

Improvement silage nutritive and hygienic value using viable lactic acid bacteria inoculant

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Introduction

Feed preservation:

1. To inhibit the growth of undesirable micro-organisms, to minimize nutrient and energy losses and to prevent the spoilage of the feedstuffs during storage.
2. LAB are commonly used:
 - a) to achieve a rapid pH drop through organic acid production and to minimize nutrient and energy losses during fermentation,
 - b) to improve aerobic stability during feed out, by inhibiting moulds and yeasts. (Feeds that have undergone aerobic deterioration have reduced nutritional value and present hazards to the animals and environment).

The objective :

To investigate the effects of adding two different LAB blends to perennial ryegrass on

1. Fermentation variables
2. Microbial composition
3. Aerobic stability

of the resulting silage at day 90 and at day 49 after ensiling *in vitro* set-up with mini silo's.

Materials and methods :

Perennial ryegrass (at early-boot stage) wilted (dry matter range: 31.8 %), chopped to about 2.0 cm length.

3 liter mini-silo.

A randomized complete block design, with 5 replicates per additive/forage combination.

C - no additive ;

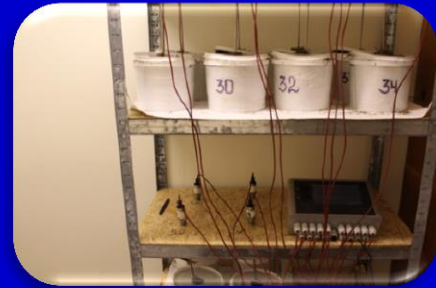
T1- (*L.buchneri*, *L.plantarum*, *P.acidilactici*, 300 000 cfu/g forage);

T2 - (*L.buchneri*, *L.plantarum* , 300 000 cfu/g forage);

Analyses: Forages and silages chemical and microbial composition (pH, DM, CP, WSC, nitrate, buffer capacity, VFA and lactic acid, NH₃-N and alcohols, stock of LAB, yeasts and mold, aerobic stability).

Materials and methods :

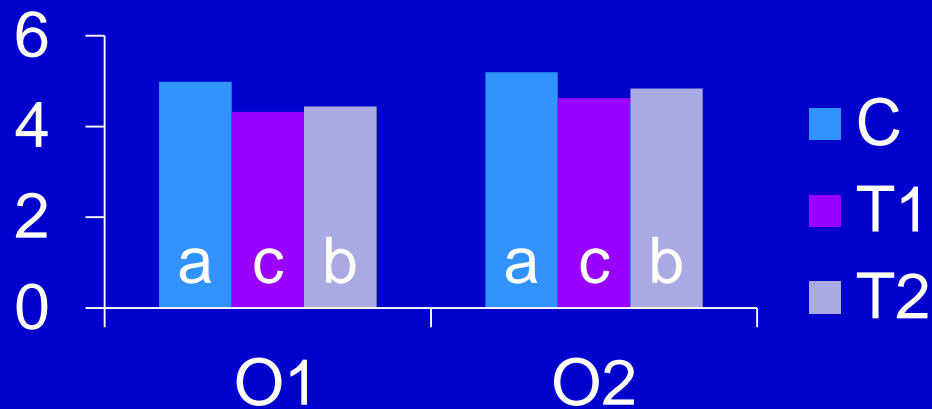
Objective	1	2
Scope of test	5 Ensiling tests (replicates)	5 Ensiling tests (replicates)
Bulk density	90 days 1 kg/5 litre	49 days 0.6 kg/5 litre
Test conditions and test criteria	Fermentation quality DM loss pH value at day 3 of ensiling pH value at day 90 of ensiling Aerobic stability	1 day air stress at day 28 and at day 42 of ensiling Fermentation quality DM loss pH value at day 3 of ensiling pH value at day 49 of ensiling Aerobic stability



