



DSM Protease

RONOZYME® ProAct - maximize your proteins

RONOZYME® - Your first choice for feed enzymes



RONOZYME® designates the unique global Feed Enzymes Alliance between DSM and Novozymes – both preeminent leaders in their field and committed to success based on collaboration and innovation.

By pooling their market and technical expertise, extensive experience and a focus on quality, the Alliance has developed the broadest range of innovative feed enzyme products to counter highly variable feed costs in a sustainable way.

All products under the brand name RONOZYME® are backed by comprehensive and independent scientific research of the highest level to confirm efficacy, reliability and safety in a wide range of feed manufacturing situations and applications. DSM and Novozymes are committed to setting the industry standards for feed enzyme formulation and product performance.

The companies share activities, and build on individual strengths to deliver outstanding products and innovative solutions.

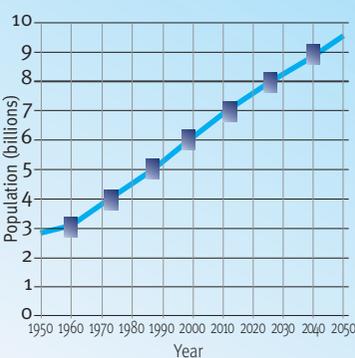
Novozymes provides knowhow in enzyme screening, strain development, formulation, and production, while DSM brings expertise of animal nutrition and feed technology, as well as a global reach in premix manufacture and sales and marketing.



Whether you require a specific enzyme or a carefully selected blend, you need look no further than RONOZYME®.

Protein - a mounting global concern

World population



The world is facing a rapidly expanding demand for quality protein from animal sources, driven by two major factors:

- **More people.** By 2050 the human population is expected to reach 9 billion people, a doubling in just over 60 years.
- **Higher demand for animal and feed protein.** Families with higher incomes want a healthier diet. This is particularly true in the high growth economies.

The challenge to the livestock production industry is two fold:

- To produce extra meat with increasingly limited resources
- To do so at a price affordable to the consumer

To meet these challenges, farmers will have to use feed, and particularly protein ingredients, more efficiently. Protein is one of the most expensive raw materials in an animal's diet but is essential for growth. As demand for protein sources increases, the price is expected to continue to rise.

The challenge is how to utilize protein sources more effectively, or how to stretch less further.

Soybeans price chart



RONOZYME® ProAct - Maximize your proteins



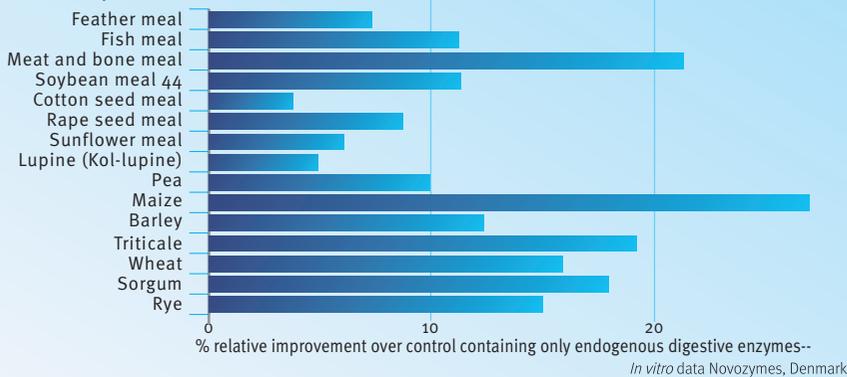
The proven solution to all these issues is the inclusion of a specifically selected protease RONOZYME® ProAct that is optimized for animal nutrition - improving protein digestibility and optimizing feed cost. The improved protein utilization also reduces nitrogen excretion and the environmental impact of livestock production.

Proteases are enzymes which breakdown complex protein molecules into the usable amino acids and peptides. Although proteases occur naturally in the digestive system of all classes of livestock, addition of a specific exogenous protease could

improve the protein digestibility of a broad range of feed ingredients, especially lower quality proteins typically not used for human consumption.

RONOZYME® ProAct increases digestibility of protein, and ensures more amino acids are available to the animal. The amount of nitrogen excreted is decreased. Ultimately this can increase the opportunity to use cheaper feed materials and so reduce feed costs. Alternatively, the protein content in the diet can be reduced while still maintaining animal performance.

