



**WE HAVE IT!--
--NEW "RUMENSIN"**

THE NEW ADDITIVE "RUMENSIN" IS NOW AVAILABLE
TO CARROLL AREA CATTLE FEEDERS!

10% BETTER EFFICIENCY! NO WITHDRAWALS!

The additive, called *Rumensin*, improves the fermentation processes that take place in the rumens of beef cattle, boosting by an average of 10 per cent the cattle's efficiency in converting feed to beef.

Nineteen cattle-feeding experiments, including two, at the Iowa State University in Ames, showed that one pound less feed is required to produce a pound of beef when the additive is used.

At current price levels, use of the additive could save farmers about \$15 per head when cattle are fed 154 days in a

feedlot, according to Robert M. Book, a vice-president of *Elanco*, which is a division of *Eli Lilly and Co.*

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DES, on the other hand, cannot be fed to cattle two weeks prior to slaughter.

Book claimed the new additive will save 350 pounds of feed when a 700-pound beef animal is fed to a market weight of 1,050 pounds.

**WE HAVE NEW "RUMENSIN"
IN PURINA CATTLE CHOWS
NOW! ASK US FOR THE FACTS!**

JUERGENS 
Produce & Feed Co.
Your COMPLETE Feed, Seed & Farm Service Center

REGULATING RUMENSIN: DEFINING ANTIBIOTIC FEEDS IN THE U.S. IN THE WAKE OF RESISTANCE

Nicole Welk-Joerger, Ph.D. candidate
(@welkjoerger)

University of Pennsylvania

World Association for the History of Veterinary Medicine
Conference

27 February 2020

DISCUSSING ANTIBIOTIC RESISTANCE AT NATIONAL AND INTERNATIONAL SCALES

- Antibiotics in general v. an antibiotic in particular

Human use:

- Penicillin
- Aureomycin
- Terramycin

Nonhuman use:

- Monensin

Side #1: It should be regulated
the same way as other antibiotics

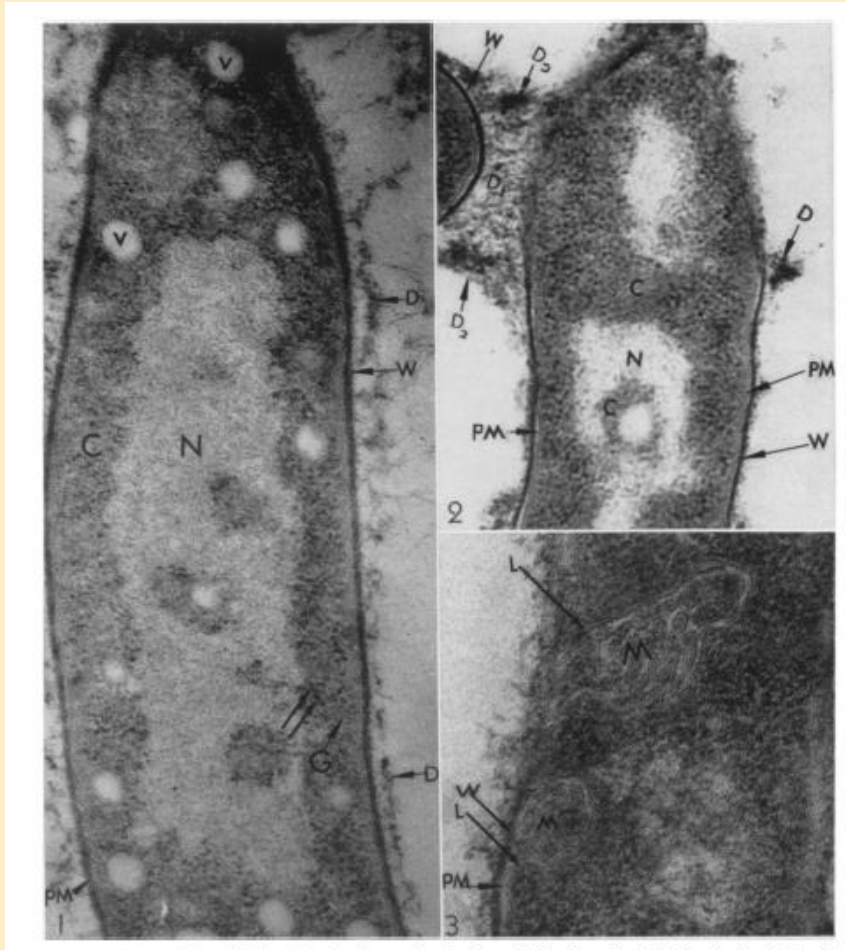
Side #2: It's not the same – it's
an ionophore

RUMENSIN'S STORY

1. Development of nonhuman-specific antibiotics to combat contemporaneous resistance issues
2. Replacement of a problematic feed technology (DES) with a different, less problematic one
3. Larger debate about how material works in the body (classification and the role of the rumen)

