GRO-TEC YEAST FEATURES & BENEFITS

- Improves Palatability & Digestion
- Maintains Proper PH (Balance Gut Micro Flora)
- Lowers the Effects of Toxins in the Rations
- Minimizes Stress
- Improves Viability and Increases Survival Rate
- Great Transition Product
  - Incoming Cattle
  - Changing Forages
- Increases Milk Production
- Larger Litters in Pigs
- Increased Weight Gain in Beef Cattle
- Better Egg Quality

ACTIVE LIVE YEAST

Dry yeast research from Scotland (Rowett Institute, where they cloned that famous sheep) which showed the following.

A. Dry yeast into the rumen is very active in scavenging (feeding on) dissolved oxygen in the system.

B. With a dry yeast there is a strong drop in the level of dissolved oxygen leading to a purer anaerobic fermentation set up in the rumen.

C. Cellulytic dry yeast bacteria require an anaerobic system, and therefore gets increases in replication, actions of fiber digesting organisms, hence better fiber utilization.

D. A dry yeast is most effective in high producing cows where fiber content (ADF-WDF) has to be limited. Where you want the most effective use of the fiber is in the high energy ration. A dry yeast in removing oxygen sets up favorable fiber digestion mechanisms in high yielding cows, especially over the 1st 120 days of lactation.

GRO-TEC
YEAST STANDARD

For livestock, poultry and pet foods

GUARANTEED ANALYSIS

Crude Protein, Min	21.00%
Crude Fat, Min	4.50%
Crude Fiber, Max	10.00%
Saccharomyces Cervisiae, Min	6 Million CFU's/lb

INGREDIENTS

Processed Grain By-Products, Sodium Bentonite, Roughage Products, Calcium Carbonate, Dried Yeast, Brewers Dried Grains, *Saccheromyces cervisiae* Fermentation Extract Dehydrated, Dried *Aspergillus oryzae* Fermentation Extract, Dried *Bacillus licheniformis* Fermentation Extract, Dried *Bacillus subtilis* Fermentation Extract, and Silicon Dioxide.

FEEDING DIRECTIONS

Dairy	Complete Dairy Ration	15-30 lbs/ton
	Lactation Grain Ration	25-50 lbs/ton
	Top Dress	4-6 oz/head/day
Beef	Grower/Finisher Rations	15-50 lbs/ton
	Top Dress	2-4 oz/head/day
Sheep/Goat	Top Dress	1-2 oz/head/day
Swine	Gestation/Lactation & Starter Rations	25-50 lbs/ton
	Grower/Finisher Rations	15-25 lbs/ton
Poultry	Starter/Breeder & Layer Rations	15-25 lbs/ton
	Broiler Grower/Finisher Rations	5-15 lbs/ton
Horses	Grain Ration	25-50 lbs/ton
	Top Dress	2-4 oz/head/day
Cat/Dog	Complete Ration	25-50 lbs/ton

Manufactured By
GRO-TEC, INC.
10324 W US HWY 36
MODOC, IN 47358

NET WT 50 LB (22.7 kg)

LOT#

Patent Pending

GRO-TEC
YEAST EXTRA

For livestock, poultry and pet foods

GUARANTEED ANALYSIS

Crude Protein, Min	23.00%
Crude Fat, Min	5.00%
Crude Fiber, Max	10.00%
Saccharomyces Cervisiae, Min	12 Million CFU's/lb

INGREDIENTS

Processed Grain By-Products, Roughage Products, Sodium Bentonite, Calcium Carbonate, Dried Yeast, Brewers Dried Grains, *Saccheromyces cervisiae* Fermentation Extract Dehydrated, Dried *Aspergillus oryzae* Fermentation Extract, Dried *Bacillus licheniformis* Fermentation Extract, Dried *Bacillus subtilis* Fermentation Extract and Silicon Dioxide.

DIRECTIONS FOR USE

GRO-TEC YEAST EXTRA is a feed supplement designed to be mixed with nutritionally balanced complete feeds for Dairy, Beef, Swine, Poultry, Horses, and Companion Animals. It may be Top Dressed on Beef, Dairy, Horse, and Swine feeds.

