

Evaluation of Particle Length Reduction During Silage Removal Using a Bunker Facer

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Objective:

Bunker-facer systems are being used on dairy farms in Wisconsin for silage removal. We were concerned that this practice may reduce silage particle length. The objective of this study was to determine the effect of using a bunker facer for silage removal on silage particle length.

Methods:

Silage was sampled three ways for particle length analysis: 1) hand removal from face, 2) after bucket removal from face, and 3) after facer-unit removal from face. Both corn silage and alfalfa silage bunkers were sampled. Hand removal was done using a trowel to expose a fresh face to avoid influence from the previous removal method. Bucket removal was accomplished by working the bucket up the face to dislodge 4 to 6 inches of silage. Facer units were attached to either skid steers or sky lifts. The facer units were started at the top of the bunker and were worked down the face to remove 4 to 6 inches of corn silage or 2 to 4 inches of alfalfa silage. Composite samples were collected from the pile at the foot of the bunker avoiding silage from the top foot of the bunker, because this material tended to fall off without much impact of the facer units or bucket. Particle length measurement was done using the Penn State – Nasco shaker box to separate silage samples into coarse, medium, and fine particle fractions. The weight of sample retained in each fraction was recorded and the proportions calculated. Samples were taken on one day each week for three weeks on each farm. Bunker-facer systems evaluated were Valmetal (VM; Valmetal, Tomah, WI; 6 and 8 ft. models; \$3,500 approximate cost), Bunker Buster (BB; Gehl, Co., West Bend, WI; \$3,500 approximate cost), and Bunker Claw (BC; D&D Equipment, Chilton, WI; \$5,000 approximate cost). On Farm A, silage removal with VM was compared to hand removal for alfalfa silage. On Farm B, silage removal with VM was compared to hand removal for corn silage. On Farm C, silage removal with VM, BB, and BC were compared to hand removal for alfalfa silage. On Farm D, silage removal with BB was compared to hand and bucket removal for alfalfa silage and corn silage. Data were pooled across farms and analyzed using Proc GLM of SAS; the model included farm, forage type, sample day, bunker-facer system, forage x bunker-facer system, and farm x bunker-facer system effects.

Results:

The results are summarized in the table. As one would expect, corn silage was finer than alfalfa silage ($P < 0.001$) and silage particle length varied by farm ($P < 0.01$ and $P < 0.001$). Silage particle length was unaffected by day of sampling, which indicates that silages and sampling and sieving techniques were consistent across the study. Silage particle length was unaffected by bunker-facing system. Under the conditions of this study, we found no evidence that the bunker-facing systems evaluated reduce silage particle length during removal of silage from the bunker

Farm	Forage	Bunker-Facer	Top or Coarse Fraction, %	Middle Fraction, %	Bottom or Fine Fraction, %
A	Alfalfa Silage	Valmetal	39.7	45.0	15.3
A	Alfalfa Silage	Hand	40.1	44.7	15.4
B	Corn Silage	Valmetal	10.6	74.2	15.2
B	Corn Silage	Hand	11.6	75.0	13.4
C	Alfalfa Silage	Valmetal	27.0	46.3	26.7
	Alfalfa Silage	Bunker Buster	31.8	41.9	26.2
	Alfalfa Silage	Bunker Claw	30.5	44.8	24.8
	Alfalfa Silage	Hand	30.9	45.1	24.0
D	Alfalfa Silage	Bunker Buster	43.2	40.3	16.6
	Alfalfa Silage	Bucket	48.2	42.6	9.3
	Alfalfa Silage	Hand	45.7	33.7	20.6
	Corn Silage	Bunker Buster	6.0	78.3	15.7
	Corn Silage	Bucket	11.2	74.3	14.5
	Corn Silage	Hand	7.6	77.4	15.0
SEM			1.6	1.3	1.1
Effects					
Farm			<i>P</i> < 0.01	NS	<i>P</i> < 0.001
Forage Type			<i>P</i> < 0.001	<i>P</i> < 0.001	NS
Sample Day			NS ¹	NS	NS
Facer System			NS	NS	NS
Interactions			NS	NS	NS

¹NS = Non significant.