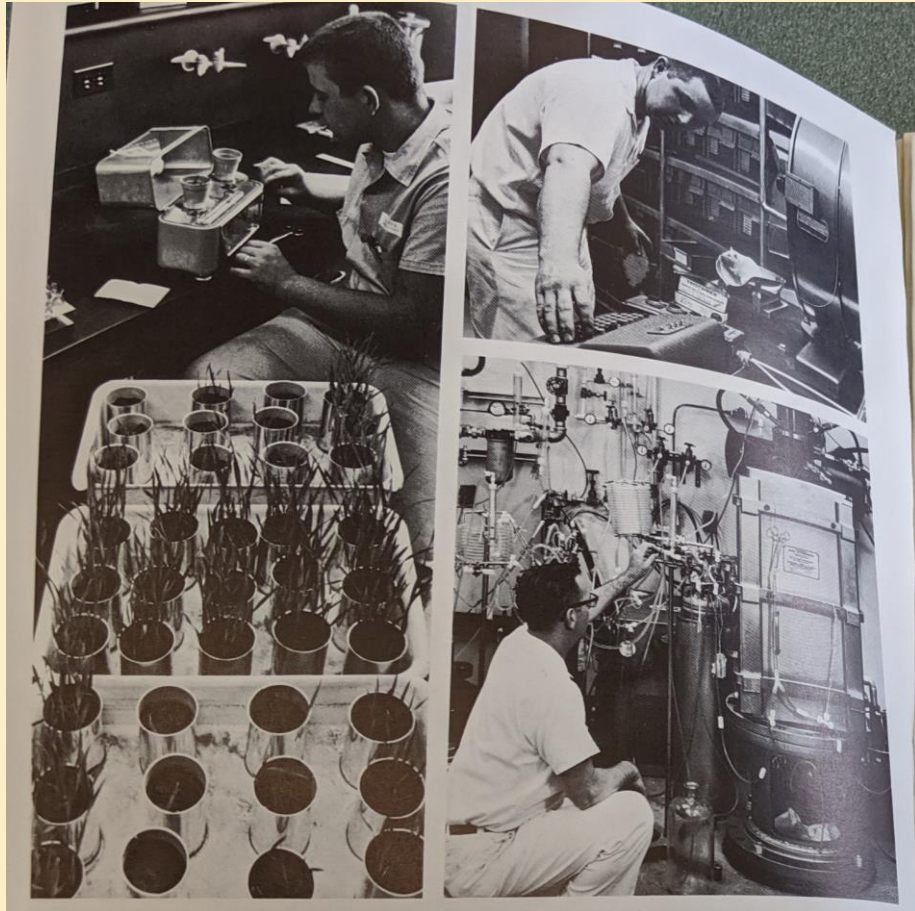
I. COMBAT RESISTANCE

MONENSIN



Streptomyces cinnamonensis.
Analyzed by Pearl Liu Chen (1964), pictured left.

MONENSIN



Lilly Research Images from 1974 catalog.
Trade Literature Collection, NMAH.