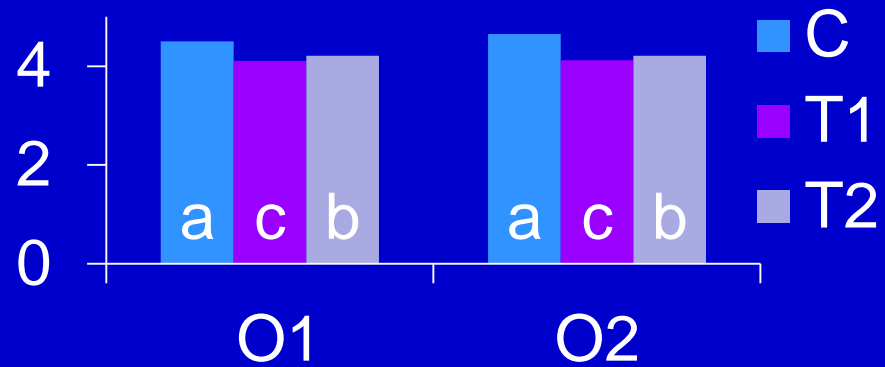
Results

Acidification level

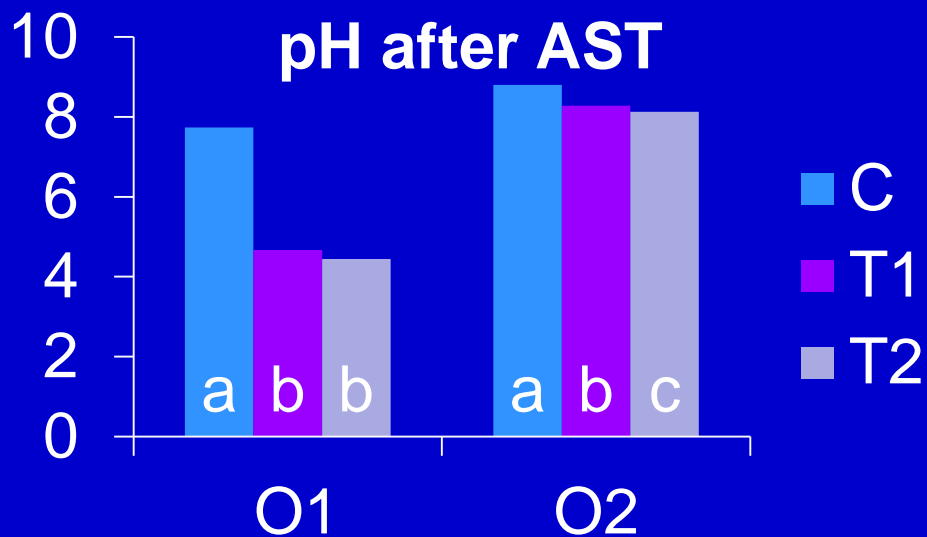
pH after 3 d



