

# Exciting early results from innovative new feed enzyme

The day before the recent VIV Europe, DSM held a one day conference on how to maximise utilisation of protein by using their product Ronozyme ProAct. In a presentation by DSM's Dr Fidelis Fru, he explained the key points behind the discovery and development of this enzyme.

The need for such products, which improve the utilisation of protein by the bird, are increasing as demands for the world's limited resources of feed ingredients also increases. This demand is coming from competition for corn and other cereals by the biofuels industry, demand for grains and other raw materials from Asia because of its huge population and improving living standards, increased consumption of meat (+2-3% per annum) from increasing city populations, the impact of quality monitoring systems on the food chain and environmental issues relating to the impact of livestock farming and global warming.

These have resulted in rising food and feed prices, some lower quality animal feeds, no sustainable farming and concerns over global warming and provided opportunities for enzymes which enable us to better utilise our ingredient resources.

The feed grain has different components and DSM have the appropriate product for each of these. These are Ronozyme A and Ronozyme VP, which act on the starch rich endosperm, and Ronozyme NP, which acts

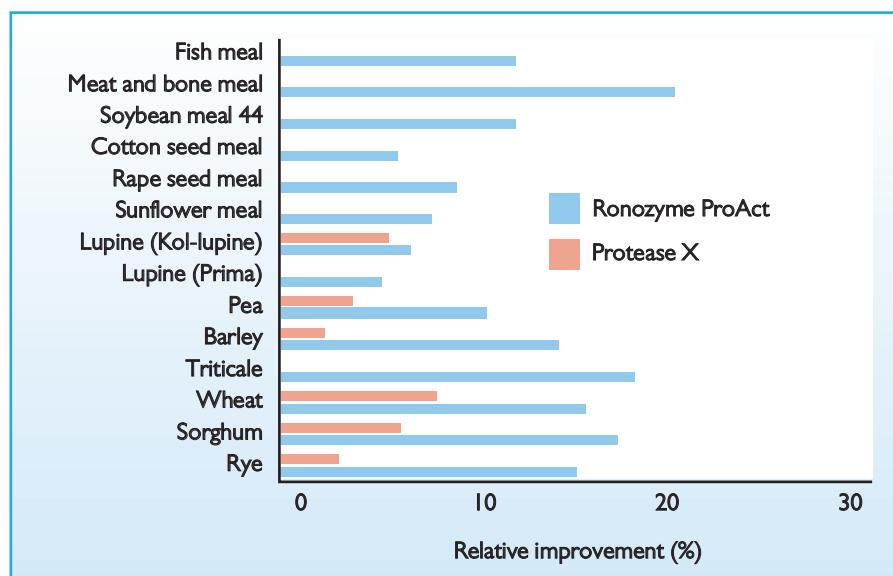


Fig. 2. Complementing digestive enzymes.

on the fibre and mineral content of the bran. They also have products which act on the whole grain. Their new product, Ronozyme ProAct, acts on the protein rich germ of the grain.

There are several stages to the development of a new feed enzyme:

- Identification of potential candidates by the screening of strain libraries.
- A pre-selection process which assess

potential candidates in vitro on different feedstuffs.

- In vivo digestibility and performance trials.
- Registration trials and global product development.

In the in vitro assays (tests in the laboratory) there were promising findings in that Ronozyme ProAct increased the proportion of low molecular size proteins, thereby

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Fig. 1. In vitro assays.