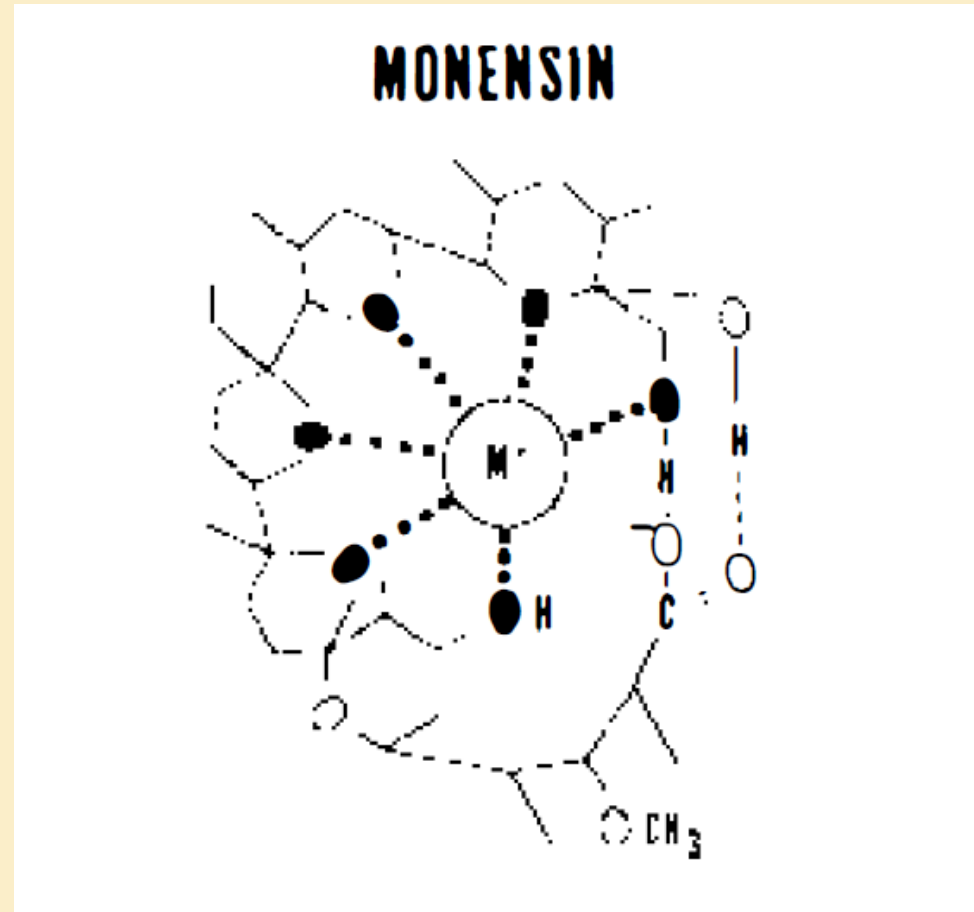


Image from “Biological Applications of
Ionophores” (1976) by Berton Pressman.

SULFAQUINOXALINE (SQ)



Building a Poultry Practice

Veterinarians can develop, easily and rapidly, a substantial practice among poultry raisers. By investing a little time in diagnostic work, they can educate growers to the value of professional supervision of flock health.

Your position with the poultryman is strengthened when, through prompt application of modern drugs such as SULFAQUINOXALINE, you guard him against severe economic loss. You can prescribe SQ with confidence for the *prevention* and *control* of coccidiosis outbreaks, because it is effective against all economically significant species of coccidia that attack chickens and turkeys.

WRITE FOR LITERATURE

The following publications are available on request:

Sulfaquinoxaline, Veterinary—detailed information on the use of SULFAQUINOXALINE in the *prevention* and *control* of coccidiosis in poultry and rabbits.

Annotated Bibliography on Sulfaquinoxaline—summaries of scientific publications on the chemistry, pharmacology, and clinical value of this drug.

Annotated Bibliography on Coccidiosis—A digest of the recent literature on this disease in all species of domestic animals.

SULFAQUINOXALINE

Research and Production for
Better Poultry and Animal Health



MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY

© Merck & Co., Inc.

Journal of the American Veterinary Medical Association—December, 1953
North American Veterinarian—November, 1953

When other drugs fail against
coxy breaks...ask for feeds containing

SQ



THE ONLY COCCIDIOSTAT EFFECTIVE AGAINST ALL IMPORTANT COCCIDIAL SPECIES

No other drug can match the effectiveness, safety, and economy of S.Q. in treating outbreaks of coccidiosis in chicks, poults, pullets—and birds in production. Unlike other drugs, S.Q. works best during the all-important 72- to 96-hour period after infection, when coccidia are most vulnerable to medication.

S.Q.—used promptly at therapeutic levels—will check coxy outbreaks...cut losses by holding mortality and stunting to a minimum...keep flocks on feed until the outbreak is under control.
Merck Chemical Division, Merck & Co., Inc., Rahway, N. J.

