# Impact of a litter amendment on welfare indicators and litter quality in a turkey husbandry

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## Background and Objective

- ***Welfare** issue: foot pad health*
- ***Need** for management measures → litter quality*
  - *‚Poultry Litter Treatment' standard procedure in US poultry production*
    - *Reduction of ammonia emissions and incidence of pododermatitis*
- ***Evaluation** of the effect of litter treatment → safety and effect on foot pad health*

## Conclusions

- *SBS litter treatment: reduces pH-value; pH-value seems to be a feasible management measure on-farm*
  - *To reduce foot pad lesions under European turkey husbandry conditions without negative impact on health parameters*
- *Further investigations have to determine:*
  - *Effect under field conditions*
  - *Impact on ammonia emissions*

## Animals, Material and Methods

**Data collection**

- Turkey research farm
  - Pre-study (**S1**; 124 days)
  - Main study (**S2**; 147 days)
- 2 groups per study/ each repeated once/ study
- Each study 142 birds/group (♂, B.U.T.6)
  - Litter treatment (**TRT**) | no treatment (**Con**)
- Litter: wood shavings (rearing; 3.4 kg/m²); chopped straw on top
- Litter treatment: Sodium bisulfate (SBS; Grillo Werke AG Duisburg)
  - 4g SBS / 100g bedding material; dispersed on top:
    - < 24 h before housing 1-day old poults
    - day 15, 22 and every 3rd litter dispersing date (∑ 20 TRT)

**Monitoring and evaluation of foot pad health (FPD)**

- S1: 220 feet / group post mortem (*p.m.)*
- S2: weekly (rearing) / biweekly (grow-out)
  - 60 birds/group and 230 feet/group *p.m.*
  - Macroscopic Score 0-4 (Hocking et al. 2008)
  - Worst scored foot of an individual was evaluated
    - Mann-Whitney U-test; α=0.05


**Monitoring of litter samples (only S2)**

- Biweekly (drinker line, feeder area, activity area)
  - pH-value (calibrated for 4.00, 7.00, 9.00; VDLUFA 2000)
  - Dry matter content (DM; weight loss after drying 24h 105°C; VDLUFA 2014)

## Results and Discussion

***Liveweight (n=60 birds/group; Mean and SD; day post hatch)***

| | 1. day | 36. day | 124./147. day |
|---|---|---|---|
| S1-TRT | 69.6 ± 5.8 | 1,393 ± 150.0 | 16,901 ± 775.5 |
| S1-Con | 72.1 ± 9.5 | 1,438 ± 177.8 | 16,850 ± 1,139.3 |
| S2-TRT | 69.6 ± 5.9 | 1,424 ± 155.8[a] | 19,523 ± 1,556.6 |
| S2-Con | 68.5 ± 6.5 | 1,347 ± 138.6[b] | 19,554 ± 1,417.0 |

[a,b] mean within a column and study differ significantly at p ≤ 0.05; t-test

**Liveweight**

- **No influence on live weight**

(cf. Broiler studies Toppel et al. 2018; Tasistro et al. 2007; Li et al. 2013)

**Mortality**

- Cumulative 1.-124./147. day

S1 TRT / Con : 8.0 vs. 11.6 %

S2 TRT / Con : 12.7 vs. 12.0 %

- **No influence on mortality** → national Ø 10.3-11.0% male mortality in turkey livestock (Damme 2017; Toppel et al. 2017)

**Foot pad health**

- Significant less severe lesions and prevention of lesions in treated groups → results in accordance with broiler studies (cf. Toppel et al. 2018)

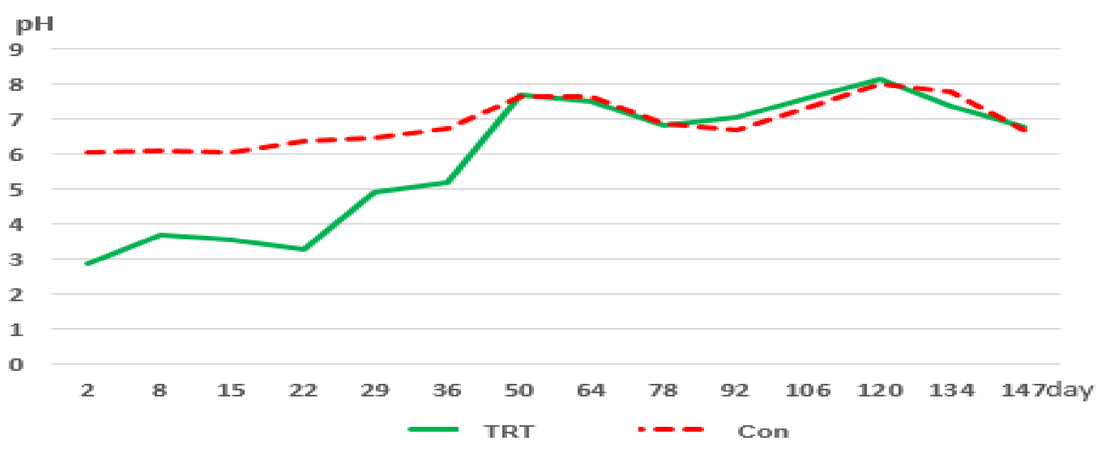
***Foot pad health p.m.** (% affected feet; no lesions = score 0, moderate lesions = score 1+2, severe lesions = score 3+4)*

| n/ group | S1-TRT | | | S1-Con | | | *p* | S2-TRT | | | S2-Con | | | *p* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | no lesions | moderate | severe | no lesions | moderate | severe | | no lesions | moderate | severe | no lesions | moderate | severe | |
| 220/230 | 10.0 | 83.2 | 6.8 | 4.1 | 84.5 | 11.4 | 0.001 | 5.2 | 74.0 | 20.9 | 0.0 | 62.6 | 37.4 | 0.000 |

means per study differ at significance level α ≤ 0.05; Mann-Whitney U-test

**Litter quality**

- Decrease of dry matter content similar between groups, despite hygroscopic treatment (Li et al. 2013)
  - 36. day TRT / Con 67.9 vs. 66.9 %
  - 147. day TRT / Con 42.8 vs. 41.2 %
- Initial pH-value 2.8 (TRT) vs. 6.7 (Con) | day 36 pH 5.2 (TRT) vs. 6.8 (Con)
  - Main FPD impact (‚group'-effect; *p=0.000*)
    - Reduction of microbial activity ? (Tasistro et al. 2007)
    - Reduction of $a_W$-value → less „free" water? (Dunlop et al. 2016)




***pH-value progress (avg. Control and Treatment)***

(pooled samples per group from drinker line, feeder area and activity area)

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