Dairy	Complete Dairy Ration	5-15 lbs/ton
	Lactation Grain Ration	10-20 lbs/ton
	Top Dress	2.0 oz/head/day
Beef	Grower/Finisher Rations	5-20 lbs/ton
	Top Dress	1-2.0 oz/head/day
Swine	Gestation/Lactation & Starter Rations	10-20 lbs/ton
	Grower/Finisher Rations	5-10 lbs/ton
Poultry	Starter/Breeder & Layer Rations	5-10 lbs/ton
	Broiler Grower/Finisher Rations	2-5 lbs/ton
Horses	Grain Ration	10-20 lbs/ton
	Top Dress	1-2.0 oz/head/day
Cat/Dog	Complete Ration	10-20 lbs/ton

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GRO-TEC
YEAST EXTRA CONCENTRATE

For the manufacture of livestock feeds and as a top dress for lactating dairy cows and lactating sows

GUARANTEED ANALYSIS

Crude Protein, Min	26.00%
Crude Fat, Min	3.00%
Crude Fiber, Max	10.00%
Saccharomyces Cervisiae, Min	12 Million CFU's/lb

INGREDIENTS

Processed Grain By-Products, Dry Yeast, *Saccharomyces cervisiae* Fermentation Extract Dehydrated, Dried *Bacillus subtilus* Fermentation Extract, Calcium Carbonate, Dried *Aspergillus oryzae* Fermentation Extract, Dried *Trichoderma reesei* Fermentation Extract, *Lactobacillus acidophilus* Fermentation Product Dehydrated, *Lactobacillus casei* Fermentation Product Dehydrated, *Bifidobacterium thermopbilum* Fermentation Product Dehydrated, *Enterococcus faecium* Product Dehydrated and Cobalt Carbonate.

FEEDING DIRECTIONS

Lactating Dairy Cows	Top Dress	1/2-1 oz/head/day
Lactating Sows	Top Dress	1/4-1 oz/head/day

MIXING DIRECTIONS

Young Animals	5-6 lbs/ton
Mature Animals	3-5 lbs/ton

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GRO-TEC
YEAST CONCENTRATE

For the manufacture of livestock feeds and as a top dress for lactating dairy cows and lactating sows

GUARANTEED ANALYSIS

Crude Protein, Min	26.00%
Crude Fat, Min	3.00%
Crude Fiber, Max	10.00%
Saccharomyces Cervisiae, Min	950 Billion CFU's/lb

INGREDIENTS

Processed Grain By-Products, Active Dry Yeast, *Saccharomyces cervisiae* Fermentation Extract Dehydrated, Dried *Bacillus subtilus* Fermentation Extract, Calcium Carbonate, Dried *Aspergillus oryzae* Fermentation Extract, Dried *Trichoderma reesei* Fermentation Extract, *Lactobacillus acidophilus* Fermentation Product Dehydrated, *Lactobacillus casei* Fermentation Product Dehydrated, *Bifidobacterium thermopbilum* Fermentation Product Dehydrated, *Enterococcus faecium* Product Dehydrated and Cobalt Carbonate.

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GRO-TEC, INC.
10324 W US HWY 36
MODOC, IN 47358

NET WT 50 LB (22.7 kg)

LOT#

Patent Pending

YEAST IN HORSE RATIONS

Research has shown that yeast aids in the digestion of fiber and other essential nutrients in your horse's ration. Yeast has been shown to enhance the growth rate and overall condition in young horses. Studies conducted at Midwestern universities have shown that the addition of yeast to diets of working horses increased their ability to work longer or stamina. Yeast also influences the microbial population in the large intestine and caecum. In doing this you will have the healthy horse you desire.

