Advancements in NIR pose opportunities to help optimise phytase

Developments in Near Infrared Spectroscopy (NIR) could provide cost savings to the feed industry through a greater understanding of feed composition. NIR has traditionally been used to measure primarily starch, protein, fat, fibre and moisture levels, but advances in NIR technology have enabled the analysis of other parameters such as phytate.

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Phytate, present in all plant-based feedstuffs, binds with both proteins and minerals present in the gastrointestinal tract, reducing digestibility and utilisation of important nutrients supplied in the diet.

Phytate varies within raw materials and if this is not accounted for in formulation it has the potential to lead to variable phytate content of complete feeds.

In Fig. 1 it is clear that some raw materials are more variable than others, particularly those that we know to be inherently variable such as bakery meal.

NIR technology can be used to measure phytate levels in raw materials and finished feeds and this understanding can be used to maximise the use of P-replacement from phytase. Understanding the phytate levels in raw materials and finished feed can help nutritionists to optimise the dose of phytase without risking performance losses or welfare problems due to phosphorous deficiency, as well as ensuring more accurate formulation and thereby reducing costs.

Decision making support

One of the benefits of NIR is the ability to measure a large number of samples, enabling you to develop a large database of results upon which more accurate decisions can be based.

Beyond having confidence in the results, the value of having a large database of raw material quality, or feed analysis, can be transferred into real-life applications such as trending and benchmarking or segregation of incoming raw materials as well as supplier selection.

Fig. 2 shows the trends in phytate content of finished feeds between European diets and 'rest of the world' diets.

European diets contain higher phytate due to the high inclusion of wheat and rapeseed meal and this is easy to see due to large sample numbers. Similar benchmarking exercises can be done using analyses such as energy and reactive lysine of raw materials.

Benchmarking becomes particularly useful for purchasing decisions when comparing one feed mill's analysis of received raw materials against that of a particular country or region. For example the ability to do this allows for the understanding of 'typical' corn energy for a particular region.

NIR technology can be used to determine the nutrient content of feedstuffs and feeds in a cost effective and timely manner.

The latest software and hardware developments can help nutritionists better understand their feed ingredients including the level of phytate in raw materials and feeds.

Emerging technologies such as centrally maintained on-line calibrations, pay-as-you-use calibrations, portable NIR and affordable in-line NIR installations are making NIR technology more accessible across the entire feed industry.

The subsequent expansion in the number of NIR-analysed results available for industry-wide interpretation brings additional potential benefits, as the main trends in feedstuff variability become both clearer and more accurate.

Conclusion

Gaining insight into the phytate levels of raw materials and finished feed can help to maximise the use of P-replacement from phytase, thereby reducing the risk of economic losses and allowing for optimal animal performance due to accurate feed formulation. ■

Fig. 1. The phytate content of over 110,000 global raw materials varies.

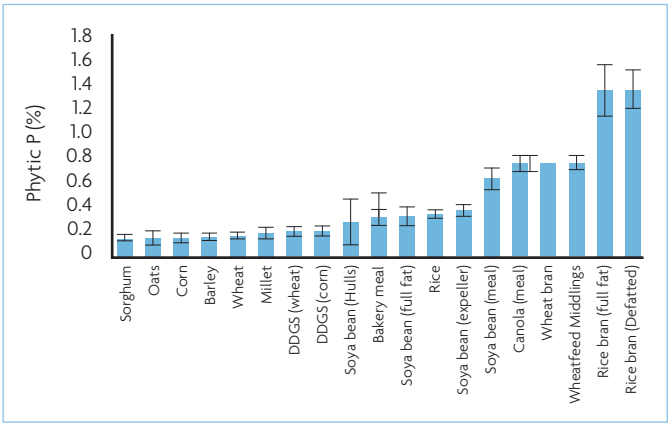

Fig. 2. Phytic P content in over 13,000 finished feeds (European diets vs rest of world diets).