Consistent protein content in Hamlet Protein products ensures reliable diet formulation

Soybeans are grown in different continents and processed to soybean meal (SBM) by removing the oil and hulls before using in animal feed. Feed mills and nutritionists formulate animal diets based on an estimated crude protein and amino acid content in soybean meal. This makes diet formulation less reliable as great variation between soybean meal batches occur and consequently impact animal performance when not adjusted for in diets.

Factors that contribute to variability include geographic origin, type of soil, and environmental conditions during growing, harvesting, and storage. This challenging variation of protein content in soybean meal can be reduced by further processing soybean meal into a specialty protein product with same consistent protein content regardless of origin.



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Variable SBM is processed into a *consistent protein ingredient* that always has the same nutrient content

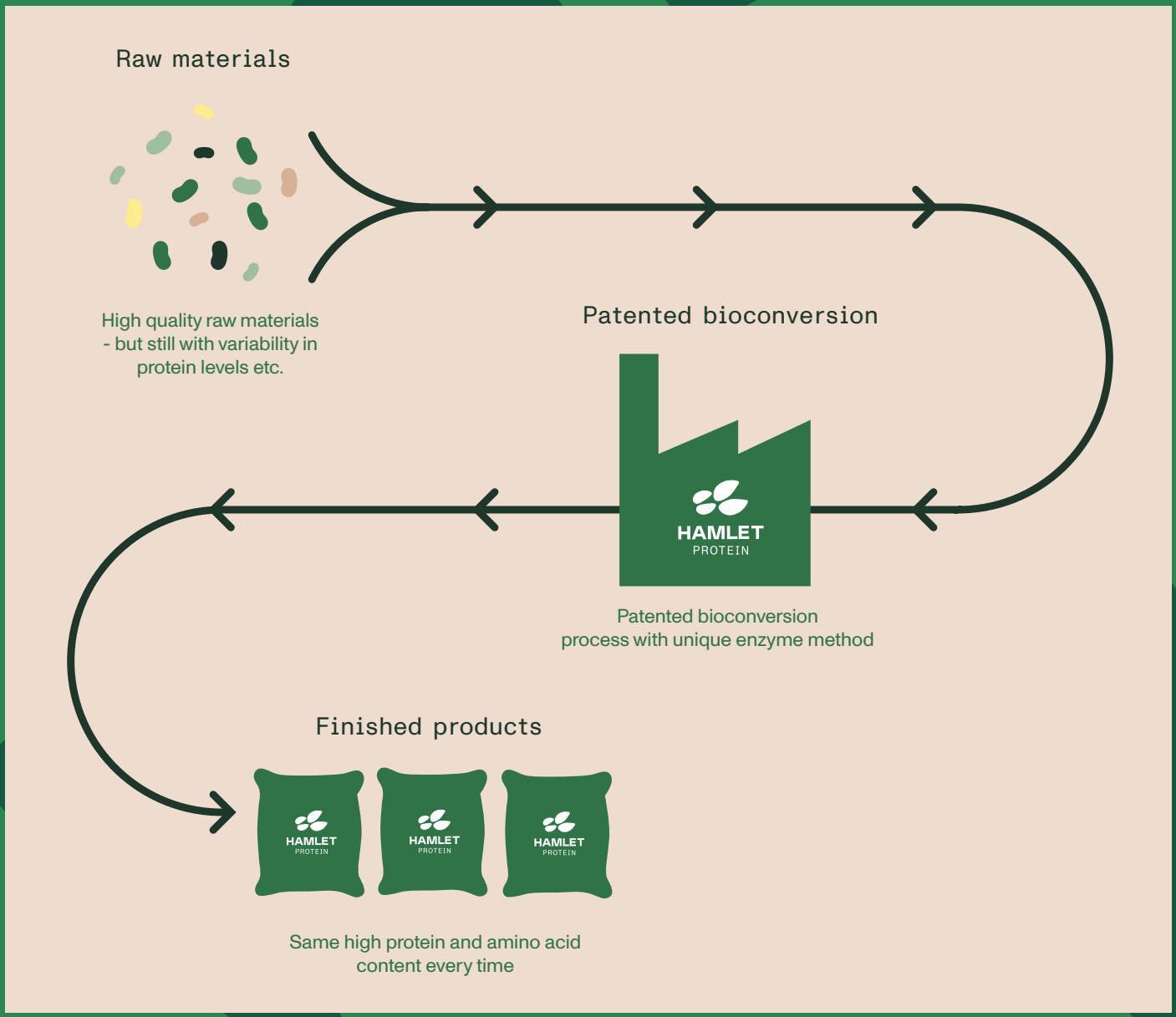

Figure 1. The unique Hamlet Protein processing method always provides the same consistent soy protein product regardless of geographic region, growing condition and storage.