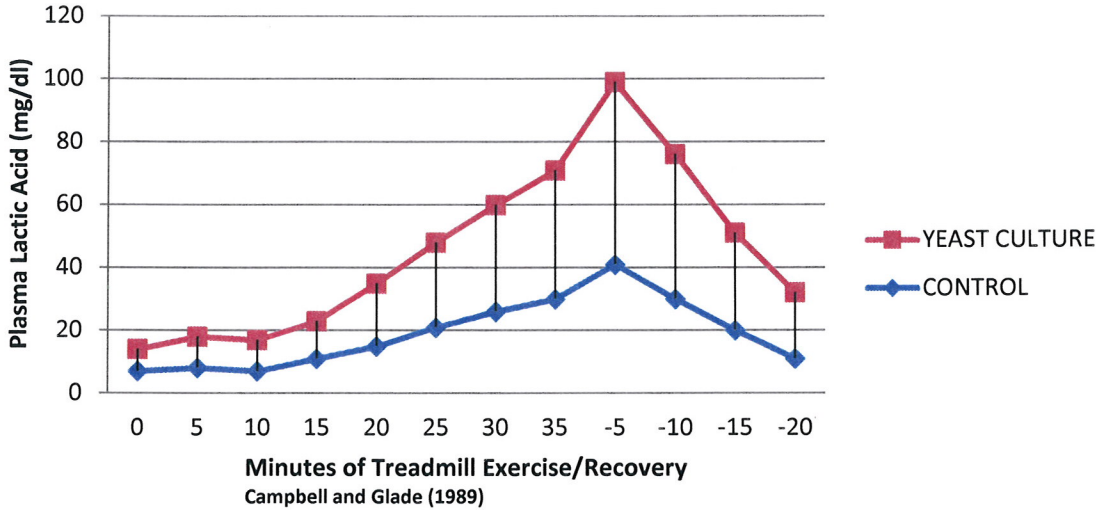
Proper nutrition requires correct levels of minerals. It is very important that you add inorganic phosphorus to the diet also. Calcium is another mineral required for horses, especially mares and growing horses. Phosphorus and Calcium are key ingredients in bone growth. Zinc, Copper, and Iron are essential for hemoglobin and red blood cell production, to give active horses better stamina.