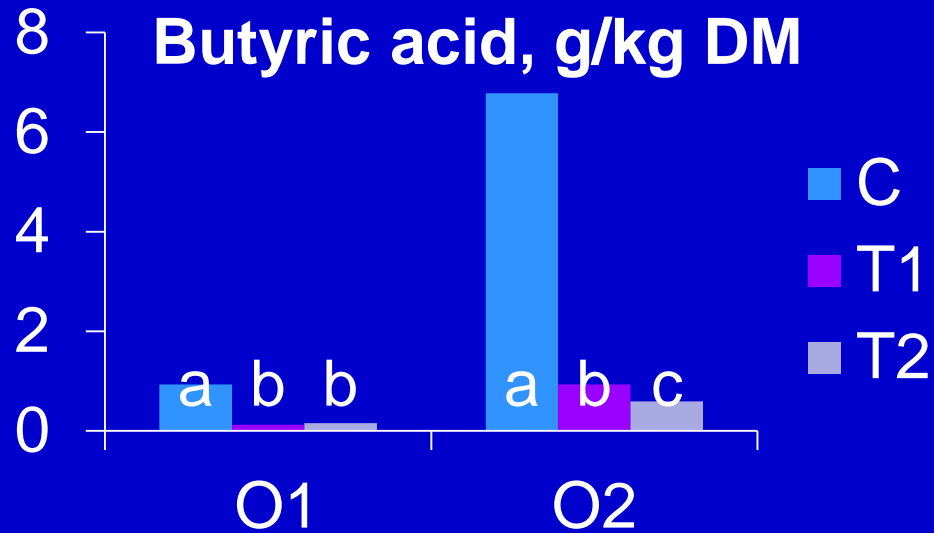
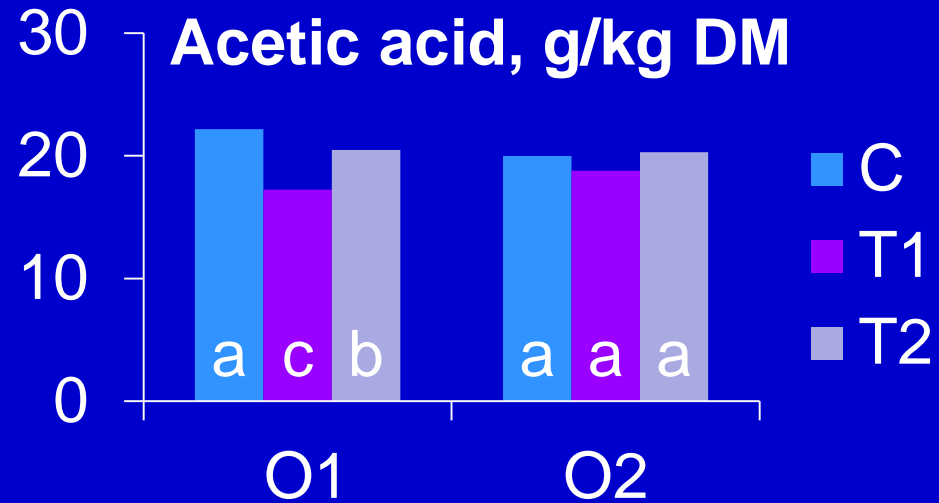
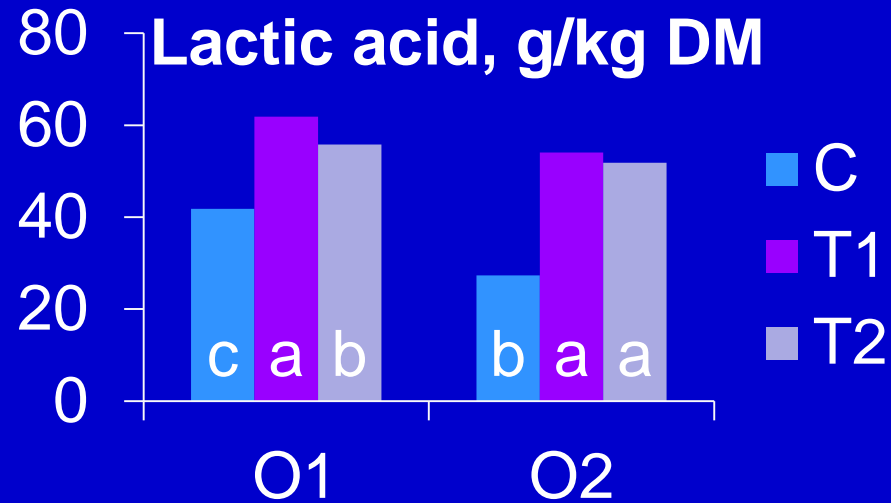
pH at fermentation end



