



Use of electronic nose for corn silage screening



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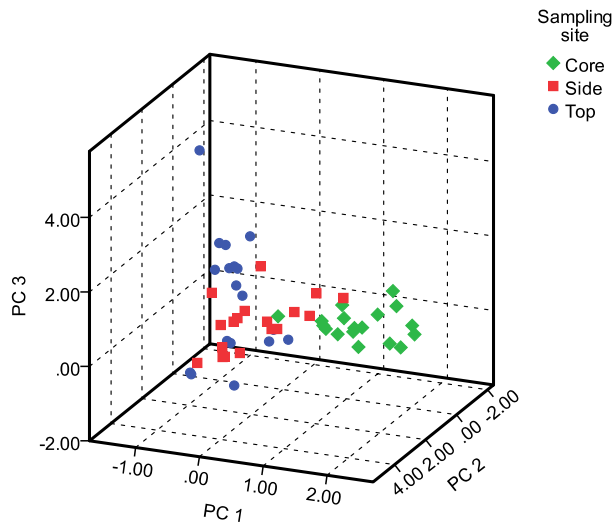
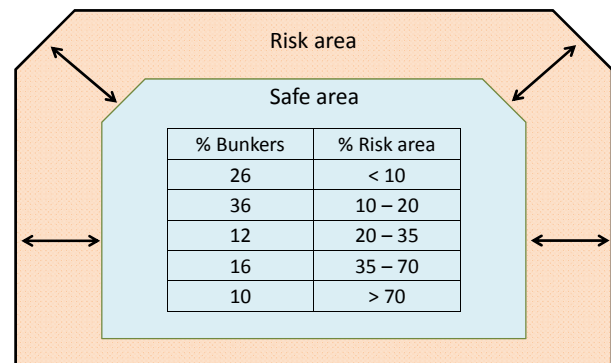
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Introduction

- The corn silage is widely used in dairy cow diets
- Silage quality is not uniform on the cutting face and unselective usage of freshly cut face of bunker could have negative consequences on animal performance and milk cheese-making quality
- Lower quality silages are frequently associated to side and top locations of the freshly cut silage face
- Air penetration and aerobic deterioration processes are major responsible
- The risk area is related to bunker management and could range between 10 to more than 70% , as observed in our previous experience

Objective

Use of the electronic nose as a rapid tool for screening of silage samples collected in different places of the freshly cut face in bunker silo.



Methods and Statistical Analysis

- 18 concrete wall bunkers silages
- Sampling sites:
 - Core: 1 meter high from the bottom
 - Side: 1.5 meter high from the bottom, 0.3 meter from the walls
 - Top: 0.5 meter from the top
- Electronic nose analysis (Pen3 - Aisense Analytics GmbH, Schwerin, Germany):
 - metal oxide semiconductor sensors: W1C, W3C, W6S, W5C, W1S, W1W, W2S, W2W, W3S
 - flow rate 400 ml/min
 - 60 s measurement phase
- Principal component analysis was performed
 - PRIN method with Kaiser's criterion (eigenvalue ≥ 1)
 - Orthogonal Varimax rotation
 - Each sampled silage was described by a specific position on three extracted principal components

Different sites of sampling – different populations

Results

- Extracted principal components (PC):
 - PC1: W1C, W3C, W5C, W1S, W2S, W2W; eigenvalue = 5.60
 - PC2: W6S, W3S; eigenvalue = 1.75
 - PC3: W1W; eigenvalue = 1.00
- PC1 allowed for samples clustering into two populations: Core vs. Side plus Top
- Side and Top samples tended to be discriminated by PC3

Conclusions

These preliminary results suggest further investigation for the use of electronic nose as a tool for discriminating corn silages exposed to different preservation processes.