Gentle enzymatic processing is used to remove unwanted content of ANFs in SBM and reduce the variation in protein to a minimum. Enzymatic processing results in a consistent and more protein dense product. That way, the concerns about geographic origin, growing conditions and other seasonal variations become irrelevant when using Hamlet Protein products (Figure 2).

More than 15,000 samples confirm our consistency - batch after batch, year after year

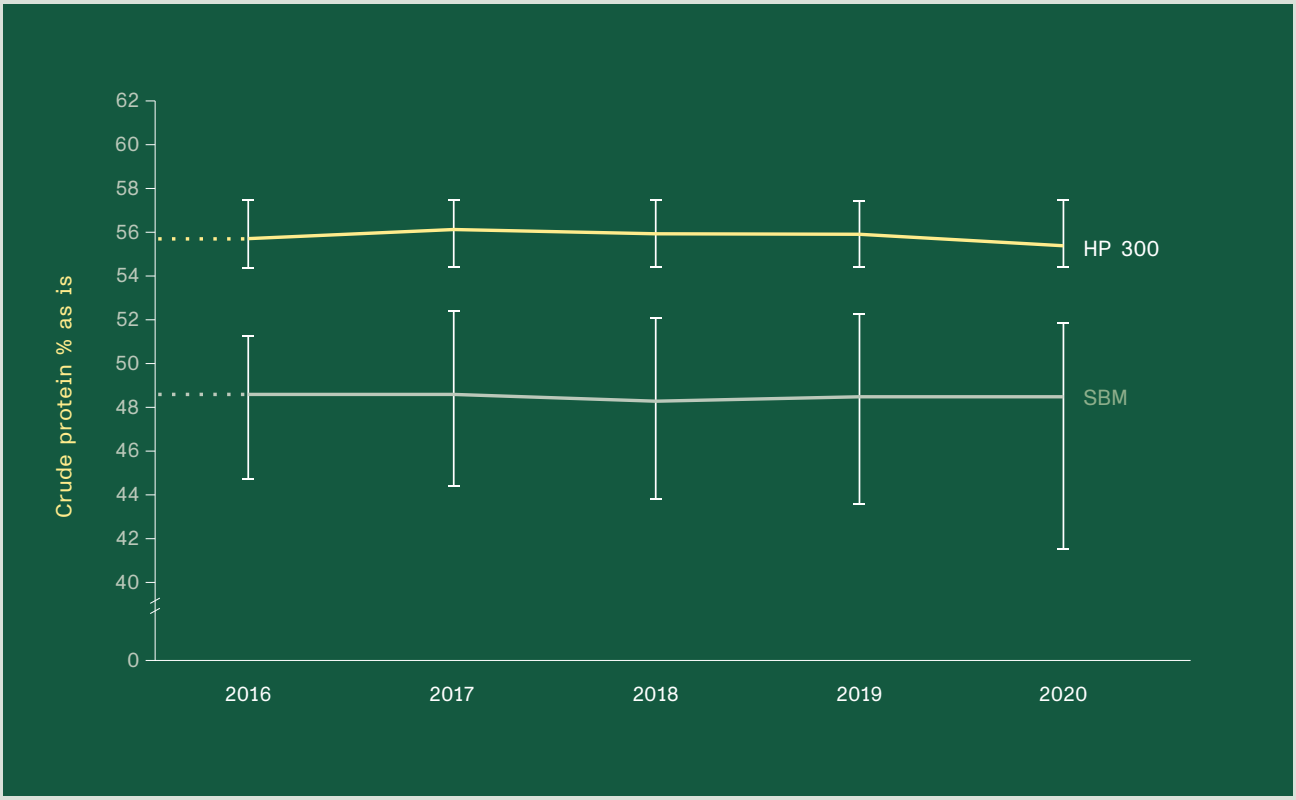

Figure 2 illustrates the consistent crude protein content in batches from 2016 to 2020 and the reduction in protein content variation in HP 300 relative to the original SBM (n > 15,000 batches of SBM and HP 300).