S.Q. with THE MERCK MARGIN OF SURETY

MONENSIN FOR CHICKENS

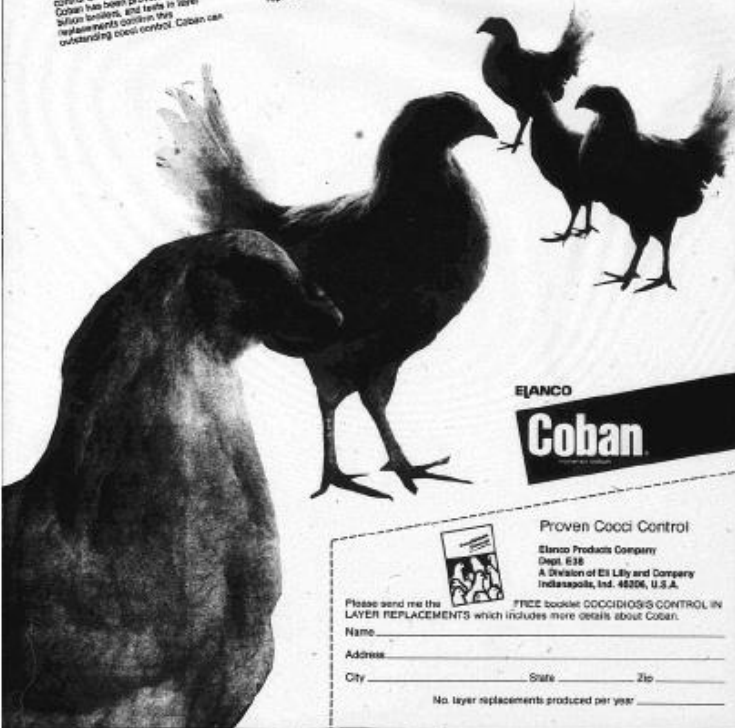
Now For Layer Replacements

Coban

Proven Solution to a Major Problem

Coccidiosis is one of the more costly diseases affecting layer replacement chickens. Layer Coban is available for use in layer replacements raised for caged layers. Replacements raised for housing compared to Coban for control of the six pathogenic coccidia Coban has been proven in over nine billion broilers, and tests in layer replacements confirm the outstanding cocci control. Coban can

help you solve the old, costly problem of coccidiosis. When you control coccidiosis, you receive additional benefits in better performance, uniformity and improved feed efficiency. Contact your Elanco Sales Representative, or send in the coupon below for complete details about Coban and its role in a layer replacement program.



ELANCO
Coban

Proven Cocco Control

Elanco Products Company
Dept. 638
A Division of Eli Lilly and Company
Indianapolis, Ind. 46206, U.S.A.

Please send me the LAYER REPLACEMENTS which includes more details about Coban.

Name _____
Address _____
City _____ State _____ Zip _____

FREE booklet COCCIDIOSIS CONTROL IN LAYER REPLACEMENTS

No. layer replacements produced per year _____

Coban advertisement in *Feedstuffs Magazine*, July 5, 1976.

II. THE “SUCCESSOR” TO DES

MONENSIN FOR CATTLE

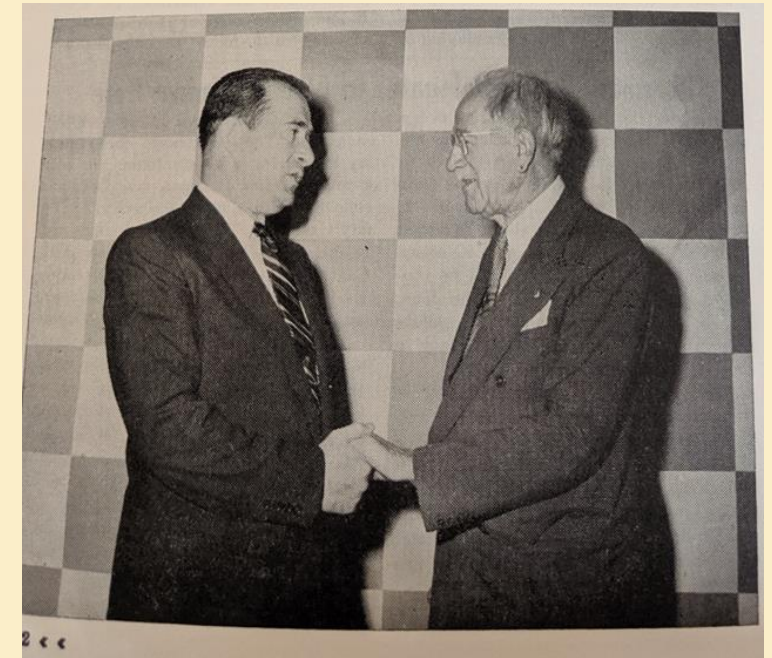
430. EFFECT OF MONENSIN ON FEED EFFICIENCY OF CATTLE. A. P. Raun*, C. O. Cooley, E. L. Potter, L. F. Richardson, R. P. Rathmacher and R. W. Kennedy, *Lilly Research Laboratory, Division of Eli Lilly and Company, Greenfield, Indiana.*

Abstract from 1974 American Society of Animal Science.

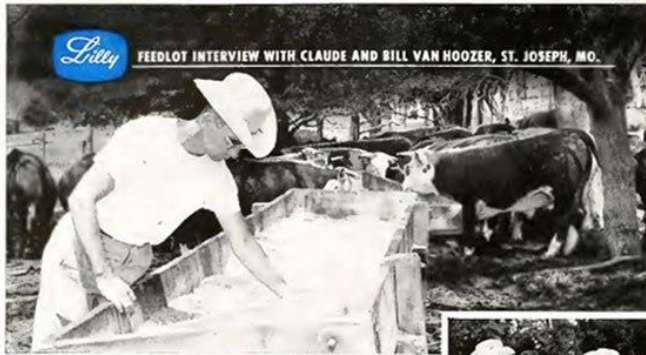
DIETHYLSTILBESTROL (DES)

