Fermented vs. enzyme-treated soybean meal



Soybean meal
(SBM)



Fermented soybean meal
(FSBM)



Enzyme-treated
soybean meal (ESBM)

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Why Hamlet Protein outperforms *fermentation* in young animal feed

What is fermentation?

- Modification of SBM components using microorganisms
  - Commonly used microbes are *Aspergillus*, *Bacillus* and *Lactobacillus*.
- Water is required to support microbial activity, either submerged or through solid-state fermentation (40-65% moisture)
- Subsequent drying is essential to remove water and stabilize the product

Weaknesses of fermentation:

- Produced in batches which leads to variation
  - Color difference is the first indicator of variation
  - Inconsistency in peptide profiles and residual sugars
- On average, the protein kinetics is slower than SBM
  - Reduced protein accessibility is due to Maillard reactions from excessive drying
- Microbes may consume lysine during fermentation
  - Leads to a reduction in available lysine
- Incomplete microbial inactivation will compromise product stability

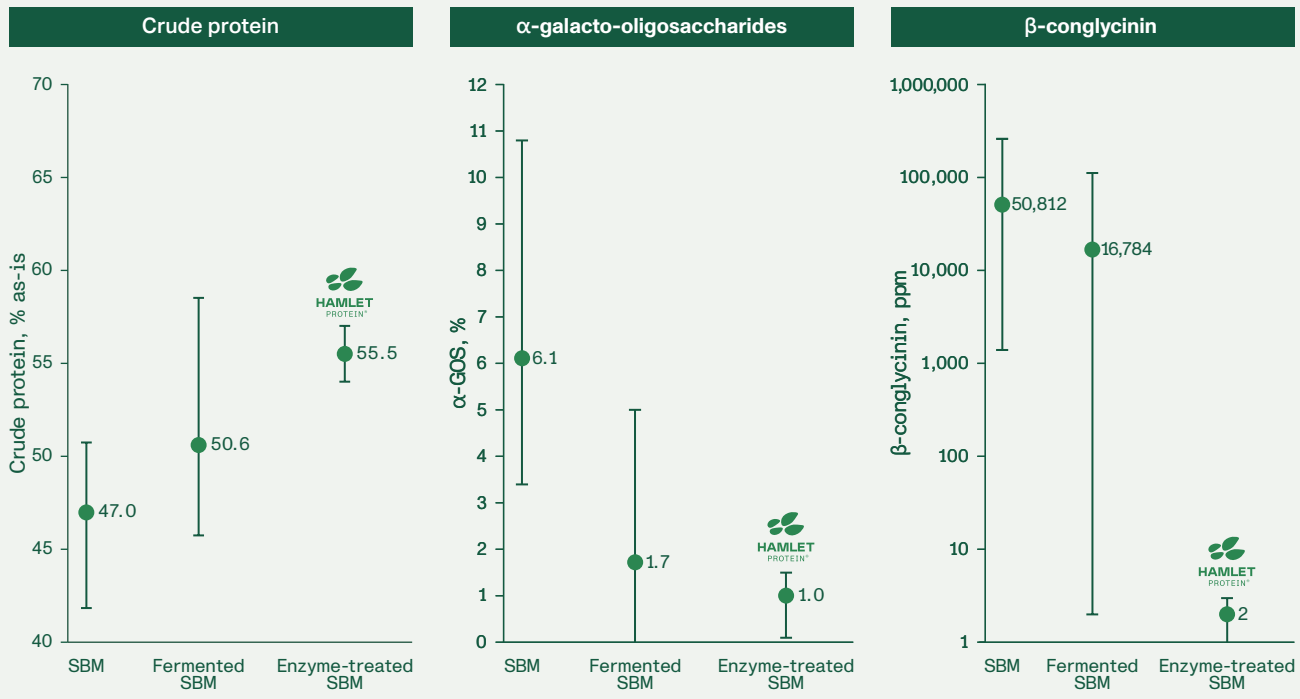

Figure 1 Overview of crude protein, α-GOS and β-conglycinin levels in SBM, fermented SBM and enzyme-treated SBM (n=277). Crude protein is determined by DUMAS method, α-GOS (sum of stachyose and raffinose) is determined by Thin-Layer-Chromatography, and β-conglycinin is determined by direct double antibody sandwich Enzyme-Linked Immunosorbent Assay (ELISA). All analyses are conducted in the laboratory of Hamlet Protein. Green dots show average values, while error bars reflect minimum and maximal values.

