

Monitoring the mixing step in feed industry

Real-time control of the mixing step in the feed process industry is critical not only to ensure a consistently high final product quality but also to reduce the operating costs and increase the margin.

Parameters like moisture, protein, fat, etc. need to be within very tight limits for a specific formula or recipe.

The installation of a BUCHI NIR-Online® process analyzer after the mixer enables to monitor these target parameters and make timely adjustments in order to meet specified final product quality. Moreover, integration to a programmable logic controller (PLC) system allows multi-component dosing in blenders.

1. Introduction

Feed millers are faced with the difficult task to produce feed with very well defined nutritional content to meet quality specifications for the formula or recipe.

During the mixing step, several components are blended according to the need and performance requirements of the farm animal. The control of this step is therefore critical to guarantee an optimal feeding.

Real-time information about the mix composition in terms of fat, moisture, protein, etc., enables in-process adjustments, to run a production closer to the specified targets, to avoid or reduce re-work and increase energy efficiency.

These determinations are generally performed using conventional chemical methods, which are tedious, off-line, destructive, and time consuming [1-3].

The implementation of a BUCHI NIR-Online® process analyzer after the mixing step (Fig. 1) provides full characterization of the feed mix. Within milli-seconds, several parameters (see Table 1), are continuously, simultaneously and accurately measured.

This application note reports the BUCHI NIR-Online® process analyzer performance to monitor the feed mix composition.

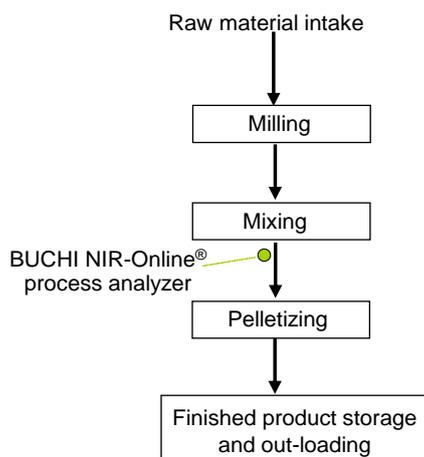


Figure 1. Feed milling process.

2. Measurement setup

BUCHI NIR-Online® process analyzer: X-One

Wavelength range: 900-1700 nm

Measurement principle: Reflection

Interface to process: Flange



Figure 2. BUCHI NIR-Online® process analyzer.

3. Results

The BUCHI NIR-Online® process analyzer was found to be suitable for accurate measurements of the relevant parameters in feed mix (Table 1).

Table 1. Calibration performance.

Parameter	Range (%)	SEC
Protein	10.0-26.6	0.40
Moisture	8.0-16.0	0.20
Fat	2.4-9.5	0.23
Crude fibre	1.11-7.81	0.28

SEC: Standard error of calibration (absolute)

Other parameters successfully monitored are starch, ash and gluten.

4. Conclusion

Results clearly show that an NIR-Online® process analyzer equipped with a flange is able to simultaneously measure multiple properties of feed mix.

Online measurements provide real-time determination of product composition, thus allowing immediate in-process adjustments, leading to maximized efficiency and profitability.

5. References

- [1] ISO 6496:1999. Animal feedings stuffs -- Determination of moisture and volatile matter content, 2016.
- [2] ISO 6492: 1999. Animal feeding stuffs – Determination of fat content, 2016.
- [3] ISO 6865: 2000. Animal feeding stuffs – Determination of crude fibre content – Method with intermediate filtration, 2012.