Timeline of DES Approval, Use, and Bans in the United States, 1941 – 1980

1941	FDA approves DES for treatment of menopausal symptoms in humans
1947	FDA approves DES as miscarriage preventative in humans; DES implants also approved for use in chickens
1954	FDA approves feeding cattle DES
1957	FDA approves DES implants for cattle
1959	DES implants for chickens banned by FDA; poultry industry fights against ban
1966	Official ban of DES implants in chickens
1971	FDA advises doctors to stop prescribing DES during pregnancy in humans
1972	FDA bans DES cattle feed; requires 120-day withdrawal for DES implants
1973	FDA bans DES implants in cattle.
1974	U.S. Court of Appeals overturns implant and feed bans in cattle because the FDA failed to hold the proper hearings.
1977	FDA holds DES meetings
1979	First successful trial takes place over DES injuries in humans against Eli Lilly; FDA bans all use of DES in cattle



Eli Lilly director, G. L. Varnes, with Ralston-Purina founder, William Danforth. *Lilly Management Report*, 1955. Science History Institute Archives.



“Wouldn’t operate without ‘Stilbosol’ in our feed”

“We’ve fed at least 8,000 head on feeds fortified with ‘Stilbosol,’” says commercial feeder. “Gains run anywhere from 2½ to 3¼ pounds per day.”

by Eugene S. Mahnel

Just 10 miles' drive south of the busy St. Joseph, Missouri, livestock yards are 23 feeding pens operated by Claude Van Hoozer and his son Bill. With 40 years of continuous cattle-feeding experience between them, they now run up to 10,000 head through their lots every year. “We were first to use supplements with ‘Stilbosol’ in this area,” Bill related, “and it’s given us good results. We’ve fed at least 8,000 head on ‘Stilbosol’-fortified rations, and they have made a big difference in our daily gain and cost of gain.” Claude took up the story. “We haven’t

had any cattle that gained less than 2½ pounds per day since we’ve used ‘Stilbosol’ in our supplements. Our gain ran anywhere from 2½ to 3¼ pounds per head per day, depending on condition.” Satisfied with ‘Stilbosol’ in supplements—“We’ve read about other ways to get stilbestrol into cattle,” comments young Bill. “But we’re not interested in wrestling our cattle around individually. It would increase our labor, and mean more equipment to catch and handle them. We’re satisfied with ‘Stilbosol’ in our supplement and will keep using it.”

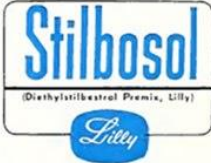


The only way to keep customers happy when you feed out their cattle on a commercial basis is to make money for them through efficient, low-cost gains. This takes planning and know-how. Claude (right) and son Bill (left) Van Hoozer depend on Clyde Lott (center) to keep up with their supplement needs. Says Claude, “We like the services of our feed manufacturer... and Clyde Lott, their representative, is always on hand when we need help or service.”



The Van Hoozer feeding pens are located on 27 rolling acres which provide good drainage and plenty of cool shade. The Van Hoozers blend grain and supplement with ‘Stilbosol’ into a uniform ration right at their own feed yards. Each batch is weighed before mixing.

ELI LILLY AND COMPANY, AGRICULTURAL AND INDUSTRIAL PRODUCTS DIVISION, INDIANAPOLIS 6, INDIANA



“Stilbosol” is Eli Lilly and Company’s trademark for Diethylstilbestrol Premix which is made and sold under exclusive license granted to Ralston-Purina Company, Research Foundation, Inc., under the U. S. Patent No. 2,753,303.

The National FUTURE FARMER

INTRODUCING RUMENSIN



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--NEW "RUMENSIN"**

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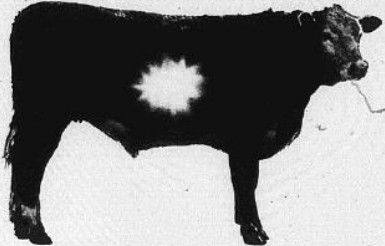
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IN PURINA CATTLE CHOWS
NOW! ASK US FOR THE FACTS!**

JUERGENS 
Produce & Feed Co.
Your COMPLETE Feed, Seed & Farm Service Center

A Purina advertisement in the Iowa-based *Carroll Daily Times Herald*. Published on December 26, 1975, sixteen days after its official FDA approval.

FEEDSTUFFS, January 5, 1976 — 3

**Announcing the clearance
of Rumensin from Elanco.
The new additive that saves
an average of a pound of feed
per pound of gain.**



This unique additive is cleared for use, available now, and will soon be announced to all cattle feeders. We believe it is one of the most significant advances ever made in improving feed efficiency and lowering cost-of-gain.

In 19 trials, cattle on Rumensin (at 30 g./ton) averaged 10.6% better feed conversion than controls. And Rumensin requires no withdrawal. It works in the rumen, improving digestion so that cattle get more energy from any ration.

For complete details on its additional benefits, and information on filing your NDA, contact your Elanco representative.

