

Objectives

- Investigation of the potential for the commercial protease RONOZYME® ProAct
- Degradation of purified soybean anti-nutritional factors (ANFs)
- Degradation of protein in soy products of various qualities

Background – ANFs in soy

Differences in soybean meal quality are known

- Kunitz and Bowman Birk inhibitor (BBI) challenge the pancreas and may cause reduced protein digestibility
- Lectin causes irritation of epithelial tissue, challenges the immune system and may lead to reduced weight gain

ANFs constitutes an important part of the amino acids in soybean meal

- BBI accounts for ~50% of the cysteine pool in soy
- Sulfurous amino acids (cysteine and methionine) are growth limiting in chicken feed

Experiments

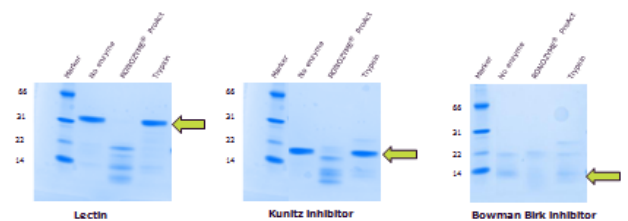
In vitro degradation of purified soy ANF

ANF (1.0mg/mL) and Protease (0.1mg/mL), is mixed in buffer pH 7 and incubated 2 h at 37 °C. Analyzed by SDS PAGE. ANF from Sigma : Lectin L1395, Kunitz inhibitor Sigma T9128 and Bowman Birk Inhibitor Sigma T9777

In vitro degradation of various soy qualities and soy bean meal

Soy substrate (57 g/L) and Protease are mixed in pH 7 buffer and incubated 3 h at 40 °C. Reaction is stopped and protein hydrolysis is measured by OPA

In vitro degradation of purified soy ANFs

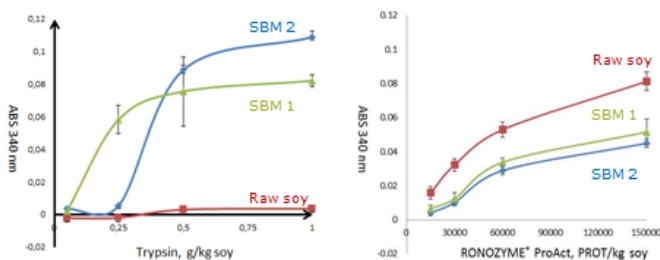


Degradation efficiency (%)

ANF	RONOZYME® ProAct	Trypsin
Lectin	98	11
Kunitz	96	4
Bowman Birk	64	29

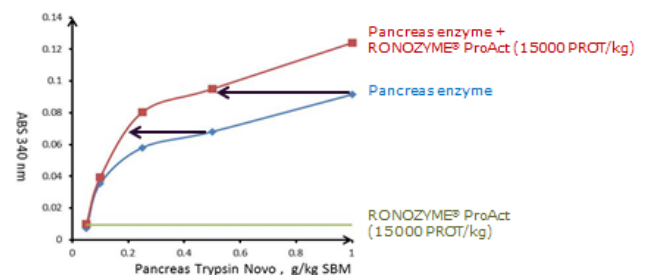
In vitro degradation of various soy qualities

- Trypsin activity is very sensitive to the presence of ANFs
- RONOZYME® ProAct is not sensitive to soy ANFs



In vitro degradation of soybean meal

- In presence of a commercial dose of RONOZYME® ProAct the same degree of protein hydrolysis is obtained with only 50% of the pancreatic protease



Conclusions and impact

In vitro the protease RONOZYME® ProAct

- Degrades purified Kunitz and Bowman Birk inhibitors as well as lectin
- Degrades protein in various soybean meal qualities ranging from soybean meal with low level of ANFs to raw soy
- Enhances the efficiency of pancreatic proteases on SBM

Potential impacts of RONOZYME® ProAct in vivo

- Reduced challenge on pancreas
- Better access to sulfur containing amino acids
- Less stress on immune system/intestinal epithelial tissue
- Improved feed conversion ratio