

Meta-analysis benefits dairy industry

A meta-analysis shows that cows improve milk production and dry matter intake with yeast culture products.

NUTRITIONISTS, veterinarians and other dairy professionals need well-designed, statistically significant research studies to aid producers in making the most profitable decisions for their animal production operation.

One or two studies on a particular product may not be enough to give consultants the confidence they need to make a recommendation. A bias in results often occurs due to poor statistical analysis or study design, biased publication or lack of relevance to a particular operation.

A meta-analysis is a systematic review that uses quantitative methods to summarize research results from many studies to provide the most reliable form of research-based evidence on a product or topic.

Diamond V recently completed a meta-analysis of research on its Diamond V Yeast Culture to provide dairy professionals with the information they need to make decisions on the effectiveness of yeast culture in dairy cow rations and the benefits its products offer the feed industry.

Understanding meta-analysis

Comparing research studies is often a challenge because no two studies are exactly the same. The number of animals, study design and other variables are often different, even when the same product is used. This makes it hard to contrast products, compare results and draw conclusions.

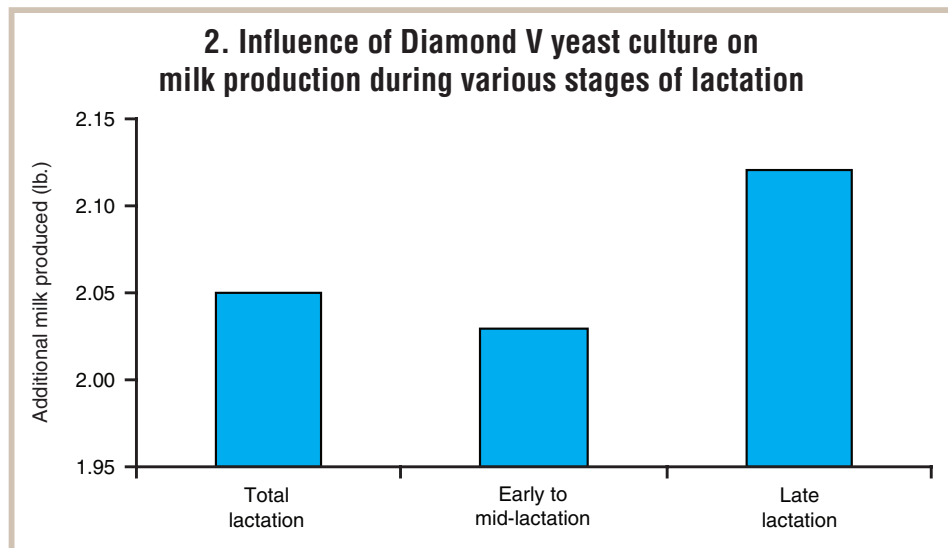
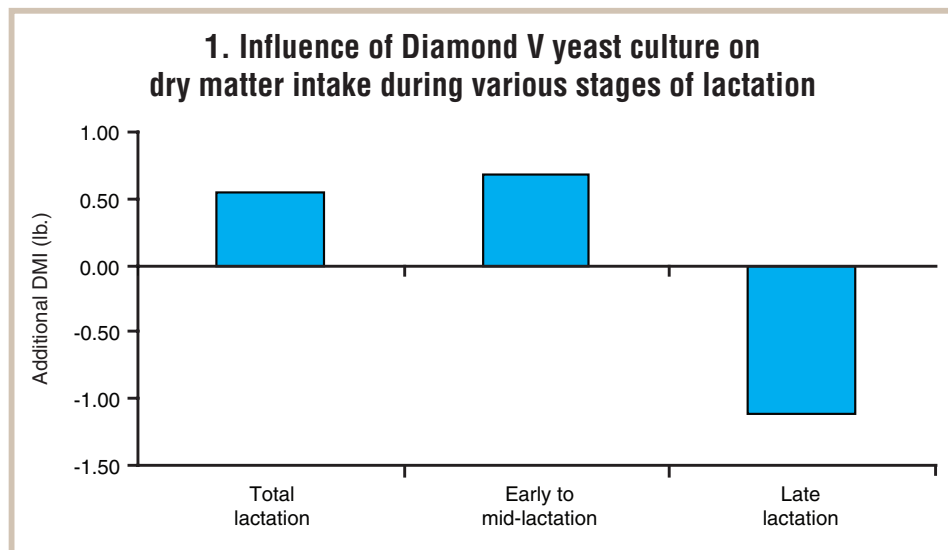
To overcome these challenges, a meta-analysis can be performed on large bodies of research. Meta-analysis is a highly sophisticated statistical method of reviewing a compendium of research on a specific topic.

