

## Pre-estimation of silage density via an application by using data available on farm

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## introduction

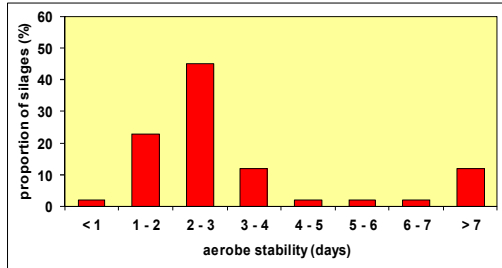
- re-heating (aerobic instability) is an common problem
- quite often not recognized



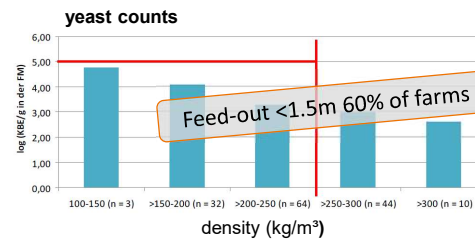
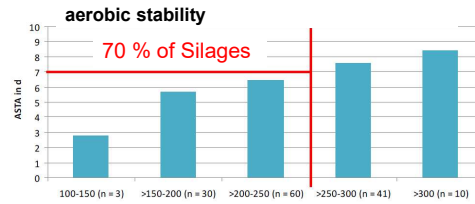
2

2

# introduction



Aerobic stability in maize silages (Kaiser & Pilz 2002)



Aerobic stability and yeast counts in dependence of silage density (Weiß und Thaysen 2014)



# introduction

- re-heating (aerobic instability) is an common problem
- quite often not recognized
- Why?*
  - problems get visible long time after cause
  - measurement of temperature, indirect info about density or
  - density measurements via auger (complicated)
  - and both measurements possible only after the bunker is reopened

- Solution!*
  - control the process during it is running
  - even better, check the process before starting it !!



Muck & Holmes 1999 and 2000

Table 2. Correlation of factors with adjusted dry matter density

Factor	Correlation Coefficient
Initial layer thickness	-0.279*
Average packing tractor weight	0.262*
Average wheel load	0.224*
Dry matter content	0.209*
Total weight of packing tractor(s)	0.200*
Tire condition (1 = New, 3 = Bald)	0.195*
Average particle size	0.194*
Packing time (min/t as-fed)	0.162*
Speed of packing (1 ≥ 8 km/h; 4 ≤ 1.6 km/h)	0.147
Number of packing tractors	0.146
Wheels per packing tractor	0.126
Slip during packing (1 = none; 3 = frequently)	0.101
Tire pressure	0.098
Crop (1 = corn; 2 = alfalfa)	0.086
Packing time (min/t DM)	0.078
Front wheel drive (1 = front wheel drive, assist; 2 = rear wheel drive only)	0.075
Packing method (1 = horizontal, 2 = progressive wedge, 3 = distribute only)	-0.068
Delivery wagon or track drives over pile (1 = yes)	0.059

\* Significant correlations (P < 0.05).

$$Est. DMD (lbs DM/ft^3) = (8.5 + PF \times 0.0155) \times (0.818 + 0.0136 \times D)$$

$$PF = \left( \frac{W}{L} \right) \times \sqrt{N \times DM \div C}$$

Formula is well suited to use at farm level?  
**NO !!**

The idea popped up to develop based on Muck & Holmes an **App** for smartphones



The image shows four screenshots of the silagecalc.addcon.com mobile application. The first screenshot shows the 'INPUT' screen with various adjustable parameters like layer thickness, number of tractors, filling length, crop DM, and delivery rate. The second screenshot shows the 'RESULTS' screen with calculated values such as necessary layer area (1167 m²), currently filled area (375 m²), and necessary layers (3.1). The third screenshot shows a detailed view of the results with sub-sections for 'max. time for passes per delivering rate' and 'necessary speed'. The fourth screenshot shows the 'INFO' screen with a disclaimer: 'All results are calculated automatically when any value changes. This APP may help to estimate the resulting silage bulk density.'



*Try it !*

<https://silagecalc.addcon.com>

*Start to play*

*learn more about your bunker filling technology!*