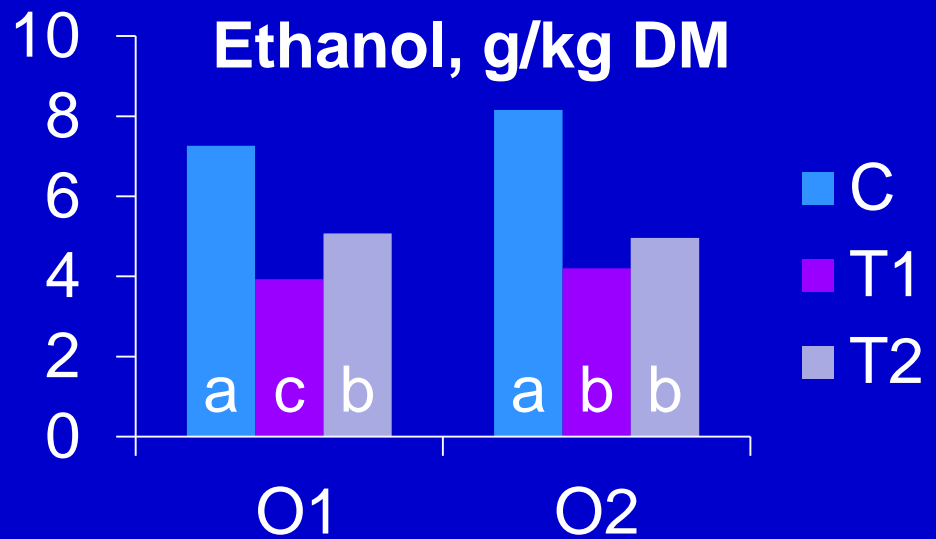
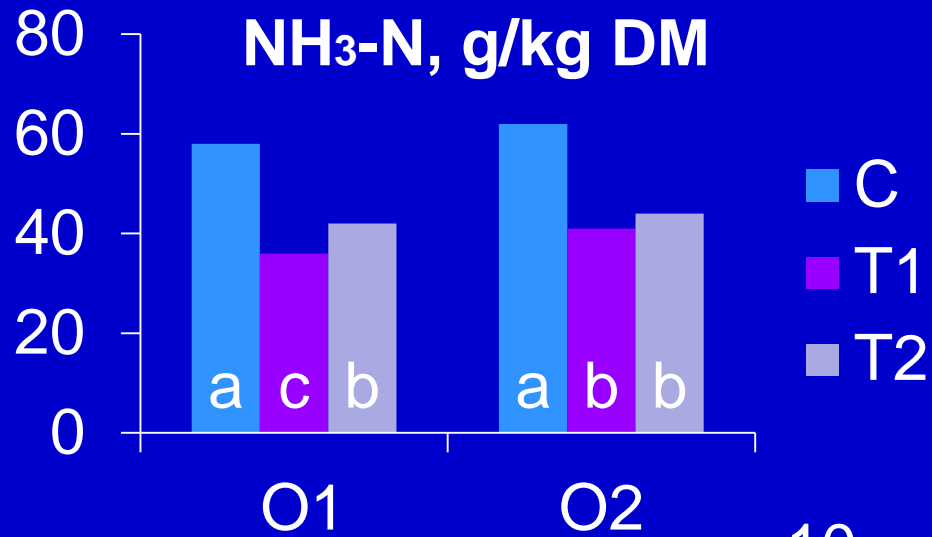
pH after AST



