Johnstown, Colorado, plant of the Great Western Sugar Company, has been used successfully both as a feeding supplement and dried on beet pulp since 1935, or for the past 17 years. The other saccharate filtrates had not been dried on beet pulp prior to these tests.

In the first fattening test with yearling steers conducted at the Colorado A & M College Experiment Station for a period of 154 days during the winter of 1950-51, the dried molasses beet pulp products were fed as one-third by weight of the grain ration, mixed with ground shelled corn. The balance of the ration consisted of corn silage, soybean meal, baled alfalfa hay and salt.

The second fattening test, conducted at the Windsor, Colorado, farm of the Great Western Sugar Company under the supervision of the Colorado Experiment Station, was also carried on with yearling steers and for a period of 186 days. In this test the dried molasses beet pulp products were fed as one-half by weight of the grain ration, and were mixed with ground barley. The balance of the ration consisted of ground alfalfa hay, soybean meal and salt.

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² M.C. 47 was supplied by International Minerals and Chemical Company, Jan Jose, California.

Table 1.—The Relative Feeding Value of Dried Molasses Beet Pulp Produced with Various Types of Saccharate Filtrates. Experiment No. 1, Animal Investigations Section¹, Colorado A & M Experiment Station, Fort Collins Colorado. Steers Fed 150 Days—October 24, 1950, to March 27, 1951. (Table based on one average steer)

Lot Number	1	2	3	4
Number of Steers	9	9	9	9
Rations Fed: ² Salt self-fed in all lots	B. Mol. Pulp Gr. Corn S.B. Meal Corn Sil. Bal. Alf.	No. 1 Hipro Pulp Gr. Corn S.B. Meal Corn Sil. Bal. Alf.	No. 2 Hipro Pulp Gr. Corn S.B. Meal Corn Sil. Bal. Alf.	MC 47 Pulp Gr. Corn S.B. Meal Corn Sil. Bal. Alf.
Initial Wt. (Feedlot)	877	875	876	879
Market Wt. (Denver)	1,218	1,222	1,201	1,208
Total Gain	341	347	325	329
Daily Gain	2.21	2.25	2.11	2.14
Average Daily Ration:				
B Molasses Pulp	5.62			
No. 1 Hipro Pulp		5.44		
No. 2 Hipro Pulp			5.17	
MC 47 Pulp				5.44
Ground Corn	11.66	11.31	10.75	11.29
Soybean Meal	.92	.92	.91	.92
Corn Silage	8.13	8.04	8.03	8.13
Baled Alfalfa	3.46	3.46	3.39	3.42
Salt	.01	.02	.02	.02
Feed Required per Cwt. Gain:				
B Molasses Pulp	253			
No. 1 Hipro Pulp		242		
No. 2 Hipro Pulp			245	
MC 47 Pulp				254
Ground Corn	326	502	510	528
Soybean Meal	41	41	43	45
Corn Silage	367	357	381	380
Baled Alfalfa	156	154	161	160
Salt	.7	.8	1.0	.9
Feed Required per Cwt. Gain:	27.39	26.34	26.99	27.67
Market Value (Denver)	\$7.05	\$7.25	\$6.85	\$7.05
Selling Price Needed to Cover Steer and Feed Cost	29.26	28.96	29.19	29.37
Carcass Yield	61.8	64.2	62.6	63.5
Carcass Grade:				
Prime	1	2	1	
Choice	8	7	7	9
Good			1	

¹ In cooperation with Great Western Sugar Co., Denver, and with International Minerals and Chemical Corporation, Chicago, Ill.

² Feed Costs Used: B Molasses Pulp at \$39.50 T; No. 1 Hipro Pulp at \$39.50 T; No. 2 Hipro Pulp at \$39.50 T; MC 47 Pulp at \$39.50 T; Ground Corn at \$61.00 T; Soybean Meal at \$95.00 T; Corn Silage at \$12.00 T; Baled Alfalfa at \$27.00 T; and Salt at \$21.00 T.

