

from the premises where it will be utilized.

It appears in view of high feed grain costs, protein shortages and a procedure to utilize a liability into an asset that recycling manure will be a part of many cattle feeding operations.

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## Palatability and Digestibility of Feedlot Waste in Ruminant Rations

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Animal manures have been used as a source of livestock feed for many years. Hogs have been used in the feedlot to salvage undigested feed that passed through cattle. In fact, growth responses, beyond that to be expected from the grain present, have been noted in both chickens and hogs feeding on cattle manure. One of these previously “unidentified growth factors” has since been identified as Vitamin B-12. This vitamin at one time was commonly referred to as the “cow manure factor.”

Research has been conducted in recent years incorporating poultry litter in beef cattle and sheep rations as a source of protein. The results indicate this can be done successfully. Poultry litter has also been recycled in broiler and layer rations with no palatability problems with either the birds fed these rations or the people which consumed the meat and eggs produced by these birds. In fact, taste panel studies showed a slight preference for meat from litter-fed broilers in one report. Several researchers have fed cattle manure back to cattle and sheep in finishing rations and to gestating and lactating females with promising results.

We have conducted some studies on the feeding of cattle and sheep manure at the Ohio Agricultural Research and Development Center. These rations have been reasonably well accepted by cattle and sheep.

An experiment was conducted with sheep to deter-

mine the digestibility of feces (no urine or bedding) from cattle which had been fed rations containing two forms of dry corn grain - whole shelled corn (WSC) and crimped corn (CC) alone and with 20 lbs. of corn silage daily. The dry matter digestibility of the all-corn fed cattle feces was 40% (one ration contained 94% feces from all-corn fed cattle) whereas, the dry matter digestibility of the silage fed cattle feces was 19%.

In another experiment three 600 lb. steers were fed an all-concentrate ration and bedded with chopped wheat straw. The manure was packed in 55 gallon barrels with plastic liners, with no additions, and allowed to ferment. The pH of the manure was 7.5 when removed from the pen and dropped to 4.5 to 5.0 after fermentation.

This fermented manure was fed as the sole ration for 60 days to two 700 lb. steers. The steers consumed up to 50 lbs. per head daily of this fermented manure and maintained their weight during this period.

In a third experiment corn stover was used as bedding for cattle fed an all concentrate ration in group pens. The resulting manure was allowed to accumulate for 75 days. It was then removed and stacked with flail manure spreaders after the addition of 10% ground shelled corn. The stack was covered with sheet plastic and allowed to ferment.

This corn-stover-bedded fermented manure was fed to cattle housed in individual pens and compared

to corn silage. During the 80-day cattle feeding experiment there was no apparent difference in palatability between corn silage and fermented manure when the corn grain component was kept equal.

The apparent digestibility of the ration fed the cattle, plus the fermented manure directly from the stack, was measured with sheep. The fermented manure direct from the stack (without additional corn grain) was higher in crude protein than the other treatments fed. The coefficient of digestion of the crude protein in this material was also higher than any other treatment. The dry matter digestion coefficient for this material was less than the other treatments, which is no doubt a reflection of lower energy content.

In another study group, fed cattle on an all-concentrate ration were bedded with chopped straw (8 lb./head/day). After 60 days' accumulation the manure was directed to a forage wagon where 10% ground shelled corn was added on top of each load. This manure was then blown into an 8 ft. x 40 ft. concrete stave silo for fermentation.

A growing-finishing cattle feeding trial was conducted to determine the role of various roughage sources on a full-feed of whole shelled corn. Corn

cobs, corn silage and straw-bedded fermented manure were compared with an all concentrate ration fed to steers. All the roughage sources studied prevented rumen wall abnormalities observed in the all-concentrate fed cattle. The incidence of liver abscesses was high for the all-concentrate fed cattle. This problem was less when five lbs. of corn silage daily was fed or by including 3% pelleted cobs, and the problem was eliminated by feeding 6% or 12% cobs, 15 lbs. of corn silage, or 5 or 15 lbs. of fermented manure.

In the current practice of feeding "high concentrate" or "all concentrate" rations to beef cattle, a large source of energy is lost due to incomplete digestion. There are materials other than energy in cattle manure which probably also have salvage value.

Beyond the economic factors involved is the implication of reduced environmental pollution from animal waste. This problem could be reduced considerably by recycling feedlot residues.

Feedlot residues which are now considered to be waste and an economic liability may be useful as an animal feed. If so, this would result in a more economically efficient method of feeding cattle plus reducing environmental pollution by recycling feedlot residue.

## An Approach to Herd Health Programming for the Smaller Cattle Feedlot Operation

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With the livestock production methods changing to larger more complex and costly units, the veterinarian is assuming more of a role in disease prevention and control in cattle feeding enterprises by becoming a staff member or consultant for these units. His services are available on a periodic and regular basis, and he renders continual consultative advice. The following outline is a general approach for such veterinary services to the smaller-sized feedlot operation, which in effect would put the veterinarian on the feedlot's management staff and his services and advice would be available on a year-round basis.

I am deeply indebted to Dr. John Herrick for his advice, counsel and technical assistance when we first embarked on this type of program. Many of these items were initially espoused by him.

*Basic concepts of the approach:*

1. The veterinarian would schedule regular visits to the feedlot for routine advice and consultation. Unscheduled visits should be made as often as

required. During a disease outbreak the veterinarian should visit the feedlot as often as necessary. The veterinarian would also survey all newly-received animals. The veterinarian would be available to the feeder for consultative advice either by telephone or in person whenever the need arises.

2. Treatment of sick animals: Under the advice and supervision of the veterinarian employees of the feedlot would perform the majority of the actual medication of the sick animals. The veterinarian would examine such animals as necessary to make a diagnosis and to advise on re-treatments.
3. The veterinarian would perform necessary surgery. Either on the premises or at his clinic facilities. He would also instruct those laymen assigned the responsibility the proper techniques for handling routine surgical matters.
4. The veterinarian would perform all autopsies necessary in establishing a diagnosis. All observations would be recorded.