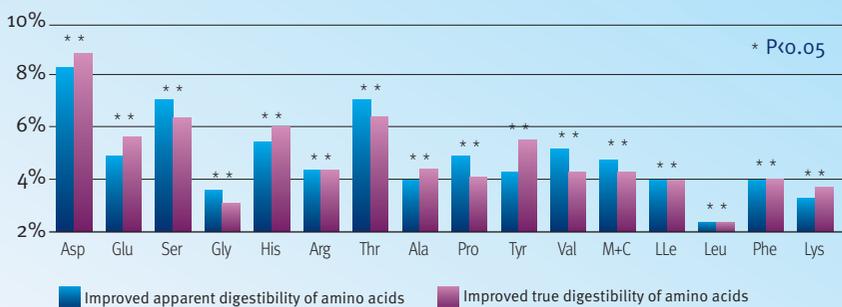
Proven efficacy in a broiler - *in vitro* model



RONOZYME® ProAct has been developed:

- **To hydrolyze proteins** in diets by complementing the naturally produced proteases in the digestive tract of farm animals
- **To provide extra power** to utilize more protein, making more peptides and free amino acids available to the animal.
- **To effectively target** a very broad range of feed protein sources.
- **To complement the performance** of all other endogenous and exogenous enzymes.

RONOZYME® ProAct improves the apparent and true digestibility of amino acids in a broiler diet



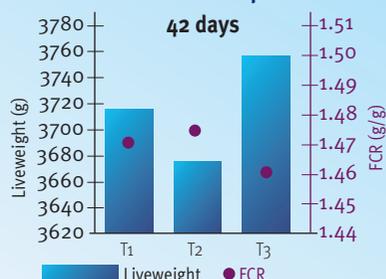
Research shows that RONOZYME® ProAct improves the apparent and true digestibility of all principal amino acids when added to a corn and soybean meal based diet.

RONOZYME® ProAct is the most stable feed protease.

RONOZYME® ProAct is stable throughout the intestinal tract, and supplements the performance of other feed enzymes such as carbohydrases and phytases. RONOZYME® ProAct has outstanding stability in all feed applications, including premixes and pelleted feeds. Trials show high levels of recovery under commercial feed production conditions.

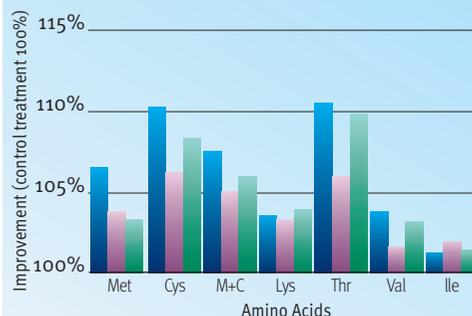
The dust-free formulation ensures there are no safety issues while being incorporated in feed. RONOZYME® ProAct increases the efficiency of livestock production by improving protein utilization in a wide range of feed ingredients. RONOZYME® ProAct is a real solution to the challenges in the economics of meat production, and ultimately boosts producer profitability in the quest for sustainable meat production.

Positive impact of RONOZYME®ProAct on performance of broilers fed diets reduced in amino acids and crude protein

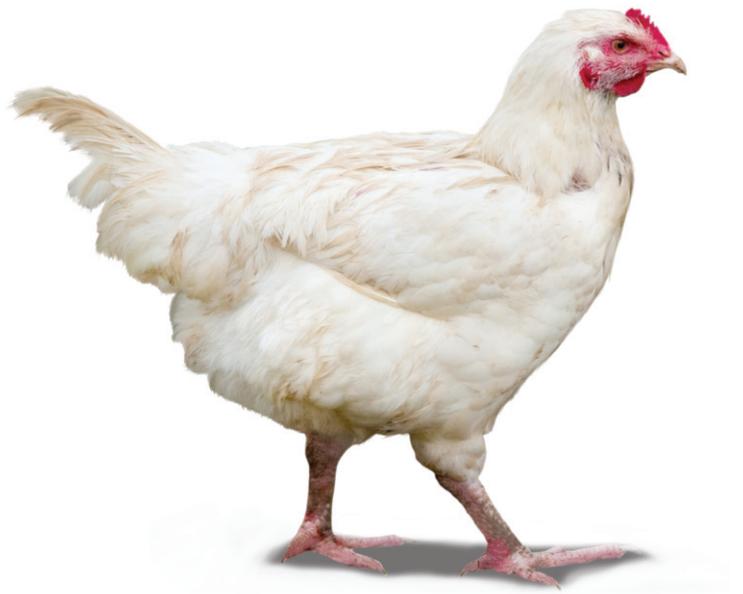


T1: Positive control, standard dietary nutrient content
 T2: Negative control, reduced crude protein (-3%) and amino acid (-3%) from 0-42 days
 T3: T2 supplemented with RONOZYME®ProAct

In vivo amino acid digestibility



* Bertechini et al., 2009 **Messias et al., 2010 ***Angel et al., 2011



For further information, please see:
www.dsmnutritionalproducts.com or contact:

DSM Nutritional Products Ltd
PO Box 2676,
CH-4002 Basel,
Switzerland

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