Table 2.—The Relative Feeding Value of Dried Molasses Beet Pulp Produced with Various Types of Saccharate Filtrates. Experiment No. 2, Animal Investigations Section, Colorado A & M Experiment Station, Fort Collins, Colorado.¹ Fed 186 days—Dec. 20, 1950, to June 24, 1951. (Table based on one average steer)

Lot No.	1	2	3	4
Number of steers	19	20	20	20
Rations Fed:^a	Gr. Barley B. mol. pulp S.B. meal Gr. alf.	Gr. Barley No. 1 Hipro S.B. meal Gr. alf.	Gr. Barley No. 2 Hipro S.B. meal Gr. alf.	Gr. Barley MC 47 pulp S.B. meal Gr. alf.
Initial Wt. (Feedlot)	693	692	685	693
Market Wt. (Denver)	1,082	1,087	1,077	1,096
Total Gain	389	395	392	403
Daily Gain	2.09	2.12	2.11	2.17
Average Daily Ration:				
Ground barley	7.62	7.81	7.55	7.94
"B" Mol. beet pulp	7.82	.....	.....	.....
No. 1 Hipro pulp	.....	7.81	.....	.....
No. 2 Hipro pulp	.....	.....	7.55	.....
MC 47 pulp	.....	.....	.....	7.94
Ground alfalfa	5.28	5.42	5.39	5.42
Soybean meal	.97	1.00	1.00	1.00
Salt	.03	.03	.04	.02
Feed Required per Cwt. Gain				
Ground barley	364	368	358	367
"B" Mol. beet pulp	364	.....	.....	.....
No. 1 Hipro pulp	.....	368	.....	.....
No. 2 Hipro pulp	.....	.....	358	.....
MC 47 pulp	.....	.....	.....	367
Ground alfalfa	252	255	256	250
Soybean meal	46	47	47	46
Salt	1.5	1.5	1.7	.9
Feed Cost per Cwt. Gain	\$23.16	\$23.41	\$22.94	\$23.21
Market Value (Denver)	\$36.45	\$36.61	\$35.97	\$36.15
Carcass yield	62.56	63.02	61.98	62.19
Carcass Grade:				
Prime	14	13	12	13
Choice	5	7	8	7

¹ In Cooperation with Great Western Sugar Company, Denver, Colorado.

² Feed Costs Used: Ground Barley at \$55.00 T; B. Molasses Pulp at \$39.50 T; No. 1 Hipro Pulp at \$39.50 T; No. 2 Hipro Pulp at \$39.50 T; MC 47 Pulp at \$39.50 T; Gr. Alfalfa at \$29.50 T; Soybean Meal at \$95.00 T; Salt at \$21.00 T.

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Table 3.—Analysis of Dried Molasses Beet Pulp Used in Cattle Feeding Tests.

	Johnstown "B" Molasses Pulp		"C.S.F." Hipro No. 1 Molasses Pulp		Neutral G.A. End Liquor Hipro No. 2 Molasses Pulp		Acid G.A. End Liquor, M.C. 47 Molasses Pulp	
	% on Orig.	% on Dry Sub.	% on Orig.	% on Dry Sub.	% on Orig.	% on Dry Sub.	% on Orig.	% on Dry Sub.
Moisture	5.0	.....	5.4	.....	5.1	.....	4.9	.....
Ash	7.6	8.0	7.7	8.1	6.2	6.6	7.2	7.6
Crude Protein	9.7	10.2	12.7	13.4	13.2	13.9	13.6	14.3
Crude Fat	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Crude Fiber	19.4	20.5	18.9	20.0	21.0	22.1	19.6	20.6
N. Free Extract	58.1	61.1	55.1	58.3	54.3	57.2	54.5	57.3

Detailed data secured in these two feeding experiments are included in the tables presented herein. While there were no really significant differences shown in the average rate of gain secured on the different lots of animals fattened, the Hipro No. 1 lot, fed dried molasses pulp produced with the concentrated, desalted Steffen's filtrate did produce the heaviest average daily gains, or 2.185 pounds per head per day, while this same pen also showed the highest dressing percentage or carcass yield for an average of 63.61 percent.

The really significant fact developed by these two cattle fattening experiments was that any one of these saccharate filtrates could be used successfully in the production of dried molasses beet pulp, and that a 20 percent dry substance molasses pulp produced with any of them could be expected to produce as good results as have been secured during the past 17 years with the standard dried molasses beet pulp produced with Johnstown feeder molasses.