Bovine Research Australasia, an independent research firm in Camden, Australia, recently completed a meta-analysis on yeast culture. The firm's meta-analysis reviewed 60 studies looking at

trial design and statistical methods. The meta-analysis evaluated the effectiveness of supplementing lactating dairy cows with Diamond V YC, XP and XPC to enhance milk production and dry matter intake (DMI).

Of the 60 studies submitted for review, only 32 studies met the strict statistical criteria set by the Bovine Research Group. Results within each study were reviewed, and a weighted average was calculated across studies to arrive at a statistically significant result.

The outcome of this in-depth meta-analysis provides dairy professionals with a more precise estimate of the effect of utilizing yeast culture products in dairy rations.



Although meta-analysis is a much more precise and accurate method of providing information required for decision-making, few companies have the capability to perform one. A substantial investment in research is needed, as well as a product that can withstand the rigors of the meta-analysis technique.

What this means

The results of the meta-analysis proved how beneficial yeast culture is to dairy nutrition. Several benefits to feeding yeast culture can be identified from the meta-analysis results, including:

- **Improved early-lactation performance and health.** Cows supplemented with yeast culture improved DMI throughout the lactation 0.55 lb. per cow per day, while early- to mid-lactation cows (fewer than 150 days in milk) increased intake 0.68 lb. per cow per day (Figure 1). The first 100 days in milk are critical to achieving higher intake levels that will support peak milk and provide a foundation for animal health.

- **Higher production levels.** Cows supplemented with yeast culture improved milk production 2.05 lb. per cow per day throughout lactation, while late-lactation production climbed 2.12 lb. per cow per day (Figure 2).

Milk production often tapers off after hitting peak production levels as energy is diverted to pregnancy and body

Summary of weighted mean differences of yeast culture on milk production and daily DMI

Outcomes	--Difference in milk yield ^a --		----Difference in DMI ^a ----	
	lb./head/day	P-value	lb./head/day	P-value
Milk yield	2.05	<0.0001	0.55	0.13
Early to mid-lactation	2.03	<0.0001	0.68	0.05
Late lactation	2.12	<0.0001	-1.12	0.62

^aDifference: weighted mean difference; comparison of Diamond V to control.

conditioning. The positive response to yeast culture supplementation during late lactation shows an improvement in feed utilization.

- **Improved feed efficiency.** In late lactation (more than 150 days in milk), cows increased milk production 2.12 lb. while consuming 1.12 fewer pounds of dry matter, improving feed utilization. Improved feed efficiency late in lactation lays the groundwork for proper body condition moving into the dry period.

With increasing feed costs and tightening margins, it is critical that cows gain as much from each pound of feed as possible. Results indicate that feeding yeast culture can optimize rumen function and ration digestibility to ensure that more critical nutrients are available for milk production.

- **Additional profits.** More milk from less feed means more profits for the producer. At \$19/cwt. milk, producers can

see as much as a 45 cent-per-cow-per-day return on investment (based on 5 cents per cow per day of input cost) in late lactation when cows are fed yeast culture. For a 1,000-cow dairy with 300 cows in late lactation, the herd could see as much as a \$135 increase in profits each day.

- **Healthy rumen environment.** All of the positive results from the meta-analysis confirm that yeast culture improves feed utilization by maintaining rumen integrity. For the industry, improved rumen function means healthier cows that can perform to their potential.

Reliable research is critical for making ration decisions and improving performance in the milking herd. The summary (Table) of the 32 studies shows that yeast culture plays a critical role in the dairy cow diet, supporting improved milk production on fewer pounds of feed while optimizing the rumen environment.