Enzymatic processing allows for flexibility to achieve the same consistent high protein content regardless of the raw material. In addition, high protein SBM is always the starting point of our process. Extended use of enzymes is also an option to further up-concentrate the protein content in a batch if needed. High temperature and prolonged heating to a lower dry matter content with the purpose of increasing the protein content is not a viable option. Harmful denaturation of protein structures or formations of irreversible complex bindings of lysine, known as Maillard reactions, are consequences of overheating. Our process includes sophisticated use of equipment and gentle heat treatment. This procedure regarding sourcing and processing applies to all protein products in the Hamlet Protein portfolio though only showcased by HP 300.

Additional processing of SBM into specialty protein products is associated with risks of heat damaging and less intact lysine when not handled competently. Reactive lysine is an in vitro method to estimate intact lysine and heat damage in a protein product (Figure 3).

No lysine damage due to enzymatic processing of SBM to HP 300

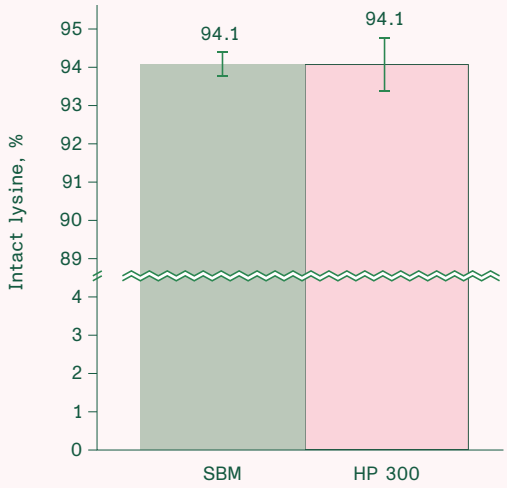

Figure 3. Intact lysine in HP 300 and the original SBM is 94.1% which indicates no heat damage due to enzymatic processing (n = 7 products).

The in vivo digestibility of lysine improves by 2.5% after enzymatic processing

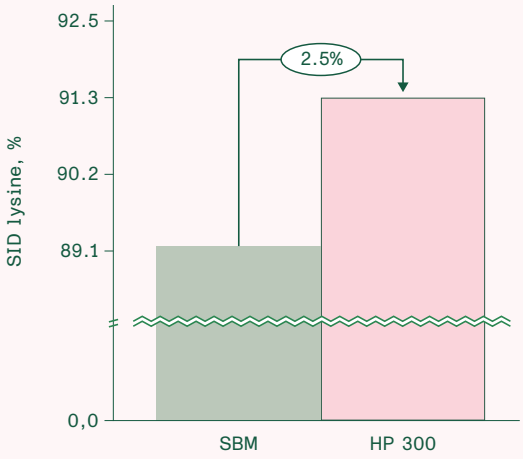

Figure 4. SID of Lysine in 9kg piglets is 2.5% points greater in HP 300 compared with SBM. This indicates that the gentle enzymatic processing of HP 300 maintains the content of intact lysine while removing harmful ANFs for full utilization of lysine in the product.

Reactive lysine reflects intact lysine content in a product but should not be mistaken for lysine digestibility and absorption. In vivo standardized ileal digestibility (SID) is currently the best indicator of lysine bioavailability in animals. SID has been analyzed in the same products and results indicate that SID of lysine is 2.5% greater in HP 300. The improvement in lysine utilization compared with SBM is due to gentle enzymatic processing to remove harmful ANFs which allows for nearly complete utilization of intact lysine present in HP 300.

The concerns about great nutrient variation in a protein product becomes irrelevant when using Hamlet Protein products. The gentle enzymatic processing technique upconcentrates and standadizes protein content without heat damaging the product while at the same time eliminating harmful ANFs. This allows for a nearly complete utilization of available amino acids in Hamlet Protein products and more important a succesful feeding due to a reliable diet.

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