YEAST BENEFITS

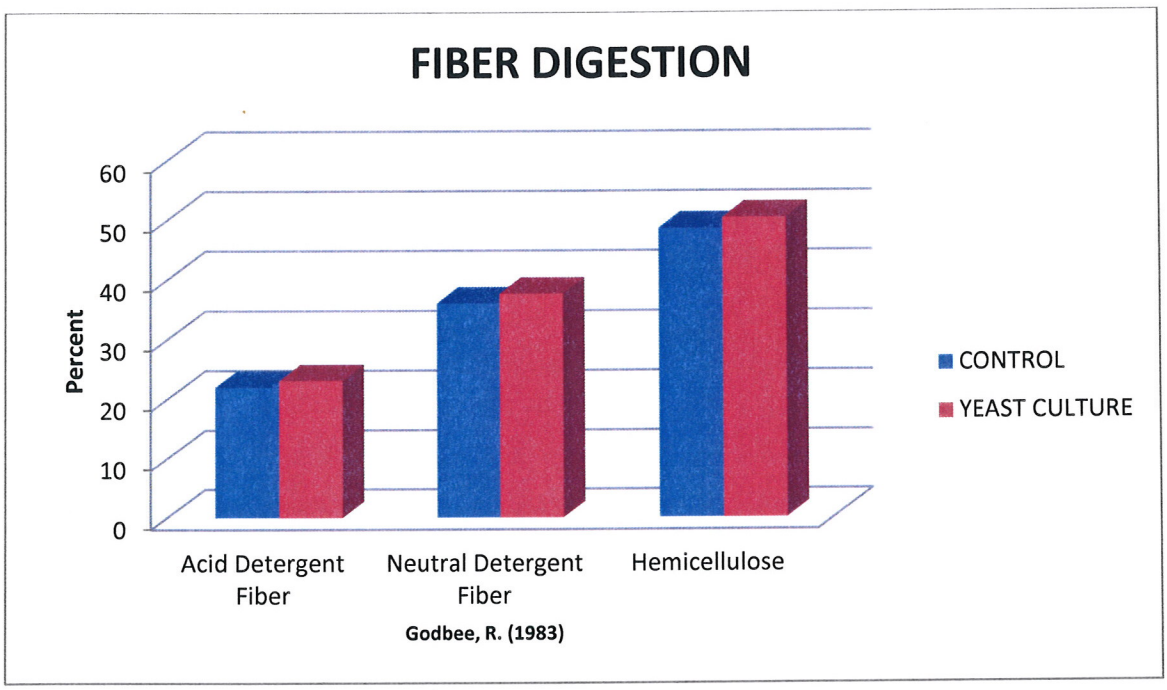
- IMPROVES FEED INTAKE
- IMPROVES GROWTH RATE
- INCREASES FIBER DIGESTION

