WATER ACTIVITY, TOTAL FUNGI LOAD AND MYCOTOXINS CONTAMINATION
DURING PRODUCTION OF SWINE FEED

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One of the challenges of the animal feed industry is the control of fungal development
during the manufacturing processes. Fungi growth is unwanted in the animal feed
production. It may result in feed nutritional value reduction, mycotoxins formation and
undesirable volatile compounds that inhibit consumption by the animal. Fungi
development is influenced by biotic and abiotic stresses. However, during the feed
production, the water activity (Aw) is the main factor to allow or not their development.
Therefore, the knowledge of the Aw level in the diet is essential to sort the problem.
The aim of this research is to monitor a pigs feed manufacturing line located at
Chapeco city, Santa Catarina state, Southern Brazil, for the occurrence of levels of Aw,
presence of aflatoxin B1 (AFB1), fumonisin B1 (FB1) and zearalenone (ZON) and total
fungi load. It was identified 38 critical points in the processing line for monitoring
parameters. Sampling at these points was made at different periods. Water activity was
measured by the instrument Testo 650 and the average of three replicates was used
for each sample. The analysis of AFB1, ZON and FB1 were performed by HPLC using
immunoaffinity columns for cleanup of the extracts. For the analysis of AFB1 was
performed post-column derivation with photo reactor and for analysis of FB1 to pre-
column derivation with orto-ftaldehyde. The fungal count was performed using the
standard methodology for counting yeast and fungi. The parameters data were
collected and registered by sampling period and so an average of each sampled point.
The Aw data obtained showed that at 11 points the average was above 0.75.
Regarding mycotoxins detection, a co-occurrence of mycotoxins was observed. AFB1
and FB1 did not occur only in samples from 7 of the total critical points, ZON was
detected in most of the critical points evaluated, except for one of them. The results of
yeast and fungi count showed that the material of, virtually all sampling sites, presented
a high load of both microorganisms. Only 11 points in the average score was equal to
or less than $10^4$ CFU (colony forming units), being the other points above that average
score, reaching $10^7$ CFU at 10 points. The high values obtained for Aw, the high fungi
and yeast load, as well as the occurrence of the three Mycotoxins, showed that the
swine feed manufacturing line had conditions for fungi growth and mycotoxin formation.
That means that there is a need of a constant monitoring either of the raw material
utilized (ingredients) as well as the in-line production in order to avoid contamination.

Key words: swine, water activity, fungi, mycotoxins, occurrence, feed, production.