



SILAGE TROUBLESHOOTING – PART II: Evaluation of sensory aspects

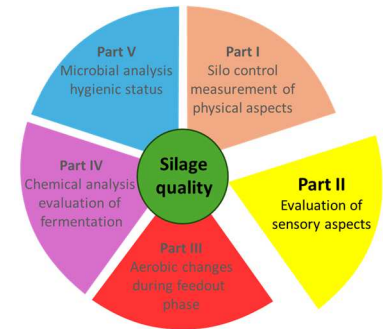
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Introduction

- On farm, daily monitoring of silage quality is required for high performance dairy cattle → ensure feed intake and animal health
 - Simple assessment for daily practice is of high importance
- Documentation of **shortcomings in 5 levels** for each aspect, expressed in energy and deduction points (dp):
 - 1. Phenological stage → **value of forage at harvest** (energy)
 - 2. **Sensory silage evaluation** (smell, structure, colour etc.)
 - 3. **Evaluation of energy loss**, in 5 graduations

Principle of sensory assessment

Step 1: Estimation of phenological stage and grass content

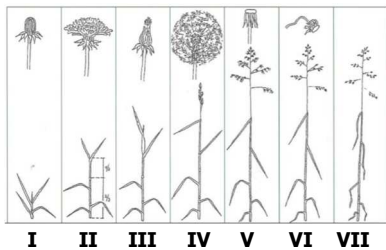
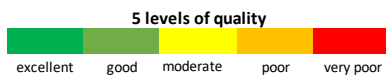


Fig 1. Evaluation of phenological stages of *Dactylis glomerata* or *Taraxacum officinale*



DLG [German Agricultural Society], 2004. Forage evaluation. Part A - DLG key for the evaluation of fresh herbage, silage and hay using a sensory test.

Step 2: Sensory estimation of deficits in silage quality



Result: Individual deduction points (dp) for different quality aspects

Major silage deficiencies can be perceived by smell!



anaerobic failures

butyric acid (dp 0-7)
acetic acid (dp 0-4)
Maillard products (dp 0-4)

aerobic problems

mould (dp 0-7)
yeasts (dp 0-4)
putrefaction (dp 0-10)

colour deviations

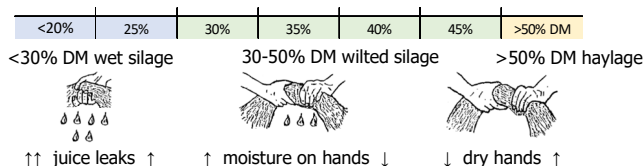
brown (to black) → Maillard reaction or bacterial decomposition (dp 0-4)
yellow or bleached → loss of carotenoids (dp 0-4)
white, gray (blue, red) → visible mould (dp 7)
unnatural green (strong butyric fermentation) → dp 7



structural failures

decomposition (smeary, sticky and greasy) → dp 0-4

Step 3: Estimation of DM by hand (press/wring test)



Conclusions

- Causes of silage problems can be identified quickly by evaluating sensory aspects on farm.
- Systematic sensory assessment of silage quality is a critical approach for troubleshooting in addition to chemical and microbiological analysis.
- Practical recommendations can be e.g.: "Don't feed anaerobically/aerobically spoilt silage!"

Step 4: pH by indicator strip or handheld meter

Classification depending on DM (see Part IV) → dp 0-4



Step 5: Sum of all deduction points and classification of fermentation quality and energy loss

Level	Silage quality	Deduction points	loss ME MJ
1	excellent	0 – 2	0.3
2	good	3 – 5	0.5
3	in need of improvement	6 – 8	0.7
4	poor	9 – 11	0.9
5	very poor	> 11	>0.9

Soil contamination → further energy loss: 0.3 – 1.0 MJ ME

Step 6: Visualisation of silage deficits – radar plot

Corresponds with Parts I, III, IV and V

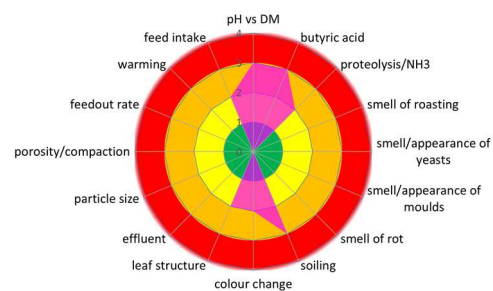


Fig 2. Example of a grass silage with various signs of anaerobic deficits.

Step 1: Energy of forage: grassland-type A1, stage IV = 10.7 MJ ME/kg DM

Step 2: Sensory assessment: **5 dp** (butyric acid)

Step 3 & 4: 30 % DM, pH 5.1 → **3 dp** (butyric acid)

Step 5: sum of deduction points = **8 dp** (pH 0.8 units > critical level)

Energy loss: silage quality deficits -0.7 MJ ME, soil contamination -0.7 MJ ME → **total ME loss -1.4 MJ**

Final result: Energy of evaluated silage: 10.7 – 1.4 = 9.3 MJ ME/kg DM

Requirements for sensory evaluation

- Silage sample should be representative for the whole silo that is fed out.
- Sample temperature >15°C.
- Pleasant room temperature ~21°C and good light conditions.
- Disturbing odours must not be present in the room.
- Evaluator must have fresh senses before the test, because the nose is sensitive to various influences.