# Influence of mixing and storage on the quality of components in the laying hen feed mix

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## 1. Introduction

The production of feed mixture must meet the requirements set by the recipe. The basis of this is, from a technological point of view, the correct ratio, ie. particle size uniformity, accurate metering device and mixing device. Often such devices do not follow the requirements of the recipe, so the aim of this paper is to monitor the movement of the variable coefficient throughout the process and based on the results to determine the layering that occurs in the production of feed mixtures.

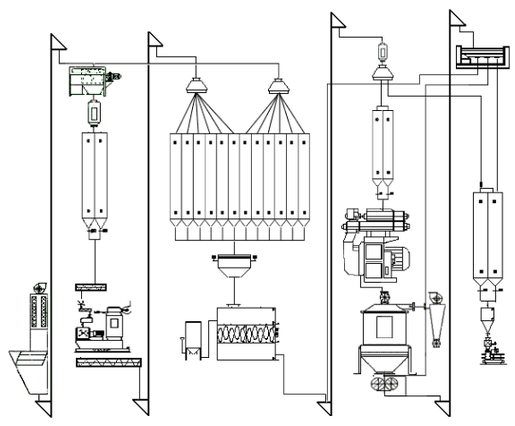


Figure 1. Process of feed production and storage

## 2. Materials and methods

The research was conducted in the feed factory on the feed mixture for laying hens (recipe shown in table 1).

In the process samples were taken in the bunker above the mixer, the bunker below the mixer, on the chain conveyor at the silo cell entrance and at the silo cell exit.

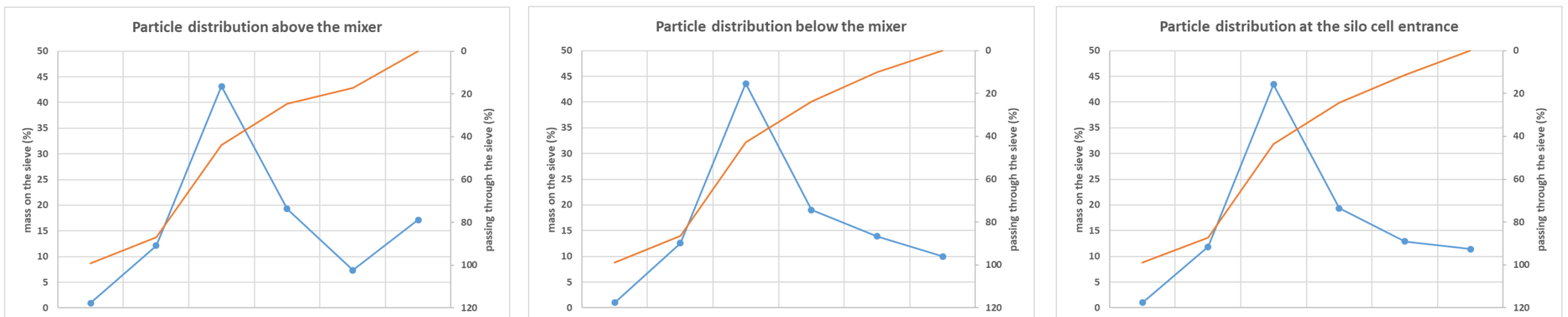
The values of particle size (the uniformity modulus was determined according to the recommended procedure of ASAE (2008)), moisture (HRN ISO 6540:2002), protein (HRN EN ISO 5983-2:2010), ash (HRN EN ISO 2171:2010) and fiber (HRN EN ISO 6865:2001—modified by FOSS Fiber Cap manual guidelines) in the mixture and the mixing of the mixture with salt (NaCl) were examined.

Table 1. Recipe of feed mixture for feeding laying hens (16.8% protein)

| Component | Proportion in mixture (%) | mass (kg) |
|---|---|---|
| Maize | 53.00 | 795.00 |
| Wheat bran | 2.95 | 44.25 |
| Wheat | 5.00 | 75.00 |
| Soybean meal | 26.00 | 390.00 |
| Alfalfa | 2.20 | 33.00 |
| Fodder chalk | 9.00 | 135.00 |
| Fodder salt | 0.35 | 5.25 |
| Premix | 0.50 | 7.50 |
| Phosphonal-forte | 1.00 | 15.00 |
| Total | | 1500.00 |

## 3. Results

The values of particle size (uniformity model) in the bunker above the mixer, the bunker below the mixer, on the chain conveyor at the silo cell entrance are shown in the following graphs.