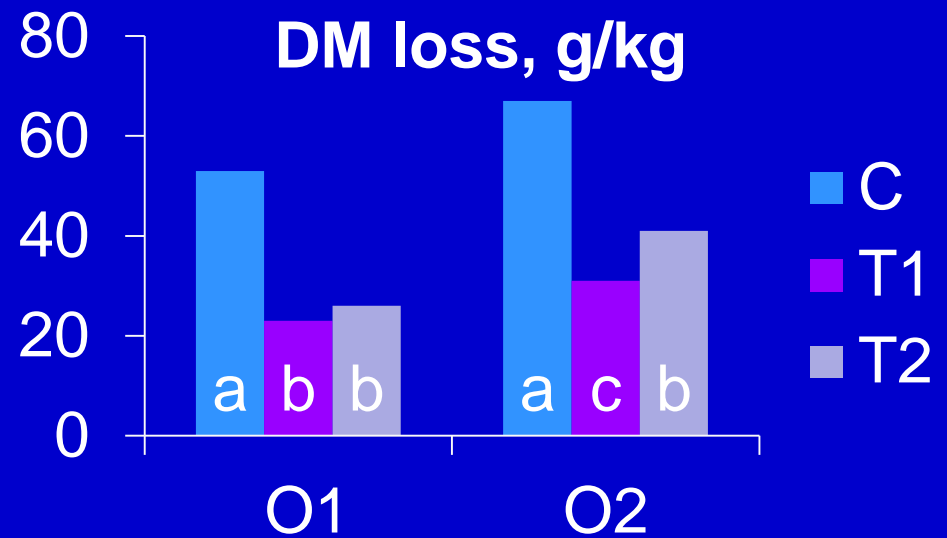
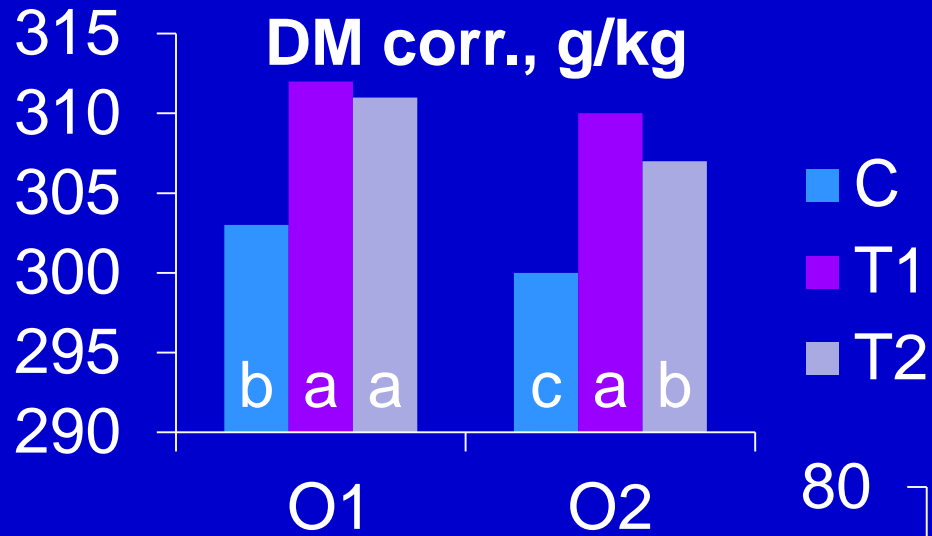
Fermentatation profile



