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A period of adaptation to urea during which feedlot performance is suppressed is frequently experienced when this product is added to rations of cattle not previously, or recently, fed it. This effect appears more evident with levels of urea used when it forms a major part of total protein in the ration.

Urea and antibiotics in combination are common additions to protein supplements or mixed rations. At usual levels for continuous feeding of antibiotics and safe levels of urea for the dietary conditions, the combination appears satisfactory and to offer the beneficial effects from these compounds after a suitable period of urea adaptation. However, much less is known about the effects of high levels of antibacterial compounds and urea together during early stages in the feedlot with unadapted cattle. More research is needed to answer questions concerning levels of these compounds during early stages in the feedlot, especially with calves shipped at weaning or a few weeks thereafter. Other information needed includes the relative effects of adaptation to urea and antibacterials singularly and together after various times of arrival of the cattle at the feedlot.

Effects of adding urea to furnish the major source of supplemental protein to a corn silage ration for calves at various times following arrival at the feedlot were investigated in this experiment. Urea additions were made to rations of calves fed with and without antibacterial compounds.

Procedures

One hundred twenty steer calves were purchased in late January for the experiment. The average weight of the calves was about 510 lb. The calves had been given treatments usually associated with "preconditioned" calves but reported to have not received any antibiotics or urea in their feed.

They were allotted into 8 pens of 15 each on basis of weight taken after arrival. The experimental design was as follows:

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Design of the Experiment

Protein supplement treatment	Control group	Antibiotic group[a]
Soybean meal	15 steer	calves per pen
Urea on day 1		
Urea on day 14[b]		
Urea on day 28[b]		

[a]Fed as Aureo S-700 to furnish 350 mg. each of chlortetracycline and sulfamethazine per head daily for the first 28 days of the experiment and then chlortetracycline at 70 mg. per head daily.

[b]Supplement prior to these days was soybean meal with or without Aureo S-700 according to the experimental design.

Rations during the experiment consisted of 2 lb. of protein supplement (about 37% protein) and a full feed of corn silage. Animals were fed twice daily. They were implanted with 24 mg. of diethylstilbestrol at the beginning of the experiment.

The protein supplements were soybean meal or corn-urea based supplements. The soybean meal supplement contained 84.5% soybean meal with added minerals and vitamins. The corn-urea supplement contained about 70% corn, 11% urea and also minerals and vitamins. Calcium sulfate was added to the corn-urea supplement in an amount to supply 1 part sulfur to 10 parts nitrogen that came from urea.

Four protein supplements were provided for the first 28 days of the experiment. Two of these were soybean meal supplements, one with and one without chlortetracycline-sulfamethazine. The other two were corn-urea supplements, also with and without the antibacterials.

Results

Results of the experiment are shown in table 1. Overall comparisons between control and antibacterial groups show essentially no differences from supplementing the cattle with 350 mg. each of chlortetracycline and sulfamethazine for 28 days followed by 70 mg. of chlortetracycline for the remainder of the 120-day experiment. The initial high level of the antibacterials did not appear to result in any consistent improvement in early feedlot performance for the various protein supplement groups. Calves fed the soybean meal supplement did gain at a faster rate with the antibacterials. However, this effect was not consistent during the first month of the experiment when other groups received the same rations for 14 or 28 days.

Results do not show any benefit from adding urea after 14 or 28 days in comparison to starting the calves on the urea supplement at the beginning of the experiment. In fact, those supplemented with urea at the later dates gained at slightly lower rates than calves fed urea from the beginning of the experiment. The latter group gained at about the same rate as calves supplemented with soybean meal.

Type of supplement as to antibacterials or protein source did not appear to affect feed consumption. Therefore, calves making slightly faster rates of gain also had small advantages on feed efficiency.

Calves used in the experiment had not been fed urea or an antibiotic prior to the experiment. However, they had been weaned and fed growing-type rations for several weeks. This may have been important in the response to the antibacterials and in adaptation to urea.

Summary

A high level of chlortetracycline and sulfamethazine (350 mg. each daily) followed by 70 mg. daily of the antibiotic did not affect feedlot performance of calves in this experiment where corn silage was full fed with a protein supplement for 120 days. Results from the antibacterials did not appear to be affected by protein source (soybean meal or urea) in the supplements.

Adding urea after 14 or 28 days in the feedlot offered no benefits in comparison to feeding urea from the beginning of the experiment. Weight gains were at a slightly lower rate when urea was added at the later dates.

Age, weight and previous treatments for the calves may have had an important influence on the results obtained. Such calves are more resistant to effects of stress from shipping and adaptation to a new location and rations than would be calves weaned and immediately subjected to these stresses.

Under conditions of this experiment, it would appear unnecessary to avoid urea in the protein supplement for a period of 2 to 4 weeks after arrival of the cattle. Adaptation to urea may be accomplished with less evident depression in feedlot performance at the same time as adaptation to the new location and ration changes than at a later date.

Table 1. Results from Urea and Antibacterial Compounds Fed to Growing Feedlot Cattle

(Jan. 27 to May 26--120 days)

	Control					Antibiotic[a]				
	SBOM	Urea on day 1	Urea on day 14[b]	Urea on day 28[b]	Avg.	SBOM	Urea on day 1	Urea on day 14[b]	Urea on day 28[b]	Avg.
No. of steers	15	15	15	15	60	15	15	15	15	60
Init. shrunk wt. (lb.)	508.7	507.3	511.3	510.0	509.3	509.7	511.0	511.3	512.0	511.0
Final shrunk wt. (lb.)	777.0	783.3	780.3	762.0	775.6	801.7	787.7	778.0	771.7	784.8
Avg. daily gain (lb.)	2.24	2.30	2.24	2.10	2.22	2.43	2.31	2.22	2.16	2.28
Avg. daily feed										
Corn silage	37.00	37.77	37.80	37.77	37.58	37.93	37.61	37.91	37.77	37.80
Supplement	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97
Feed/100 lb. gain (lb.)										
Corn silage	1655	1642	1686	1798	1695	1559	1631	1706	1745	1660
Supplement	88	86	88	94	89	81	85	88	91	86

[a]Fed as Aureo S-700 (aureomycin and sulfamethazine each at 350 mg. per head daily) for the first 28 days of the experiment and then aureomycin at 70 mg. per head daily.

[b]Supplement prior to these days was the soybean meal with or without Aureo S-700 according to the experimental design.