

THE FAMILY OF COMPLEX PROTEINS known as enzymes are not themselves alive, but they exist in the living cells of all plants and animals. Sometimes called *biochemical middlemen*, enzymes speed up and influence all of the chemical reactions that contribute to the continuous breakdown and build-up of cells. In the mouth, the enzyme, *ptyalin*, splits starch into simple-sugar molecules. Enzymes control photosynthesis and help ferment wine, tan leather, bake bread, make cheese, tenderize meat, and clean clothes.

Enzyme chemistry has progressed tremendously in recent years, but many large animal practitioners and most small animal practitioners are unfamiliar with the potential inherent in the use of supplementary enzymes in nutrition. In feeding tests with chicks, an unidentified growth factor was demonstrated in a culture of *Aspergillus oryzae* grown on wheat bran.<sup>1</sup> This fungus and others can synthesize nonreducing sugar from sucrose.

A growth factor also has been isolated from the gut of well-doing swine that had been fed Aureomycin® (American Cyanamid).<sup>2</sup>

In other feeding experiments<sup>3</sup> the investigators clearly demonstrated that significant improvement in total weight gain and rate of weight gain can be achieved by adding enzyme products to the feed of 600-lb, quality steers being fed a good ration.

Scientific study and extensive and prolonged clinical observation have made apparent the fact that animals, both large and small, are often unable to utilize adequately all the nutrients available to them in commercial rations. One example of this underutilization of dietary ingredients is the rather frequent passage of undigested oats in the feces of horses. Examples in dogs are occasional diarrhea and failure of a dog to gain or maintain desirable weight despite availability of more than adequate amounts of good-quality commercial food.

Because of the common occurrence of digestive problems in cattle (bloat, etc.), an enzymatic prod-

## clinical impressions of the use of an **ENZYME FOOD ADDITIVE** in large and small animals

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Addition of an enzymatic supplement to various commercial diets fed dogs, cats, cows, horses, and hogs has brought about noticeable improvement in the physical appearance and coat of these animals. In many instances the quantity of food required to maintain body weight has been reduced. In other instances, desirable and, in some cases, remarkable weight gains have been seen. The product (Vita-Ferm® or K-Zyme® — Bio-Zyme Enterprises) is derived from a by-product of *Aspergillus oryzae*.

uct was developed to help improve the nutrition of cattle. This ration supplement (Vita-Ferm® —Bio-Zyme Enterprises) contains a by-product of the growth of *Aspergillus oryzae*. The organism is grown under strict biologic control, and the enzyme produced thereby is harvested. When this enzyme is combined with vitamins, minerals, and other chemicals, a relatively homogenous meal results. A similar product (K-Zyme® —Bio-Zyme Enterprises) has been developed for small animals.

We are not chemists and do not presume to be able to explain the chemical reactions that occur with the feeding of these products; but, as clinicians in separate practices and in different fields of practice, we are competent to share observations on the clinical use of these dietary supplements.

### Use in large animals

#### Cattle

Vita-Ferm was originally used in cattle. Results were not easy to evaluate in well-nourished cattle; however, when pastures were short and the product was offered free-choice, the animals were obviously better able to maintain condition. Considerably less hay was consumed—up to 25% less. Such improvements as increased appetite and weight gain were soon obvious in calves, especially bucket-fed dairy calves. Death losses were greatly reduced. Annoying—sometimes serious—problems such as “running eyes” and scours were virtually eliminated.

#### Horses

For six months a 5-year-old Quarter Horse gelding had been underweight, had a poor appetite, and had stiff and swollen legs after light work. Practitioners at three equine clinics had examined this horse. Their findings, including the results of laboratory tests, were all normal. After this animal was fed 2 oz of Vita-Ferm on the ration twice daily for three and one-half weeks, all clinical signs disappeared. Thereafter, each time the feeding of the enzyme supplement was discontinued, the signs returned, and each time the supplement was reinstituted, the horse became clinically normal.

Reports from clients are consistent that, with

Vita-Ferm, less feed is required to maintain horses. Owners of field-trial horses and horses used for trail rides are particularly pleased with the increase in their animals' stamina.

#### Swine

Reports regarding the feeding of the enzyme product to swine have been equally impressive. When 25 pounds of Vita-Ferm were added to 1 ton of sow rations, the sows required less feed (4 lb instead of 6 lb/day), the size of the litters increased, and mortality decreased. In droves in which baby pig scours was a problem, the disease was either controlled or eliminated. Pigs in these litters stood the stress of weaning much better than had previous litters and they reached market weight almost one month sooner than pigs on conventional ration.

#### Use in small animals

One teaspoonful of K-Zyme/pup was added to the diet of 48, 9-week-old Greyhound dogs that were off feed and underweight. Within one week, these pups showed improved appetite, and eventually, they attained normal weight.

When the diets of brood bitches were supplemented with the enzyme product at the rate of 2 tablespoonfuls/dog/day, the bitches became more alert and gained a healthier appearance. After gestation and whelping, their milk production increased. Their pups were stronger, heavier, and healthier than pups in previous litters. An interesting note regarding these improvements is that they were seen in a Greyhound colony that had been established 40 years and was known for the high quality of its dogs and its excellent management.

The small animal practitioner's (Dr. Knowles') first experience with K-Zyme came about when Dr. Bassham (mixed practice) suggested use of the supplement in a kennel of field-trial bird dogs. Among the pups were 2 Pointers whose dam had habitually destroyed her progeny. These puppies were separated from the mother at birth and tube-fed and hand-reared. Although they had been offered almost unlimited amounts of a commercial dog food and a prescribed canned diet, these pups were underweight at 4 months of age.

Addition of the enzyme product to the diet of the 2 underweight pups was begun. Then, in just

seven days, each of these pups gained 6 pounds (from 27 lb to 33 lb and from 31 lb to 37 lb). This phenomenal gain in so short a time could have resulted only from supplementation of their diet, since all other aspects of their environment and management had remained the same. This experience prompted further investigation of the product.

We have since used this material under a wide variety of circumstances in dogs and cats. As would be expected, dogs with nutritional problems (parasitism, anemia, inadequate diet) would probably show the greatest response to the feeding of K-Zyme. Dogs under extreme stress, such as sentry dogs, attack dogs, etc., benefit remarkably. Such dogs expend a great amount of nervous energy by barking and roaming inside fenced areas for 12-hour stretches.

We have dispensed the enzyme supplement for feeding to dogs subjected to stress conditions. For example, a 3-year-old Rottweiler, a member of the Canine Corps, had a thyroid deficiency and chronic

dermatitis. This dog's weight was also very difficult to maintain. On February 12, 1979, the dog weighed 78 pounds. At that time, feeding of the enzyme was started. No other changes were made in the dog's situation or medical treatment. On February 17, the dog weighed 87 pounds. Subsequent weights have been: May 5—87 lb; May 23—88 lb; July 5—96 lb; August 2—98 pounds.

K-Zyme is now being used routinely as an additive to the food of hospitalized and boarding dogs and cats. Empirical evaluation is imprecise and difficult; however, our clinical opinion is that these animals retain their weight better than animals given the feed additives we have used previously.

#### REFERENCES

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3. McCullough, M.E.; Burnside, J.: The University of Georgia College of Agriculture. Personal communication.

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