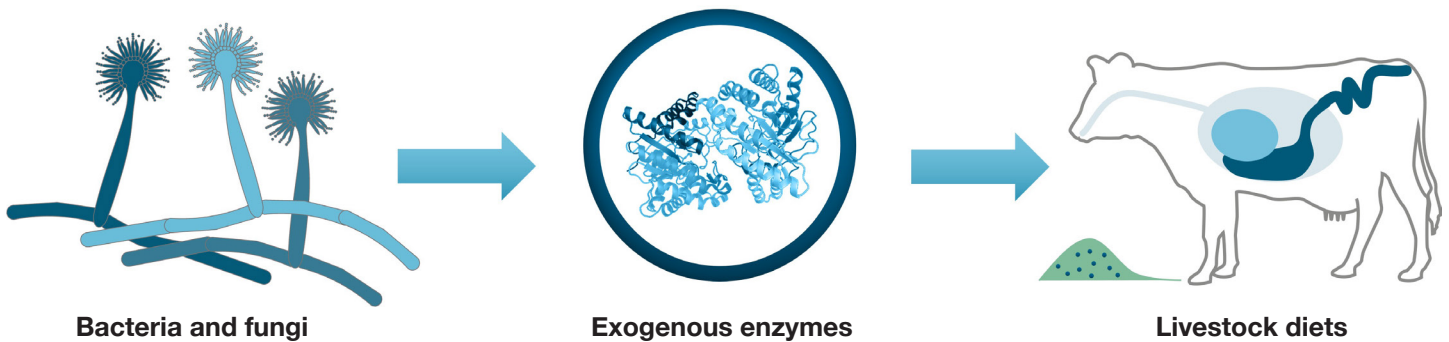


## PAC FACTS

# What you need to know about exogenous enzymes.

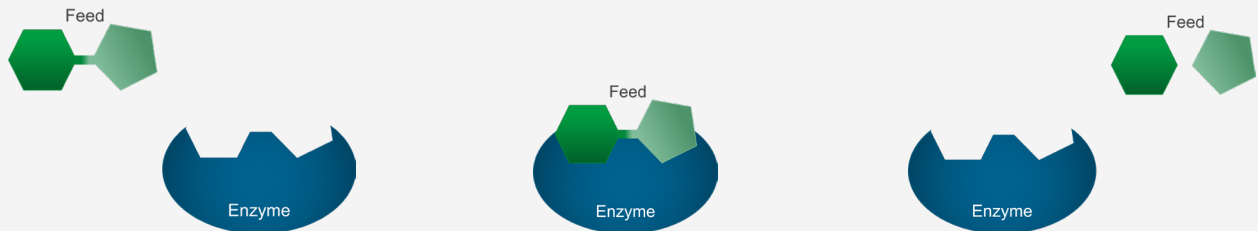
Enzymes are proteins that catalyze or speed up reactions in the body. *Exogenous* enzymes are sourced outside the body usually from bacteria and fungi and then fed in livestock diets. Common exogenous enzymes include amylase, hemicellulase, cellulase, pectinase, xylanase, beta-glucanase and phytase.



## How do exogenous enzymes work?

### 1. They breakdown feed and pre-digest it.

This makes feed nutrients more available to rumen microbes as well as to the animal's digestive tract.



### 2. They increase attachment and enzymatic activity of rumen microbes.

This enables rumen microbes to breakdown feed that would otherwise be challenging for them to utilize.



## When should exogenous enzymes be used?



Moderate / low-quality  
feedstuffs



High producing  
animals



Periods of stress

## What are typical responses?



Increased nutrient digestibility

Improved growth or milk production

Improved reproduction

Reduction in frequency, severity, or  
duration of illness

## How do you select an exogenous enzyme?

### 1. Look for a blend of enzymes.

Utilizing a blend can lead to more consistent improvements in feed utilization across a variety of diets and ingredients.

### 2. Look for data on enzyme efficacy.

Data should show improvements in nutrient digestibility or health and performance parameters in both the diets and life stages of interest.

### 3. Look for enzyme guarantees on the product label.

Guarantees ensure consistent levels of enzymes are in every dose.