Elanco Products Company
A Division of Eli Lilly and Company
Indianapolis, Inc. 46206, U.S.A.

ELANCO
Rumensin

more energy from any ration

Rumensin advertisement in *Feedstuffs Magazine*, January 5, 1976.

III. RUMEN CONVERSION

Rumensin:

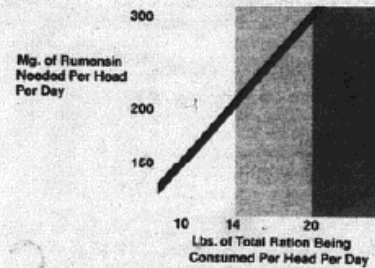


An extra 5 minutes
with the feed man
can save 40 tons of
ration in these cattle.



Rumensin can save an average of a pound of feed per pound of gain.* For every five head putting on 400 pounds that's a ton of feed saved. Forty tons in these 200 cattle.

But to get the full benefits, cattle need the full Rumensin level. They need 15 milligrams of Rumensin in every pound of total air-dry ration. So the bigger they are and the more they eat, the more Rumensin you need in your supplement.



To make sure your cattle are getting the full Rumensin level, talk to your feed man. In 5 minutes he can show you the 3-step Rumensin supplement program.

For instance, cattle eating 10 pounds of feed a day should receive a supplement that supplies 150 milligrams of Rumensin per head per day. For cattle eating 14 pounds of total ration, use a 200-milligram per head per day supplement. And, for cattle eating over 20 pounds, the 300-milligram per head per day supplement is right.

All it takes is 5 extra minutes with your feed man. And it could save you an average of a pound of feed per pound of gain.

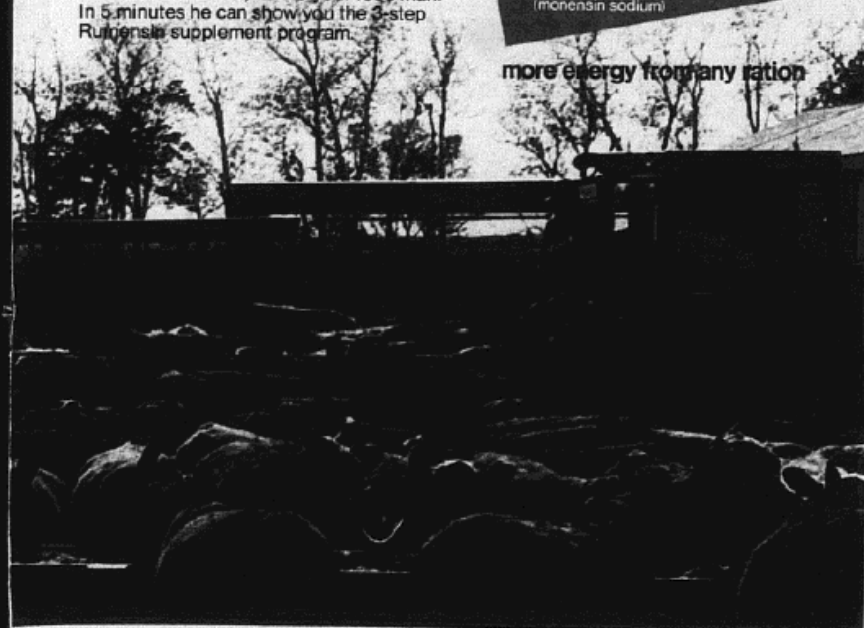
*Based on 19 feedlot trials with cattle fed Rumensin at 15 milligrams per pound of total air-dry ration.

Elanco Products Company
A Division of Eli Lilly and Company
Indianapolis, IN 46206, U.S.A.

ELANCO

Rumensin
(monensin sodium)

more energy from any ration



Rumensin advertisement in *Feedstuffs Magazine*, July 5, 1976.

Rumensin[®]:

**Grow cattle on pasture
16% faster - for about a penny
per head per day.***

Rumensin, from Elanco, now brings cattlemen extra gain from pasture and range at exceptionally low cost. And it's available in commercial supplements for your stocker and feeder cattle.

With this unique feed additive, cattle produce and average of an extra pound of gain per head every five days. In 100 days, that's an average of 20 extra pounds of marketable weight per head.

Rumensin changes rumen digestion so that cattle get more energy from both pasture and supplement. Based on a 45-55 cent per pound market price, you can earn an average of \$8-\$10 for every dollar you invest in Rumensin.

Research in hundreds of cattle proves Rumensin works, and works in every major pasture region.

Summary of 24 Pasture Trials

	Average Only Gain (Lbs.)	Improvement in ADG (Lbs.)	Percentage Improvement in ADG
Pasture plus Supplement	1.23	—	—
Pasture plus Supplement with Rumensin [®] (200 mg./hd./day)	1.43	0.20	16.3%

Rumensin is not a hormone. It's effective in both steers and heifers.