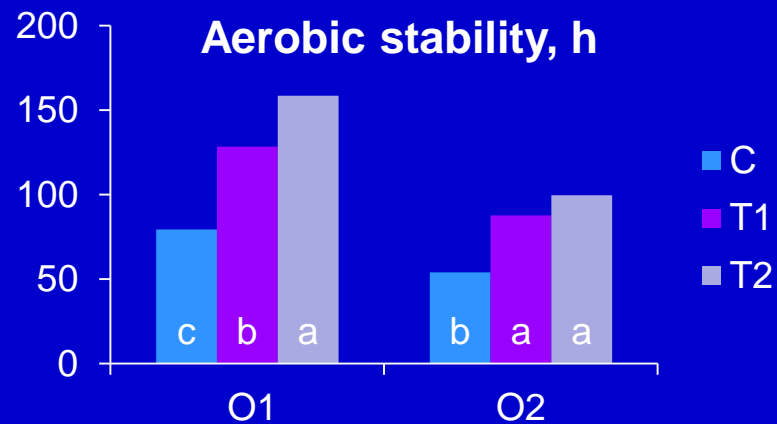
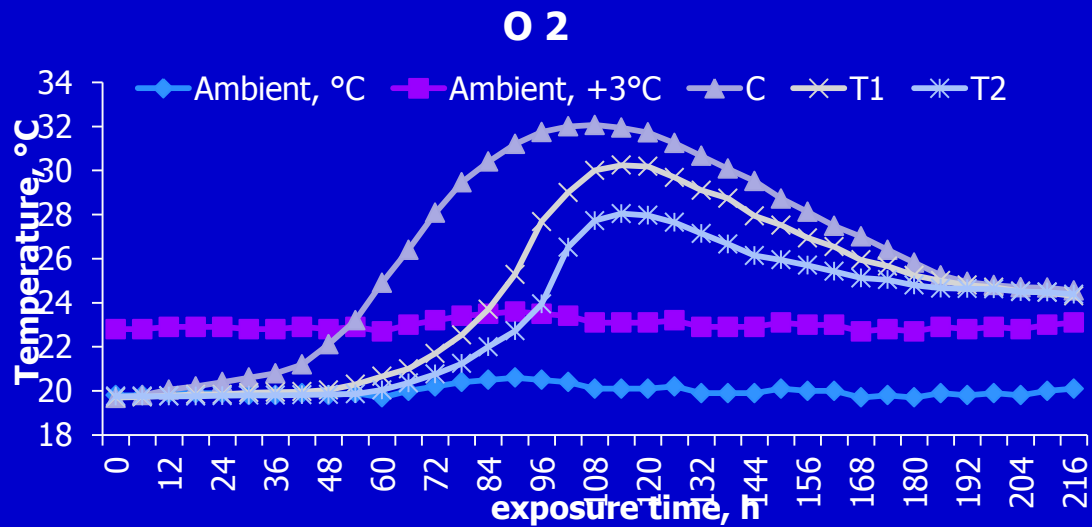
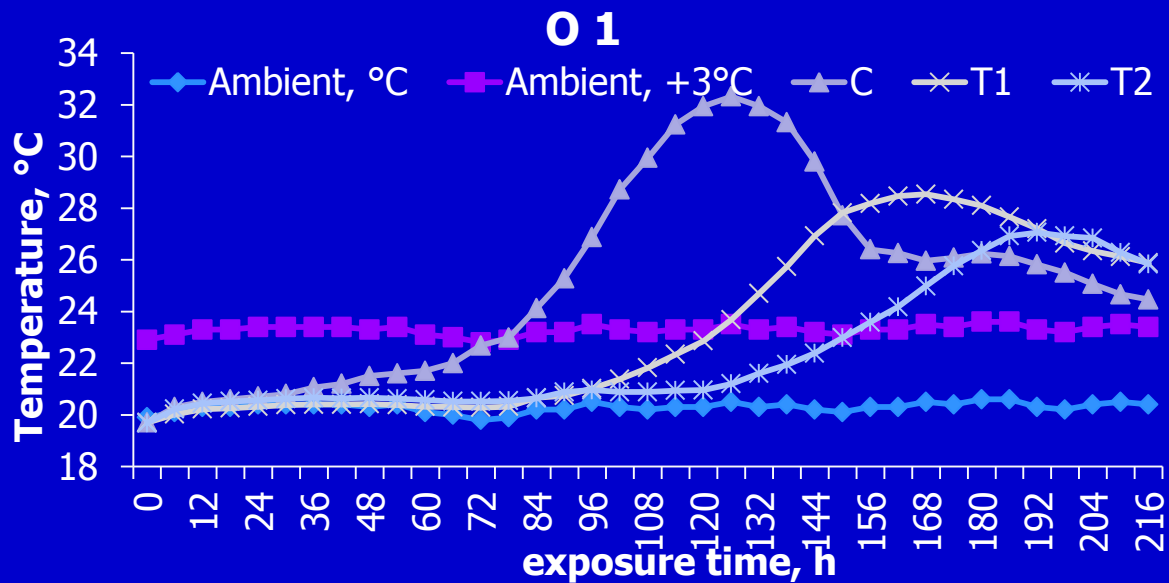
Fermentatation profile