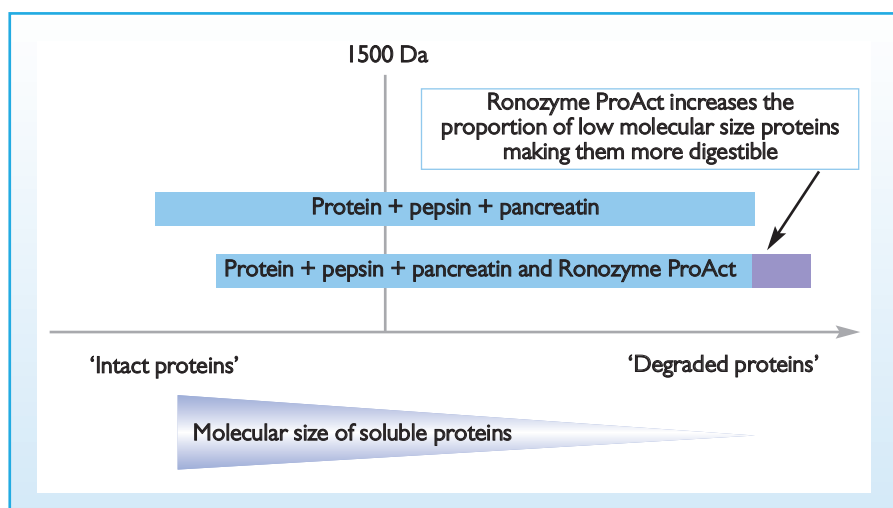
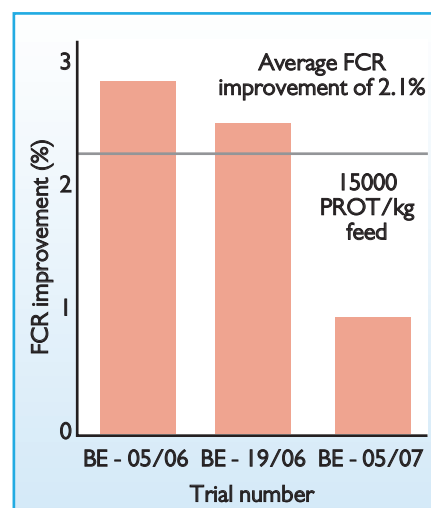
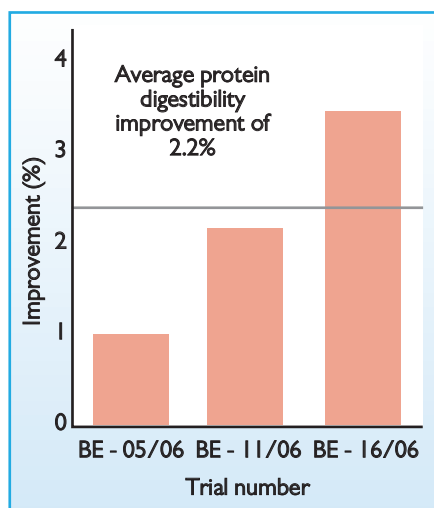


Fig. 3. Cage trials – FCR.





**Fig. 4. Protein digestibility.**

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making the protein more digestible (see Fig. 1). Work also showed how Ronozyme ProAct improved the protein digestibility of various ingredients (see Fig. 2). This graph also includes the results for another commercially available protease.

Then came in vivo testing (tests with live broilers) which were undertaken to show that Ronozyme ProAct improves feed utilisation in broiler diets and that the enzyme product improves protein digestibility and reduces nitrogen excretion by the broilers.