*Gain based on average results from 24 trials, with Rumensin at 200 mgs. per head per day. Approximate cost is for Rumensin only—does not include price or additional value of supplement.

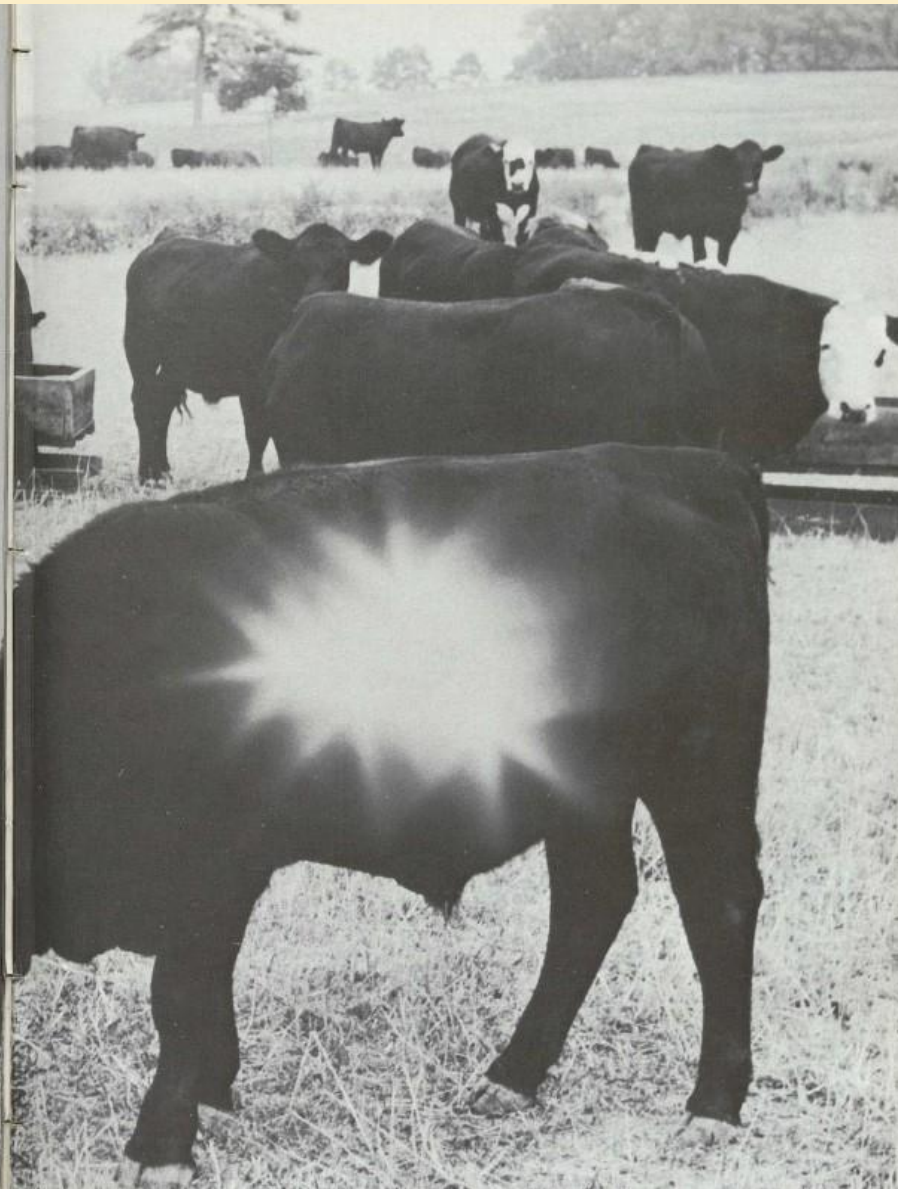
Rumensin... more than another additive... a major advance in the economics of growing cattle on pasture. And it's ready for you now. Ask your feed man for Rumensin.

Elanco Products Company
A Division of Eli Lilly and Company
Indianapolis, IN 46206, U.S.A.

ELANCO

Rumensin
(monensin sodium)

more energy from any ration



Rumensin advertisement in *The Florida Cattleman and Livestock Journal*, October 1978.

“IONOPHORE” CLASSIFICATION

Drugged feed may be harmful

By WARREN E. LEARY
AP Writer

WASHINGTON — New tests indicate a powerful drug used in feeds to fatten animals may be getting into food products even though its potential effects on humans have not been studied, according to a scientist.

Dr. Berton C. Pressman of the University of Miami said Tuesday a sensitive new test he has developed shows that, contrary to previous studies, carbonylic ionophores pass through the tissues and blood of animals before being excreted.

*The Tampa Times,
September 12, 1979.*

farm talk...



