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INTRODUCTION

In Argentina, more than 70% of silage is stored in silo bags (CACF, 2024). This is primarily because **drive-over pile silos (DOPS) have shown low compaction** ($<180 \text{ kgDM/m}^3$) and often **poor sealing** or **no cover at all** ($\sim 20\%$ uncovered). The scaling-up of farms has increase the need for DOPS to reduce plastic use and storage area. DOPS require high filling rate, good compaction ($>240 \text{ kgDM/m}^3$), and quick and efficient sealing.

Oxygen barrier films (OB) can help to reduce losses or mitigate the suboptimal silage-making process. Slow or delayed filling of DOPS, low packing, deficient sealing or no sealing at all and damaged plastic wrap can promote mold proliferation and mycotoxin production before opening and usage (Ogunade et al., 2018)

OBJECTIVES

To characterize whole-plant corn silage DOPS with **LOW** and significant differences in density between the **CORE** and the **TOP**, covered with OB on **fermentation** variables and **mycotoxins** concentration.

MATERIALS AND METHODS

- ✓ During 2024, three DOPS ($\sim 200 \text{ ha}$ each) from farms in Córdoba and Buenos Aires (Argentina) were selected, all covered with SealPlus $120 \mu\text{m}$ OB film and stored for over 100 days.
- ✓ Each silo was subsampled at three depths on the exposed face: 25 cm from the top (25CM), 50 cm from the top (50CM), and the core ($\sim 150 \text{ cm}$ from the floor).
- ✓ Silos were selected based on significant differences in silage density (kgDM/m^3) among these depth sections.
- ✓ A total of 27 samples were taken using a master forage probe, which also allowed for density measurements by dividing fresh weight by probe volume and converting to dry matter basis.
- ✓ The following variables were analyzed: DM (%), pH, lactic acid, acetic acid, ammonia-N, protein solubility, ADICP, ash, and WSC (%DM), using NIRS technology.
- ✓ Mycotoxins (AFB1, Zea, DON) were quantified by RIDASCREEN® ELISA tests (R-Biopharm) at Rock River Laboratory Inc. (Santa Fe, Argentina).
- ✓ Data were analyzed using ANOVA and LSD tests with Infostat 2020 software.

RESULTS AND DISCUSSIONS

Densities were 80.88 kgDM/m^3 , 122.96 kgDM/m^3 and 226.32 kgDM/m^3 for 25CM, 50CM and CORE respectively ($\text{SE} = 12.51$; $p\text{-value} < 0.001$). CORE had the highest density (226.32 kgDM/m^3) but remained below the recommended 240 kgDM/m^3 .

Table 1. Characterization of fermentation variables and mycotoxin at 25 cm from the top (25CM), 50 cm from the top (50CM), and $\sim 150 \text{ cm}$ from the floor (CORE). Values for 25CM, 50CM, and CORE represent the means of three replicates from each of the three silos ($n = 9$ per depth).

Variable	25CM	50CM	CORE	P-Value
Dry matter, %	45.06	45.11	39.46	0.445
pH	4.13	4.13	4.01	0.239
Lactic acid, %DM	2.88	2.56	3.29	0.441
Acetic acid, %DM	1.19	1.51	2.24	0.096
Ammonia-N, %CP	7.15 ^b	8.11 ^b	11.21 ^a	<0.001
Protein solubility, %CP	62.27 ^b	61.54 ^b	68.34 ^a	0.003
ADICP, %CP	8.11	9.26	7.77	0.372
Ash, %DM	6.1	5.74	5.53	0.352
Sugar WSC, %DM	3.96	4.1	4.69	0.149
AFB1, ppb	7.28 ^b	7.37 ^b	13.72 ^a	0.053
ZEA, ppb	375.01	311.64	699.97	0.156
DON, ppm	0.93	0.81	0.96	0.798

Means in the same row with different letters differ significantly ($P < 0.05$).

Most fermentation variables (pH, lactic/acetic acids, WSC, ADICP) showed no significant differences across depths, indicating uniform fermentation, although the CORE showed signs of slower, more heterofermentative activity. Despite density variations, fermentation was generally stable. However, slower fermentation and possibly delayed sealing may have contributed to increased proteolysis (Xu et al., 2024; Borreani et al., 2018) and higher mycotoxin accumulation in the CORE. AFB1 levels were below both the EU maximum limit (20 ppb) and the Argentine average (15.82 ppb; Ogunade et al., 2018). ZEA remained below limits in 25CM and 50CM, but exceeded the EU threshold (500 ppb) in the CORE, surpassing the Argentine average (436.4 ppb).

CONCLUSIONS

- Comparison across depths suggests that **effective sealing with OB mitigated** the effects of differences and low density in the **upper layers**.
- **The lack** of differences in the variables suggests **consistent fermentation** across the silo but highlights the need for **better compaction** and filling rate.
- The CORE exhibited signs of **delayed fermentation**, possibly due to the large size of DOPS and the time required for completion and sealing.