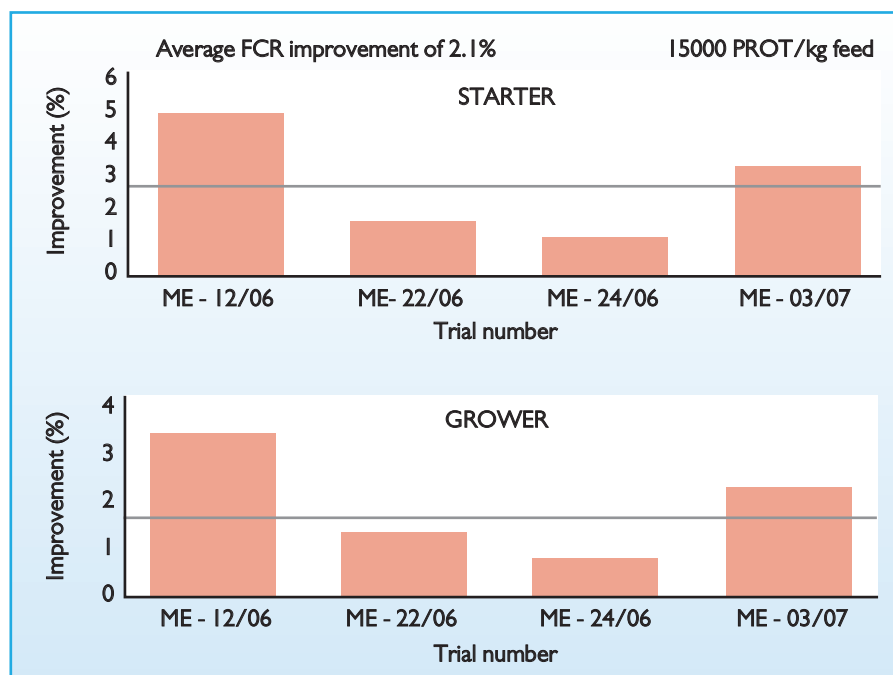
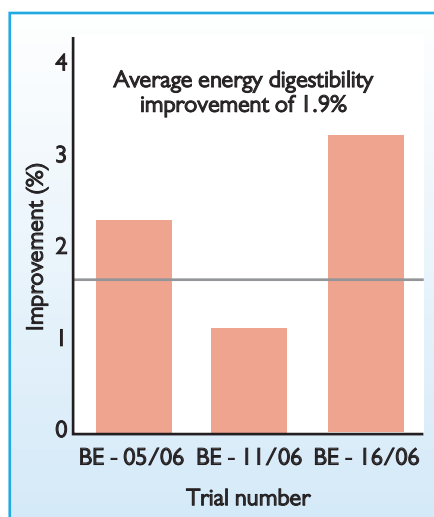
Also at this stage tests are undertaken to assure users that there are no adverse reactions with Ronozyme ProAct and other substrates in the feed.

Fig. 3 shows the results from cage trials that show an overall average improvement to FCR of 2.1%. Similar results for protein digestibility (average improvement of 2.2%) and energy digestibility (average improvement of 1.9%) are shown in Figs. 4 and 5 respectively.

Floor pen trials with starter followed by grower feeds showed an overall average improvement of 2.1% in FCR (see Fig. 6).

In modern broiler feed production where

**Fig. 5. Energy digestibility.**



**Fig. 6. Floor pen trials – FCR**

there is a heavy reliance on pelleting (a heat treatment) it is important that this process does not adversely affect enzyme levels in the feed. To assess this, feeds were pelleted at 70, 80 and 90°C and held for three months. At the first two temperatures no significant deterioration of levels were seen immediately or after three months. At the third temperature some reduction was seen but enzyme recovery rates were still over 90%. This confirmed Ronozyme ProAct's excellent pelleting stability.

Similar work on feed processed by an expander, which conditioned feed at 80°C for 30 seconds before expanding it at 120°C for 10-15 seconds, also showed excellent results with an average recovery rate for the enzyme of 92%.

This product was heading towards a launch so in order to have commercial data available the use of Ronozyme ProAct in broilers was evaluated at a number of universities and research institutes in Europe,

as well as in Latin America, the USA and the Asia Pacific region. The findings from these confirmed and reinforced the previous findings. Environmental impact trials showed that the use of this product reduced the amount of nitrogen excreted by 6% (from 22 to 16%) and improved protein digestion from 78 to 84%.

Table 1 shows the results of a customer field trial in Israel. The second to third treatments had significant reductions in terms of their content of protein (-6-9%), energy (-1-5%), met + cys level (-12-20%), lysine level (-9-13%) and threonine level (-10-13%) and the results in Table 1 have to be assessed against this background information. The most important comparison (like for like on a formulation basis) is to compare row 2's results (with Ronozyme ProAct) against the competitor's products in whole or in part.

These initial results look really exciting and it will be interesting to see whether they stand up to the test of time. ■

**Table 1. The results of a field trial.**

Treatment	Body weight (g)	FCR	Breast meat weight (g)	Breast meat yield (%)
Standard feed containing Ronozyme P5000, Ronozyme WX and Ronozyme VP	2437	1.835	593	29.01
Reformulated feed containing above three enzymes + Ronozyme ProAct	2304	1.907	592	28.70
Reformulated feed containing competitor's protease and phytase + Ronozyme WX and Ronozyme VP	2175	2.024	577	28.75
Reformulated feed containing competitor's protease, phytase and competitor's wheat and soya enzymes	2101	2.082	536	27.14