The values of moisture, protein, ash, fiber and NaCL for samples of feed mixture for feeding laying hens in the process of production and storage in the silo cell are shown in the following graphs.

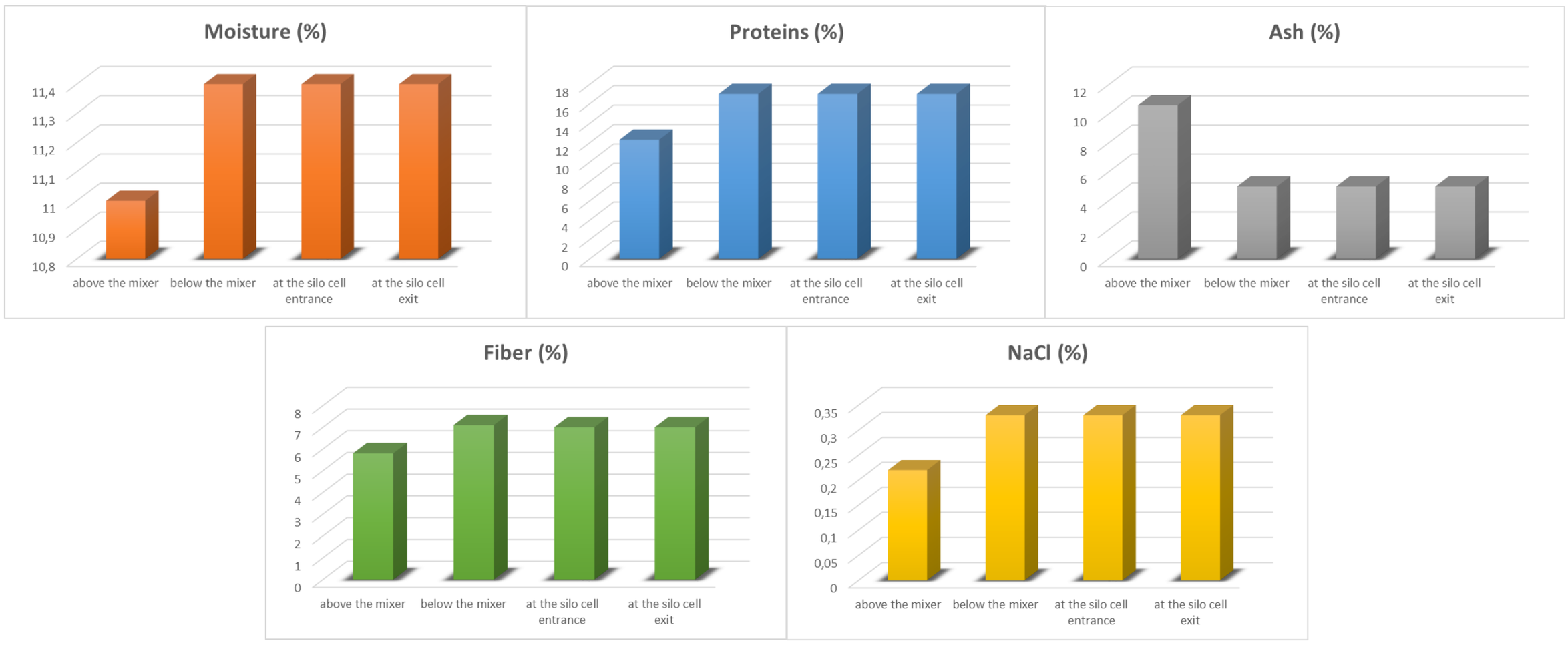



Table 2. Rates of laying hen feed mix stratification in the process of production and storage in the silo cell

| | above the mixer | below the mixer | at the silo cell entrance | at the silo cell exit |
|---|---|---|---|---|
| Rates of stratification (%) | 37.0 | 5.68 | 4.82 | 4.72 |

## 4. Conclusion

Differences in chemical composition, ie. the quality of the mixture between the individual sampling points on the way from the mixer to the exit from the silo cell is not statistically significant, which proves that the individual points on this transport path, in the observed factory, are properly adjusted. Mixture decomposition did not affect the chemical composition of the mixture. Differences in the weights of individual components of the mixture are due to insufficient adjustment of the dispenser and scales, which can be eliminated by installing newer dispenser systems.

Based on all the above, it is possible to conclude that in the observed factory the technological processes were set up correctly and thus achieved quality assurance of the feed mixture during the entire production process from mixing to storage.

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