Methodology

For each feed material or family of feed materials, we will use the following methodology:

- Research and identification of relevant databases and scientific literature.
- Collection of quantitative and qualitative feed data.
- Summarizing of quantitative information.
- Establishing representative and consistent vectors of chemical and nutritive values.

For large families of feedstuffs, the methods of meta-analysis will be used.

The project is managed through a collaborative website that is editable on-line by the contributors. Another database contains the composition and nutritive data, as well as the equations and calculation processes.

Current results

- A database containing more than 2 million raw data has already been established.
- Specifications have been drawn up for researching information and writing datasheets.
- Collaborations have begun with the Gembloux AgroBioTech (Belgium), the Hassan II Institute (Morocco) and the University of Cordoba (Spain). Other institutions are interested in participating.
- A first batch of 50 datasheets was produced in 2009.

To be done

- Establishing a formal methodology for calculating final tables values.
- Generation of approximately 200 datasheets per year over the next 3 years.
- Finding new partners in other countries in order to increase the width of both data collection and expertise.
- Production of the final tables.

doi:10.1017/S2040470010000919

Lower temperature profile and less aflatoxin on corn silage covered by oxygen barrier plastic film

Rafael Camargo do Amaral†, Luiz Gustavo Nussio, Maity Zopollatto, Rodrigo Silva Goulart, Edward Hernando Cabezas Garcia and Sérgio Gil de Toledo Filho

University of São Paulo – ESALQ – Department of Animal Science, Brazil

Introduction

The establishment of anaerobic conditions in silage is important to avoid the growth of aerobic microorganisms. Nevertheless, the silage stored in horizontal silos, which are exposed to air are prone to aerobic deterioration, mainly in the upper layer of those silos (Ashbell and Lisker, 1988). The plastic sheet used to cover silage has oxygen permeability and small amounts of air will penetrate the silage. In this way, aerobic microorganisms will consume reserves, resulting in losses of DM, development of pathogenic species (Borreani and Tabacco, 2008), and production of mycotoxins (Garon *et al.*, 2006). The objective of this research was to study several sealing methods to reduce the top losses in corn silage.

Materials and Methods

The treatments evaluated consisted of three factors: plastic sheet (black-on-white polyethylene (PE) film with 200 μm thick or black-on-white coextruded polyethylene-polyamide – oxygen barrier (OB) film with 125 μm thick); bacterial or chemical additives applied onto the top of the silos (control, *Lactobacillus buchneri* 1×10^6 cfu/g forage[1] and sodium benzoate 0.02% wet weight basis); addition of a soil layer (100 kg/m^2) over the external surface of the plastic sheets. Forage was ensiled (30–35% DM) into macro experimental silos made on cement, containing 500 litres and cylindrical in shape (1.04 m^2 working area) which were packed by feet to reach 300 kg. During the ensiling one plastic bag with well-mixed chopped forage (approximately 4 kg of fresh weight bag^{-1}) and one data logger were buried into the upper layer (25 cm depth) of the silo. The plastic films were adjusted on the top of the silos and were fixed with adhesive tape and the silos were stored in an open field. The bags and data loggers were removed from the silos for analysis 90 days after ensiling. The quality of the sealing method was assessed by temperature measurements and top losses in the silages were also determined by chemical and microbiological analyses. Effects of treatments were analyzed according to a randomized design over the experimental units by using the MIXED procedure and the statistical significance was declared at the 5% level.

† E-mail: rcamaral@esalq.usp.br

Results

The dry matter (DM) losses in the upper layer showed high values in the control silage. However, the silage covered with polyethylene film achieved more losses than the OB film silages. The moulds counts were higher in polyethylene control silage than in the OB film control silage. We understanding that more moulds create a higher amount of DM losses in polyethylene control silages. In this way, the temperature of silage above the environmental pattern showed high values in polyethylene control silage and this fact contributed to increased competition across fungi strains and to a higher aflatoxin production. The use of additives showed less DM losses in polyethylene film, but in the silage covered with OB film the benefits of additives were not observed due to a better control of losses.

Table 1 *Corn silage fermentation variables according the sealing methods*

	Polyethylene film			OB film			
Item[1]	Control	Bacterial	Chemical	Control	Bacterial	Chemical	SEM[2]
DM losses, %	13.18^{a}	6.82^{b}	7.23^{b}	9.73^{ab}	8.41^{ab}	8.54^{ab}	0.65
Molds ($\log_{10}$ cfu g^{-1})	4.11^{a}	2.95^{ab}	3.35^{ab}	1.41^{b}	3.31^{ab}	3.40^{ab}	0.28
T-E, °C	2.93^{b}	4.83^{a}	3.76^{ab}	0.79^{c}	2.35^{b}	1.55^{bc}	0.39
Aflatoxin (ppb)	13.02	nd	nd	nd	nd	nd	–

[1] DM = dry matter; cfu = colony forming units; T-E = temperature of silage above of environment; nd = not determined; [2]SEM = standard error mean.

Conclusions

The use of oxygen barrier plastic film to cover corn silage led to lower temperature patterns in the upper layer of the silo which inhibited the growth and aflatoxin production. However, no response was observed on the control of DM losses.

Acknowledgements

The authors would like to thank FAPESP (São Paulo Research Foundation) for the support in this project.

References

Ashbell G and Lisker N 1988. Aerobic deterioration in maize silage stored in a bunker silos under farm conditions in a subtropical climate. J. Sci. Food Agric. 45, 307–315.

Borreani G and Tabacco E 2008. Low permeability to oxygen of a new barrier film prevents butyric acid bacteria spore formation in farm corn silage. J. Dairy Sci. 91, 4272–4281.

Garon D, Richard E, Sage L, Bouchart V, Pottier D and Lebailly P 2006. Mycoflora and multimycotoxin detection in corn silage: Experimental study. J. Agric. Food Chem. 54, 3479–3484.

doi:10.1017/S2040470010000920

Heavy metals contents in farrowing, weaning and fattening pig feeds in a commercial pig farm in Beijing and their thresholds values given by the Chinese feed standards

Roxana Mendoza Huaitalla[1†], Eva Gallmann[1], Kun Zheng[2], Xuejun Liu[2] and Eberhard Hartung[3]

[1]Institute of Agricultural Engineering, University of Hohenheim, Stuttgart, 70599, Germany; [2]College of Agricultural Resources and Environmental Sciences, China Agricultural University, Beijing, 100094, China; [3]Institute of Agricultural Engineering, Christian-Albrechts-University Kiel, Kiel, 24098, Germany

Introduction

Formulation of pig diets follows local recommendations in order to achieve efficiency in terms of productivity, food safety, environmental protection and welfare in pigs. Nutritional requirements for pigs vary in every growing stage and are taken into consideration when

† E-mail: rmendoza@uni-hohenheim.de