Ionophores help cattle gain

Ionophores — used for years to control parasites in poultry — can also increase weight gain in beef cattle.

In cattle, ionophores work by altering the rumen environment. Most of the direct action of ionophores is in the rumen and gut.

These additives don't affect the carcass or leave residues when used according to label instructions. Ionophores are also highly cost-effective, he said.

Ionophores can improve feed efficiency by 10 percent in feedlot cattle. Effects are slightly different in pastured cattle. There is no real effect on feed efficiency but weight gain usually improves 5 to 10 percent.

Two ionophores are now cleared for pastured beef cattle. Rumensin and Bovatec are cleared only for weaned animals — pastured stockers or feeders — and not for cow-calf operations. These additives may cause milk-fat depression if fed to lactating cows.

Rumensin can be fed daily or on alternate days, but Bovatec should be fed daily.

Neither Rumensin nor Bovatec are approved for free-choice feeding. They must be hand-fed in a mixture of at least one pound of grain per day per animal. They should be mixed carefully following directions.

—Woody Lane, UW-livestock specialist

*The Country Today,
April 9, 1986*

APPROACHES TO RISK

- Definition of “growth promotant” in EU
- Distinction of “human environment” in U.S. Federal Register
- Monensin in future human medicine
- Monensin as “feed efficiency” tool, helping with methane reduction

Rumensin®

Optimizing Rumensin in Cattle

Rumensin® (monensin) is a proven management tool that optimizes your investment by improving cattle weight gain and feed efficiency, even as the quality of forage changes from year to year.¹ Rumensin is the only ionophore approved for use in all production phases in the beef industry.

Elanco

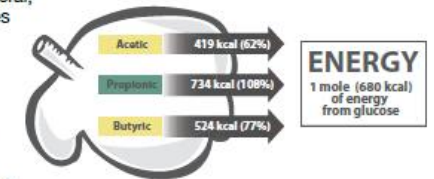
Rumensin.

How does Rumensin work?

Monensin is an ionophore — a specific class of animal-only antimicrobial used as a coccidiostat due to its alternative mode of action. In general, Rumensin has a lower effective dose compared to other ionophores (e.g., lasalocid, laidlomycin).²⁻⁴

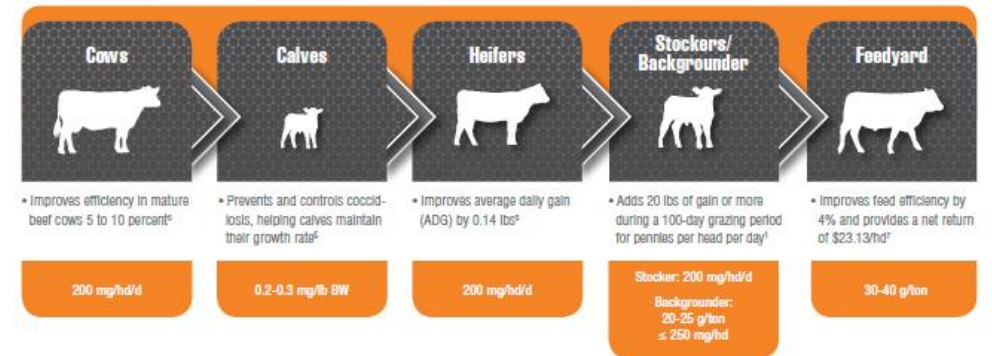
Rumensin:

- Alters rumen bacteria populations, resulting in less waste products (CO₂ and methane)
- Shifts the production of acetate toward propionate, a more energetically efficient volatile fatty acid (VFA)
- Improves gain in stockers/backgrounders and maintains similar daily gains on slightly less feed in cows and feedlot cattle



Implementing Rumensin

The impact Rumensin has on performance is detailed for the different stages of production in the figure below. To maximize feed efficiency throughout the production cycle, Rumensin can be fed in any diet.



Rumensin for coccidiosis in cattle

For the prevention and control of coccidiosis, Rumensin is the most potent ionophore available that kills coccidia parasites at three different stages of development² instead of merely slowing their development.

Target a feeding rate of 200 mg/hd/d by using this formula to determine grams/ton (g/t) in the Type C final feed:

$$\text{g/t} = \frac{(200 \text{ mg/hd/d} \times 2)}{\text{(Dry-matter intake [DMI])}}$$

RUMENSIN'S STORY

1. Development of nonhuman-specific antibiotics to combat contemporaneous resistance issues
2. Replacement of a problematic feed technology (DES) with a different, less problematic one
3. Larger debate about how material works in the body (classification and the role of the rumen)

THANK YOU

- This project has been generously supported by the National Museum of American History, the Lemelson Center, and the University of Pennsylvania Teece Award.
 - nwelk@sas.upenn.edu
 - [@welkjoerger](#)
 - welkjoerger.com