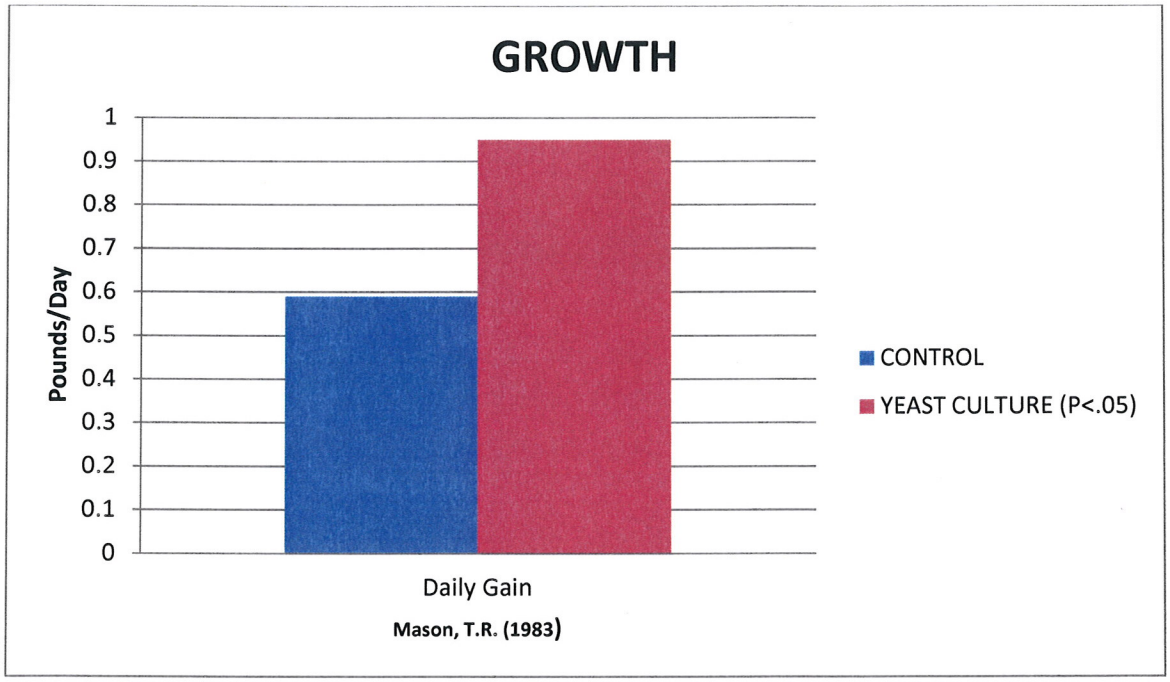
STAMINA

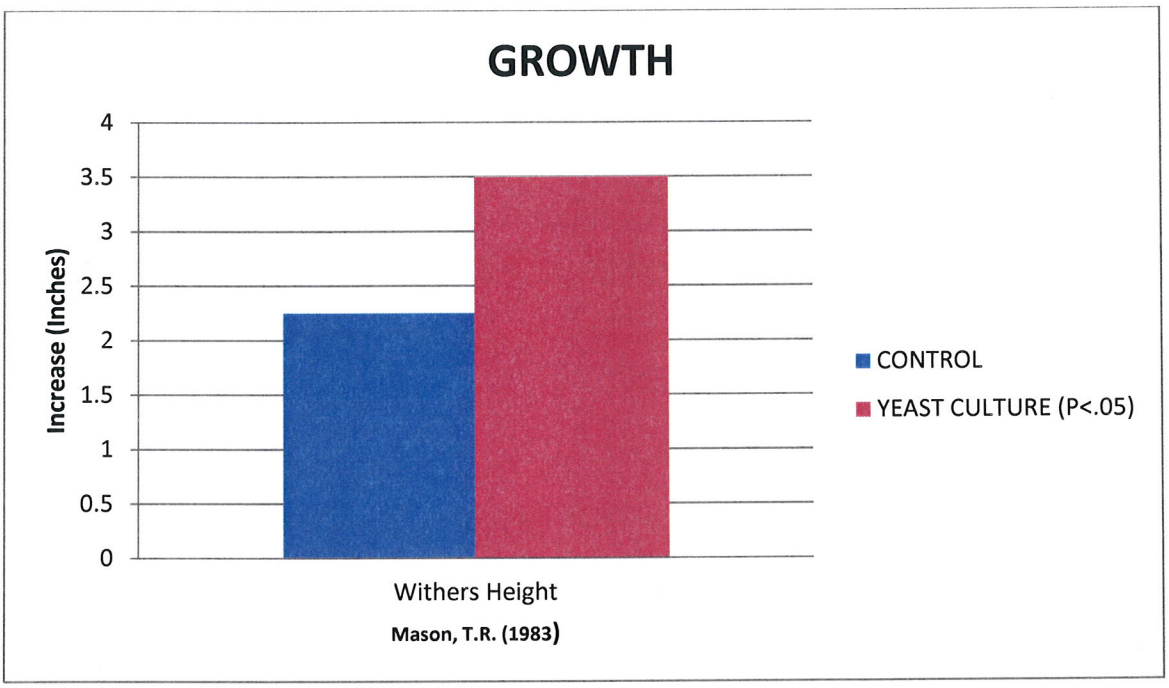
Increased stamina is most likely due to an increase in red blood cells (PCV).

