



Bio-AG
SOLUTIONS

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Who is Bio-Ag Solutions

- ▶ A research and development company
- ▶ R&D Lab in Albuquerque, New Mexico
- ▶ Business office in Cheyenne, Wyoming
- ▶ 20+ years of R&D experience with microbial technology
- ▶ Industrial and agricultural applications
- ▶ They sell-off these technologies to companies with sales teams and marketing people

What is BactiSource

- ▶ A rumen modifier, altering VFA production
- ▶ Bacterial-based, combined with non-bacterial active ingredient
- ▶ Contains non-bacterial active ingredients which function as a catalyst
- ▶ **Converts ruminal lactic acid to propionate**

WHY IS PROPIONATE IMPORTANT?

- ▶ Propionate is the VFA that is fuel for gluconeogenesis
- ▶ Gluconeogenesis is performed by the liver, to manufacture energy for the cow
- ▶ The increase in propionate drives our performance response
- ▶ Reducing ruminal lactic acid levels has 2 key benefits
 - ▶ Increased rumen pH, and thus rumen health
 - ▶ Increases the ability to feed more starch safely

Proof of Concept: 2 Avenues To Take



University

Difficult to find more than a couple hundred cows

Very expensive, for the limited data points received

1 Year+ waiting list to start



Large Scale Field Trial

No limit to number of cows available

Needs to be large enough to mitigate variation in response

Cost effective

Able start immediately

More “real world”

27,494 Cows Field Study

- ▶ Trials were conducted the fall of 2020 through spring of 2021
- ▶ Cows were continuously fed for 28 days
- ▶ Production response was recorded at the end of the 28-day study
- ▶ Results were compared to pre-trial baseline level of production
- ▶ Dose was 4.5 g/cow/day, mixed into the protein blend
- ▶ No other changes were made to the diets

LARGE SCALE FIELD TRIAL

(Fall & Winter of 2020 and Spring of 2021)

27,494 HEAD

12 HERDS

4 STATES

SEVERAL NUTRITIONISTS

LOCATION	COW NUMBERS	MILK RESPONSE LBS.	PROTEIN RESPONSE %	FAT RESPONSE %
Eastern Corn Belt	980	3.2	0.15	0.2
Eastern Corn Belt	672	6.4	0.1	0.2
Eastern Corn Belt	426	4.2	0.08	0.1
Midwest	721	3.7	0.1	0.15
Southeast	5297	3.4	0.1	0.2
Eastern Corn Belt	178	2.8	0.1	0.15
Eastern Corn Belt	419	4.2	0.15	0
Midwest	3477	2.6	0.1	0
Eastern Corn Belt	412	0.1	0.2	0.2
Eastern Corn Belt	1994	5.4	0.1	0.05
Eastern Corn Belt	5509	4.4	0.15	0.1
Eastern Corn Belt	7481	2.1	0.05	0

AVERAGE RESPONSE / COW	3.34	.1	.08
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TOTAL COW NUMBERS	27494			
AVERAGE HERD SIZE	2291	4.9 LBS. OF ENERGY CORRECTED MILK		

OBSERVATIONS/IMPACT OF DIETS

Milk production response was linear to the starch + sugar levels in diet

Starch + sugar \geq 32 was the tipping point to see a response

High fiber, low starch diets had a minimal response

Adequate ammonia is needed for bacteria to flourish

- Soluble Protein = 6-7.5%
- RDP = 11.3-11.8%

ADDITIONAL OBSERVATIONS

- ▶ I met with each farm's Owner, Herdsman, Nutritionist, and Veterinarian
- ▶ Each one gave similar feedback
 - ▶ Manure changes were seen at day 3
 - ▶ Less feedstuffs (both grain and fiber) in the manure
 - ▶ Manure had a "creamier" texture
 - ▶ Milk production response started between day 10-14
 - ▶ Production response plateaued around day 20-24
 - ▶ No increase in feed intake
 - ▶ The hottest diets actually decreased in feed intake while achieving a production response

THREE FEEDING STRATEGIES:

- ▶ Hot Diets
 - ▶ Insert BactiSource directly into diets in excess of 32% starch + sugar, with adequate soluble protein to drive the conversion of lactic acid into propionate.
- ▶ Conservative Diets
 - ▶ Add starch (corn) by 2-3% to boost milk production without fear of acidosis or crashing butterfat.
- ▶ Fat Added Diets
 - ▶ If the reason for adding fat is to gain energy without adding starch, see above.
 - ▶ If a different reason for adding fat (reproduction, etc.), you can keep the inclusion of BactiSource cost-neutral by replacing enough fat with starch to cover the cost of the BactiSource.

ADDITIONAL OPPORTUNITIES

Calves

- Weaning time, as they transition to dry feed
- Acidosis mitigation

Stressed animals

- Systemic inflammation defenses become an obligate user of glucose
- BactiSource creates more glucose from the diet

COMMERCIAL APPLICATIONS

Dosing:

- Dairy Cows 4.5 g/hd/day
- Feedlot cattle 2.25 g/hd/day
- Calves 1.5 g/hd/day

Package size is 50 lb poly-lined paper bags

Stable for 9 months in dry storage

MakeMoreMilk.net