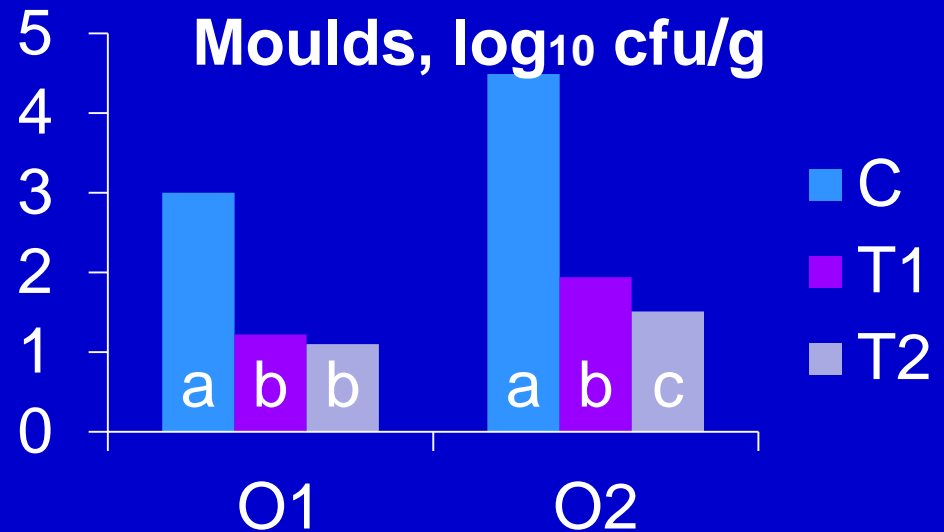
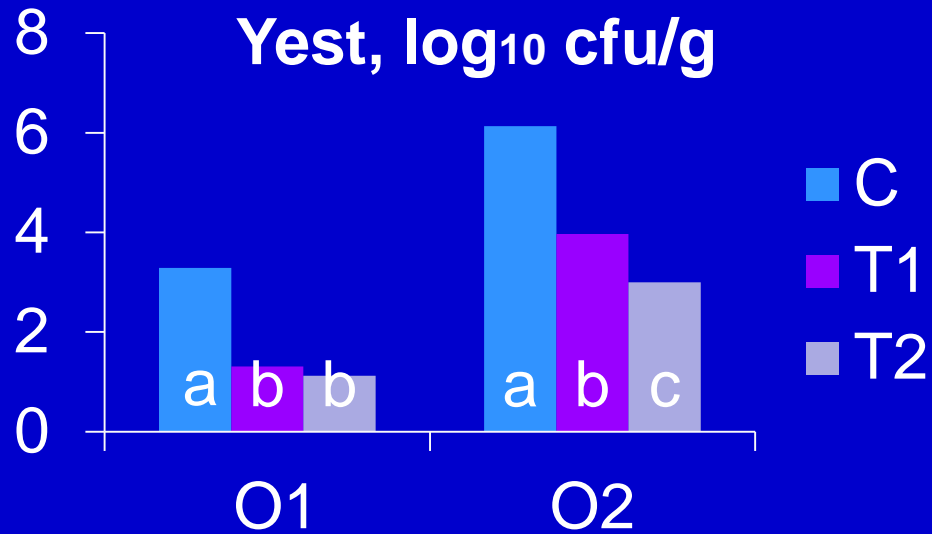
DM losses



Aerobic stability



Microbial characteristics



Conclusion

Overall, it can be concluded that application of viable homo and hetero LAB blends *L.buchneri*, *L.plantarum*, *P.acidilactici* (T1) and *L.buchneri*, *L.plantarum* (T2) did succeed in altering the quality of perennial ryegrass silage ensiled in laboratory silos (in both Objective 1 and Objective 2). Inoculation:

- a) increased fermentation rate and resulted in lower pH;
- b) changed fermentation profile produced more lactate and less ammonia-N, alcohols, and butyric acid and reduced DM loss;
- c) were effective in limiting the degradation of protein, lowering growth of moulds and enhancing silage aerobic stability.

Thank you for your attention