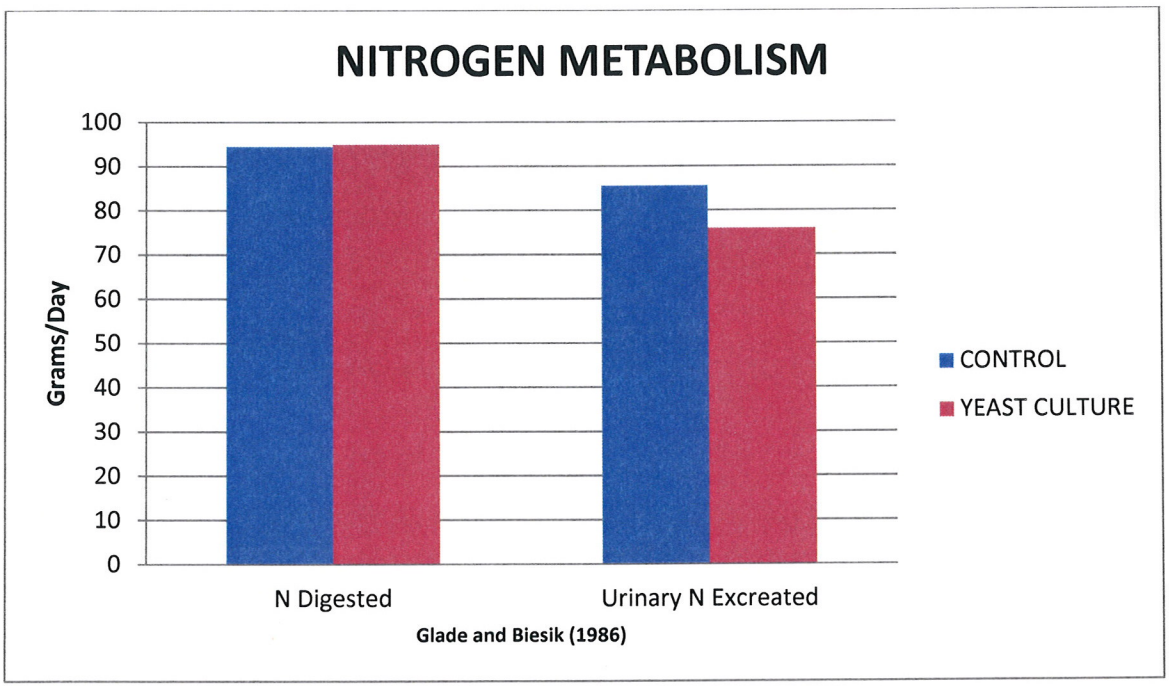


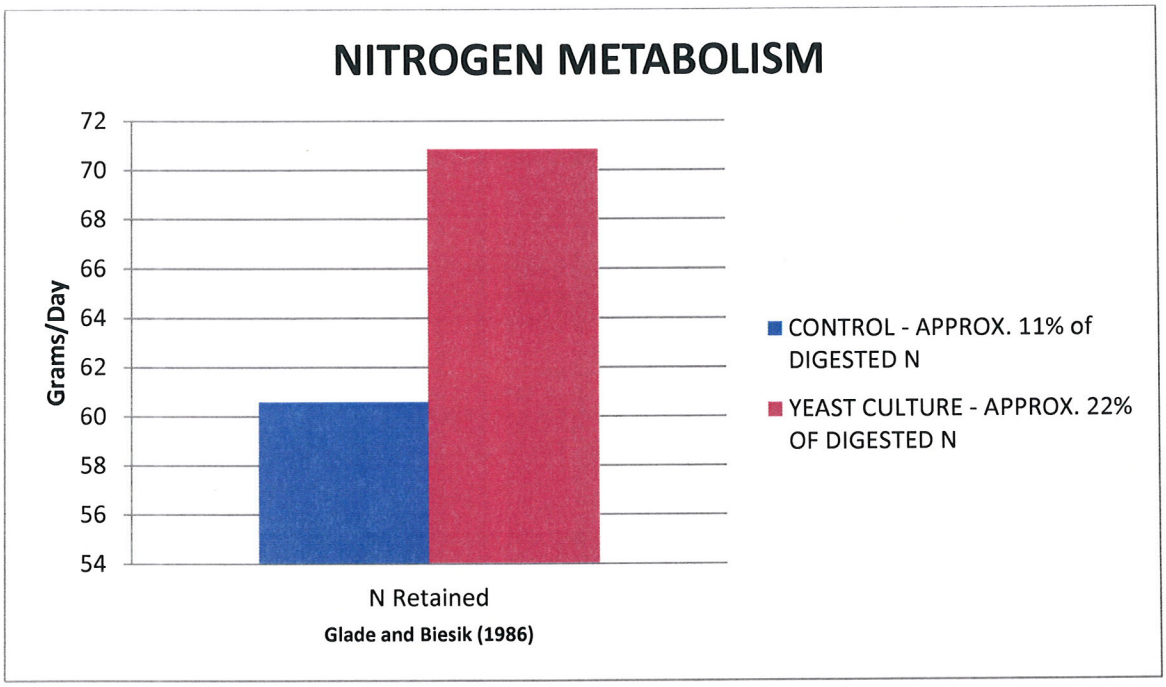
Campbell and Glade (1989)

