

Confinement beef cow calf production manure nutrient characteristics and value

A.S. Leaflet R3315

Russ Euken, ISU Extension Livestock Specialist and
Shawn Shouse, ISU Extension Ag Engineering Field
Specialist

Summary and Implications

Iowa cow calf producers have interest in and have been using roofed bedded confinement buildings for beef cow production. Potentially more manure nutrients can be captured for crop production in this system. This summary characterizes the manure nutrient analysis from several producers using bedded confinement systems.

Introduction

Traditional cow calf production utilizes grazing during the growing season. When cows are grazing manure nutrients are recycled and utilized on the grazed land. If cows are in confinement, the manure nutrients can be captured and applied for row crop production. The amount of nutrients in the manure relates to the value of the manure.

Materials and Methods

In 2015, a three-year project working with producers using different cow calf production systems was implemented by the Iowa Beef Center. One part of the project was to sample and analyze manure from producers using confinement production.

Eight samples from five producers using bedded confinement for beef cows were taken and sent to Dairyland Labs and analyzed for moisture, total nitrogen - N, phosphorus-P₂O₅ and potassium-K₂O.

Samples were taken in different seasons and varying locations in the building or from manure stockpiles.

Results and Discussion

Average and ranges of the sample analysis are shown in Table. 1.

Bedded cow calf manure as compared to beef feedlot bedded confinement manure analysis shows that moisture is similar, nitrogen is much lower, phosphorus is slightly lower, and potassium is slightly higher in concentration.

Based on the range and standard deviation in the samples it is recommended that producers sample the manure from their building and analyze it to make crop

application decisions. Differences in source and amount of bedding, diets, and cattle density in the building could affect manure nutrient values. However, the averages provide a starting point for producers to determine the value of manure from a bedded cow calf confinement building.

Producers need to take into account that not all the nutrients are available for crop production when the manure is applied. The ISU publication PM 1003 Using Manure Nutrient for crop production indicates that nitrogen from bedded cattle manure is 30-40% available in the first year. At 40 % availability there would be 4 lbs. of N per ton available for crop production in the first year after application, based on the average amount of N in the manure samples. Phosphorus and potassium are 60-100% available primarily based on soil test of the application field. In addition, the manure nutrients applied should offset any commercial fertilizer applied to capture full value of the manure.

The project did not measure the amount of manure from these buildings. A calculated estimate based on reported manure production of beef cows and typical bedding amounts would suggest up to 13 tons per head per year of manure could be available for land application if the cows were in the building the entire year. Again, amount of bedding, diet, and cattle density could affect the quantity of manure and the amount could vary greatly from one operation to another. The application cost of the manure should be subtracted from the nutrient value to calculate the manure value for crop production.

Table 1. Average and range of manure sample analysis of beef cows in confinement systems

	% moisture	Total N ¹	P ₂ O ₅ ¹	K ₂ O ¹
Avg.	69	10	7	16
Min.	52	7.8	3.6	8.4
Max.	75	12.8	10.4	27.6
Std. dev.	8	1.8	2.5	6.3

¹lbs./ton

Acknowledgements

Funding for the project was provided by the Iowa Beef Center and Leopold Center for Sustainable Agriculture at Iowa State University. Additional thanks to the cooperating producers and ISU Extension Beef Field Specialists for assistance with the project.