

# Partitioning of nutrients is key to dairy feeds

BY DR. NATE SMITH  
Director of Dairy Research  
Ralston Purina Company

A dairy cow has a tremendously high requirement for nutrients in early lactation, much higher than

she can normally consume. The result is a period of high stress, stress that can result in less than

maximum milk production, poorer breeding efficiency, and more metabolic disorders, such as ketosis.

nutrient components capable of supplying the energy and protein needs of the cow.

## Purina introduces dairy feed products

ST. LOUIS, Mo. — Ralston Purina Company has introduced four new dairy feed products which it says are the result of major breakthroughs in dairy research.

These breakthroughs, says Dr. Nate Smith, Purina's director of dairy research, include the formulation of a Purina feed concentrate that helps deliver nutrients to the body parts of a cow where they are most needed, as well as a top-feeding concentrate containing high nutrient density and favorable palatability. Convenient, weather-proof blocks for lactating cows and a dry cow, heifer supplement will also be introduced by Purina, all developed to improve milk production and lifetime persistence, Smith says.

The technology which went into these new products — Maxi-Tech 40, Hi Octane Top Feed B 37, Hi Octane Milking Block and Easy Care Block — is the result of years of research, feeding trials and practical application, Smith reports.

Maxi-Tech 40, says Smith, is a highly effective concentrate that succeeds in partitioning nutrients to a cow's body parts where they are most needed. Smith describes the new top-feeding concentrate — Hi Octane Top Feed B 37 — as a highly palatable product that can reduce weight loss during early lactation.

Purina's newest block products, Smith says, are convenient as well as efficient. A completely balanced



Nate Smith

milking ration for lactating cows, the Hi Octane Milking Block delivers energy, protein, vitamins and minerals necessary for top milk production. The Easy Care Block meets the nutritional needs of dry cows and heifers.

"The average dairy farmer could not afford the vast amounts of time and money necessary for the kind of thorough, scientific research that goes into finding the right combination and levels of ingredients for a top-performing feed," Smith notes. "At Purina we have the largest staff of research nutritionists in the commercial feed industry."

This staff directs research ac-

tivities at Checkerboard Square, where the livestock nutrition laboratory was opened more than 50 years ago, and at Purina's Dairy Research Center in Gray Summit, Mo.

At the Research Center, about 325 cows, heifers and calves are fed experimental feed in extensive research studies, and are continuously monitored for milk production, milk composition, growth, palatability inclinations and other criteria.

"Our staff and scientific approach to practical feeding trials keeps us at the forefront of dairy research," Smith comments. "When this research brings us to a better understanding of specific nutritional needs, and our technology research allows us to put that to use, then we are able to formulate a feed to better meet those needs," he explains.

Researchers can and often do toil for years before a truly significant breakthrough is achieved, Smith points out.

"For example, one long-time goal has been to identify the balance of nutrients, such as energy, protein and NPN, which will achieve the proper partitioning of nutrients inside a cow's body," Smith says. "Finally, a major step in reaching that goal has been attained in the form of Maxi-Tech 40. It was a long time in coming, but like all of our dairy research, in terms of what it can do for the dairy farmer, it was time well spent."

We attempt to counteract this stress with higher concentrations of nutrients in feeds and feeding programs. Such feeding programs, we know, will result in a higher peak and total lactation milk yield. This is because the cow will respond most efficiently to increased nutrients during early lactation. We also know that minimizing weight loss during early lactation is critical to maximum breeding efficiency (earlier reproductive cycling and higher conception rates).

However, just increasing energy, protein and other nutrients in the ration is not the answer. In fact, this often will result in more problems, including, for example, decreased fat test, cows fattening instead of producing more milk and cows going off-feed. The real answer is better "partitioning of nutrients." This requires a better environment in the rumen, abomasum and small intestine in order to produce a better balance of nutrients from digestion. These can then be directed (partitioned) within the cow for more milk, milk components (fat, protein, lactose), and for body tissues.

Scientists and dairymen have long known and said that "fiber is not fiber is not fiber is not..." What does this mean? It means that fiber from one source or feedstuff will not result in the same digestion and performance as another. Fiber is a general term that includes many different chemical or nutrient components. Similarly, energy and crude protein are general terms, with many chemical compounds or

It is the balance of these chemical or nutrient components (protein or nitrogen sources, types and sources of fiber and energy, mineral levels) that is the key to higher performance rations and improved partitioning of nutrients in the lactating cow. This balance of nutrients and nitrogen supply from both feed proteins and non-protein nitrogen (NPN) have been the key to accomplishing this breakthrough in super performance rations in the case of Ralston Purina's new Maxi-Tech 40 concentrate.

### Better Rumen Environment

Maximum digestion of feeds, and especially roughages, requires maximum microbial growth and fermentation in the rumen. If rumen microbes are limited in their growth, fiber digestion is decreased, and the full energy value of the feed is not available to the cow. Milk production, as a result, will be limited. In addition, acetate production in the rumen and availability to the cow will be reduced since it is the major end-product of fiber digestion. Acetate is the major nutrient used by the cow in making or synthesizing milk fat. Therefore, decreased fiber digestion not only results in lower milk production, it also means a drastic decrease in milk fat.

Maximum growth and digestion by the rumen microbes, just like the cow, requires the right environment and balance of nutrients in the rumen. A major factor in this balance is the supply of nitrogen. Fiber-digesting bacteria

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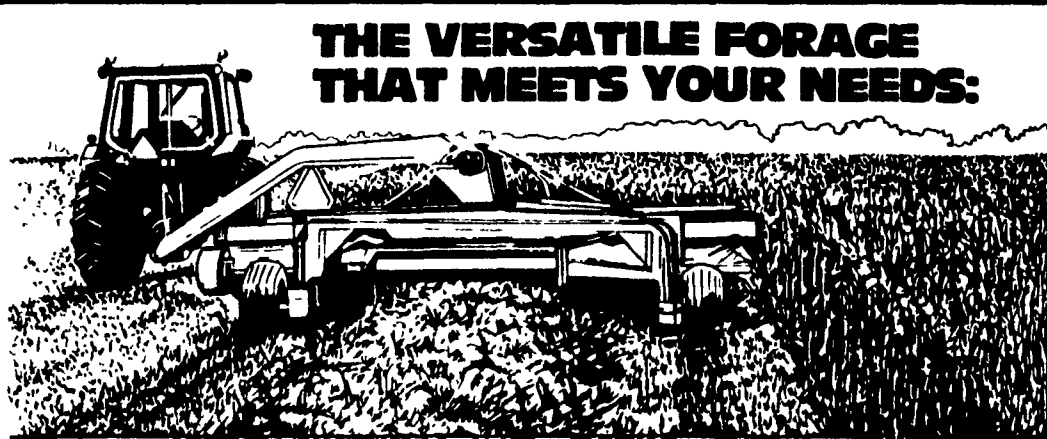
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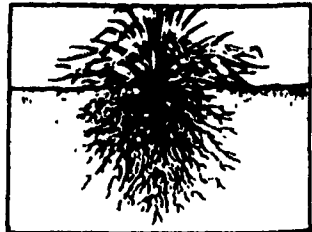
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