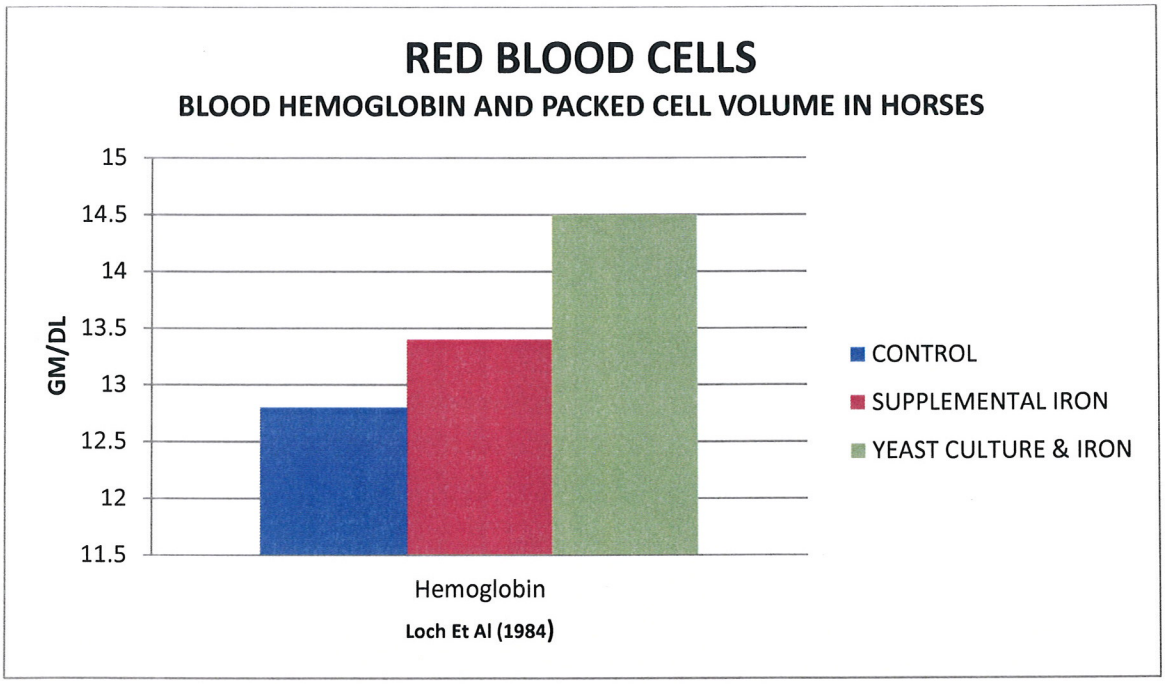

FIBER DIGESTION
Percent
60
50
40
30
20
10
0
Acid Detergent Fiber
Neutral Detergent Fiber
Hemicellulose
CONTROL
YEAST CULTURE
Godbee, R. (1983)

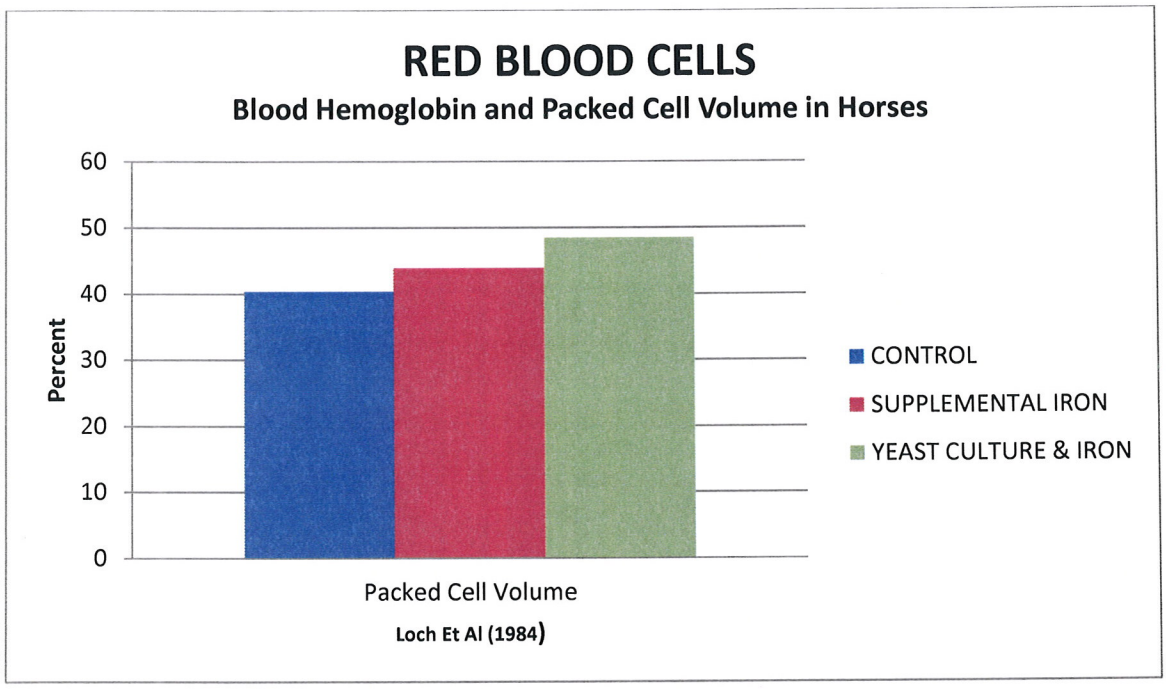

GROWTH
Pounds/Day
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Daily Gain
CONTROL
YEAST CULTURE (P<.05)
Mason, T.R. (1983)


GROWTH
Increase (Inches)
4
3.5
3
2.5
2
1.5
1
0.5
0
Withers Height
CONTROL
YEAST CULTURE (P<.05)
Mason, T.R. (1983)


NITROGEN METABOLISM
100
90
80
70
60
50
40
30
20
10
0
Grams/Day
N Digested
Urinary N Excreated
CONTROL
YEAST CULTURE
Glade and Biesik (1986)