Strengths of Hamlet Protein's technology compared to fermentation:

- **Highly controlled continuous production process delivers exceptional consistency, regardless of raw material variation**
  - Ensures reliable, consistent performance in every batch
- **Reduced risk of Maillard reactions as residual sugars are removed continuously**
  - Maintains high lysine/CP levels to support optimal growth
- **Guaranteed low levels of ANFs, including β-conglycinin**
  - Reduces digestive issues and promotes gut health
- **Improved protein accessibility resulting in higher fraction of fast protein**
  - Ensures maximum protein utilization and nitrogen deposition

High variability and increased risk of Maillard reactions in fermented SBM products

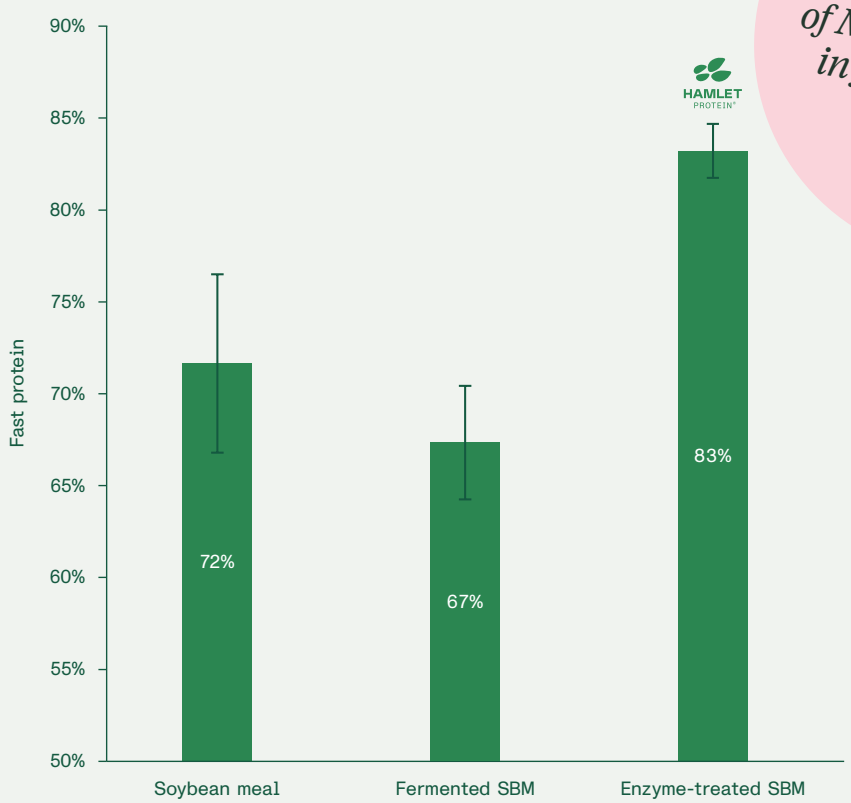

Figure 2 Overview of fast protein levels in SBM, fermented SBM and enzyme-treated SBM. The level of fast protein is determined by the pH-stat method conducted at Aarhus University and represents the fraction of the protein hydrolyzed after 30 minutes. Error bars represent standard deviation.



Three examples of fermented SBM products

Summary effects of fermentation and enzyme treatment on parameters critical for young or sensitive animals.

	High in crude protein and amino acids	High fraction of fast protein	Low in trypsin inhibitor activity	Low in α-GOS	Low in β-conglycinin	High water holding capacity
	%	%	mg/g	%	ppm	ml/g
SBM	47.0	72	2.9	6.1	50812	2.8
FSBM	50.6	67	1.2	1.7	16784	2.1
ESBM HAMLET PROTEIN® a nuscience brand	55.5	83	1.3	1.0	2	5.0

Effect of processing

Supporting animal health and performance

More Medium Less

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