

Role of enzymes in animal production

P.V.Patil* and M.K.Patil

College of Veterinary & Animal Sciences, Udgir Dist.Latur-413517,
Maharashtra

Abstract:

Ruminant animal ration mainly consists of roughages i.e. dry and green roughages. Dietary fibre in the animal ration is useful to maintain diet bulk, maintain peristalsis movement of intestines, hunger satisfaction, to drink more water and improve milk fat synthesis. But most of the dietary fibre part remains undigested and excreted through the faeces of animals. To improve the roughage digestion the exogenous enzymes plays an important role. These enzymes are also produced by widespread micro-organisms like bacteria, yeast and fungi in the fermentation process. Different enzymes needed to break down feed and forage is produced naturally by microbes in the digestive tract of the animal. When enzyme products are fed to ruminant animals, the main site of action is the rumen. The enzymes secreted or exogenous enzymes assist the rumen microbial flora by performing some of the digestion for the microbes. The enzyme supplementation improves digestion of feedstuff, improves feed efficiency and animal production.

Keywords: Animal, Digestion, Enzymes, Feed efficiency, Production

Introduction:

Feed grade enzymes are produced by bacteria, yeast, fungi in the fermentation process and enzymes produced by fungi have a broad spectrum of activity and higher stability than bacterial enzymes. But, a mixture of both types is more effective than a single source. They are used on an industrial scale for improving the properties of pulp, texture and animal feeds. The specific enzymes are used with specific objectives. e. g. Phytase, lipase, ligninase are used to improve the availability of nutrients like phosphorus, calcium, zinc, copper, protein,

amino acids and utilize the phytin phosphorus. Enzymes act as biological catalysts and speed up reactions but, not change the reaction.

One of the tools that can be used to increase the efficiency of nutrient utilization is enzymes. Enzymes are called specialized proteins requires to perform specific functions to make life possible. Enzymes assist or hasten chemical reactions (catalyze) that can breakdowns organic compounds into substances that can use as nutrient sources by animals, and microbes (Jones, 2017).

The exogenous enzymes used in ruminant diets can be classified as fibrolytic, amylolytic and proteolytic based on the specific substrate on which their enzyme activity can perform (Sujani and Seresinhe, 2015). Microbes in rumen produce naturally the many of the enzymes needed to break down feedstuffs. But, the quantity of enzymes produced naturally by the animal is limited than required for the proper digestion that occurs in the digestive tract under production conditions.

Mode of action of enzymes:

1. Decrease deleterious factors in the digestive tract.
2. Increase saccharification of NSP and nutrient digestibility and lowering the gastrointestinal viscosity.
3. Break down the cell wall and expose nutrients to enzyme attack and breakdown of components that cannot be digested into absorbable nutrients.
4. Decrease the faecal output and improve animal health, gain, and feed intake.
5. Releasing other nutrients bound to non-starch polysaccharides, proteins, phytate and increases the digestibility of the protein and various minerals like Ca, Mg, Zn and P (Prasad and Neeraj, 2012).

Desirable qualities of the enzymes

Enzymes should maintain their activity at variable pH (2-7) and temperature (15-45 °C). It should maintain its stability outside the animal body at different climatic conditions; it should not be digested by the host animal. Enzymes are highly specific in their

reactivities. Enzymes should not be bound to any other substances and hamper their utilization.

When to supplement enzymes in animal ration?

The supplementation of enzymes in the animal ration is commonly adopted during the stress period, post-weaning period, high intestinal viscosity and early growing period (pre-ruminant).

Benefits of enzyme supplementation in animals:

1. It makes nutrients more available, the enzymes due to faster digesta passage rate counter-act the multiplication of bacteria, which could migrate from hindgut upwards.
2. Reduction in digesta viscosity leads to a reduction in stickiness as well as higher dry matter content of the faeces.
3. The energy needed for endogenous enzyme production will be available for body mass resulting from the energy and protein saving effects.
4. Releasing other nutrients present in the compound of the cell wall for benefit of an animal body.
5. Breakdown of components which cannot be digested into absorbable nutrients by endogenous enzymes.
6. Reduction in digesta viscosity and stickiness helps to keep animals cleaner on the floor and indirectly helps reduces leg weakness and breast blisters etc.