NITROGEN METABOLISM
72
70
68
66
64
62
60
58
56
54
Grams/Day
N Retained
Glade and Biesik (1986)
CONTROL - APPROX. 11% of DIGESTED N
YEAST CULTURE - APPROX. 22% OF DIGESTED N


RED BLOOD CELLS
BLOOD HEMOGLOBIN AND PACKED CELL VOLUME IN HORSES
15
14.5
14
13.5
13
12.5
12
11.5
GM/DL
CONTROL
SUPPLEMENTAL IRON
YEAST CULTURE & IRON
Hemoglobin
Loch Et Al (1984)


RED BLOOD CELLS
Blood Hemoglobin and Packed Cell Volume in Horses
60
50
40
30
20
10
0
Percent
Packed Cell Volume
Loch Et Al (1984)
CONTROL
SUPPLEMENTAL IRON
YEAST CULTURE & IRON

GRO-TEC YEAST CONCENTRATE

Live Yeast - Live yeast cells fed to cows

- Stabilize Rumen pH
- Improve Fermentation
- Increased Fiber Digestion
- Produce Vitamin B_{12}

GRO-TEC YEAST STANDARD/EXTRA

Yeast Culture - Dead yeast cells and the media they were grown in

- Improve Fermentation
- Nutrient Source for Rumen Microbes

G-MANNA-CEL

Hydrolyzed Yeast - Yeast cells are "cracked" open exposing yeast cell components

- Improve Fermentation
- Cell Wall Components Bind Pathogens & Mycotoxins
- Cell Extract (cell guts) Stimulates the Immune System (if left in the product)

Yeast Cell Components and what they do:

Cell Wall

- Mannan (MOS) - Pathogen & Mycotoxin Binder
- Glucan (beta glucan) - Pathogen & Mycotoxin Binder, Immune Stimulant

Extract

- Nucleotides - Immune Stimulant

*G-Manna-Cel does not bind trace minerals.
*Hydrolyzed - to break down (a compound) by chemical reaction with water.
*Nucleotides - organic compounds that consist of three joined structures: a nitrogenous base, a sugar, and a phosphate group.

GRO-TEC YEASTS and G-MANNA-CEL
are safe for Dairy, Beef, Swine, Sheep, Goats, Poultry, Horses and Pets.

ACTIVE DRY YEAST - A form of yeast that is dehydrated granules that are alive but dormant by the lack of moisture. It speeds up digestion allowing more feed to be digested in a shorter time. (more digestion-more consumption)

ASPERGILLUS ORYZAE - Helps treat intestinal disorders, helps breakdown certain fibers and grains. Tends to lower the risk of cardiovascular problems.

ASPERGILLUS NIGER - It is derived from a soil saprode with a wide array of hydrolytes and oxidative enzymes involved in the breakdown of plant lignocellulose, degrading fiber, and has molecular mechanisms critical to fermentation process.

BACILLUS SUBTILLUS - Works as kind of a fungicidal while not being a true fungicidal, it colonizes the "root" system of the bacteria leaving no way for the fungal organisms to grow. It is also beneficial in de-sizing fiber and starches making them more readily available for digestion.

The combination of these digestive enzymes activity has shown to increase fiber digestion by as much as 50%. (more cows per acre ??)

Summary of Stephensville, Texas Switch Back Trial

A 1,100 Head Commercial Herd

July to September

The trial was conducted for 91 days.

- The first 22 days of the trial a Competitor Yeast Product was used.
- The next 37 days (July to August) Gro-Tec Yeast Concentrate was used.
- The herd was switched back to the Competitor Yeast Product for the last 32 days.

There were **7 days of temperatures exceeding 100 degrees** in the Gro-Tec trial compared to **3 days in July on the producer's current program** and no days in September.

The period the herd was on the Gro-Tec Yeast Concentrate was the highest temperature.

- The trial milk production was higher.
- Protein level was elevated.
- Milk butter was slightly lower by .02 points.

The cost of the yeast along with the slightly elevated protein and increased milk production during a normal "heat stress" time when milk production slacks, present Gro-Tec Yeast as advantages in the producers ration.

Trial Data Available Upon Request

GRO-TEC TECHNICAL SERVICE BULLETIN