



# A pinch of herbs and spices for your cows

Approach each feed additive with a scientific mind. Ask your nutritionist the right questions to help you make your decision.

by Emma Wall

**A** COMMON goal of many of you is to maximize production efficiency of your animals. Among the ways to accomplish this is to promote the use of nutrients by the rumen microbes, to maximize rumen microbial production, and to prevent energy and protein loss during fermentation. The use of feed additives such as an



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ionophore (monensin) has proven to be a very successful approach to maximizing energy and protein utilization in the rumen and also improving milk production efficiency. Many other feed additives have been studied, including yeasts, organic acids, direct-fed microbials, and plant extracts.

As a dairy producer, how do you decide which feed additives to use and when to feed them? Mike Hutjens from the University of Illinois suggests evaluating feed additives with the 4 Rs: response, returns, research, and results. In addition, you should approach each feed additive with a scientific mind. Ask your nutrition-

ist the right questions to help you make your decision:

- How was the product in question developed?
- What research has been conducted on the product?
- Have the results been published in a peer-reviewed journal?
- Have field trials been conducted to determine the repeatability and consistency of the effects on multiple farms and multiple management schemes?
- Will it improve bottom-line profitability?

It is important that you choose feed additives that have been well-researched, with strong and consistent results. That is what it should take to convince you that the product is worth adding to your feeding program.

## Essential oils considered

The essential oils represent a group of feed additives that are relatively new on the market but are quickly gaining the attention of dairy producers and nutritionists. The medicinal and antimicrobial properties of many essential oils have been known for years. More recently, however, researchers have been exploring the possibility of exploiting specific essential oils to beneficially alter rumen fermentation.

Most experiments looking at the effects of essential oils on rumen fermentation have been conducted in vitro (in laboratories). The results of these experiments have been extensively reviewed in the Journal of Dairy Science. With accumulating research being conducted both in vitro and in the field, many of these molecules are showing promising effects on rumen fermentation.

Several essential oil products, including garlic oil, cinnamaldehyde (from cinnamon), and eugenol (from cloves) have been shown to reduce the acetate:propionate ratio and to reduce methane gas production in vitro. In an effort to identify the specific molecules in garlic that are responsible for its activity, Busquet and others investigated the effects of garlic oil versus four of its compounds on rumen microbial fermentation. The results of their in vitro experiments, published in the Journal of Dairy Science, showed that there are

**THYMOL**, an aromatic aldehyde found in oregano, has strong antimicrobial activity against a wide range of bacteria. Although it is the most well-researched of the essential oils, its use as a feed additive has not been developed because it has such strong and nonspecific antimicrobial activity.

two specific compounds in garlic oil that are responsible for its effects. Importantly, these two compounds markedly cut methane production even more than monensin which was their positive control. A year later, the effects of monensin was compared with that of eugenol or thymol (from thyme and oregano). All treatments reduced the acetate to propionate ratio. Interestingly, both monensin and thymol were associated with a drop in true digestibility. This, along with the observations of Busquet, have led people to speculate that some essential oils may have additive effects when combined with monensin because they may work

***“When we are considering adding a new feed additive to our products, we are looking for peer-reviewed, published data showing consistent and marked effects on improved transition cow health, increased peak milk yield, and improved milk components. We want solid research and strong evidence that the use of a certain product will increase cow performance.”***

—Kevin Kouri, Poulin Grain

through different mechanisms. However, this concept has not been confirmed.

For some essential oils, the effects on rumen fermentation appear to be diet and pH-dependent. Therefore, an additive that improves dairy cow performance may not work for beef cows, and vice versa. In addition, there are optimal doses for the essential oils. If these doses are exceeded, it is possible that negative effects will be observed.

Although the majority of research on essential oils has been conducted in vitro, there are a growing number of experiments being conducted on dairy cows in the field. In a later article, I will discuss those experiments and talk about products currently available to improve milk production, reduce the negative effects of stress associated with heat and the transition period, and perhaps add to your bottom line.



**EUGENOL**, an aromatic aldehyde found in clove bud, has been associated with a decrease in acetate production, an increase in propionate production, and improved protein utilization by the rumen.

**COMPOUNDS PRESENT IN GARLIC OIL** have been associated with a decrease in acetate, an increase in propionate, and marked decrease in methane production. These effects suggest an overall increase in the efficiency of energy use by the rumen.