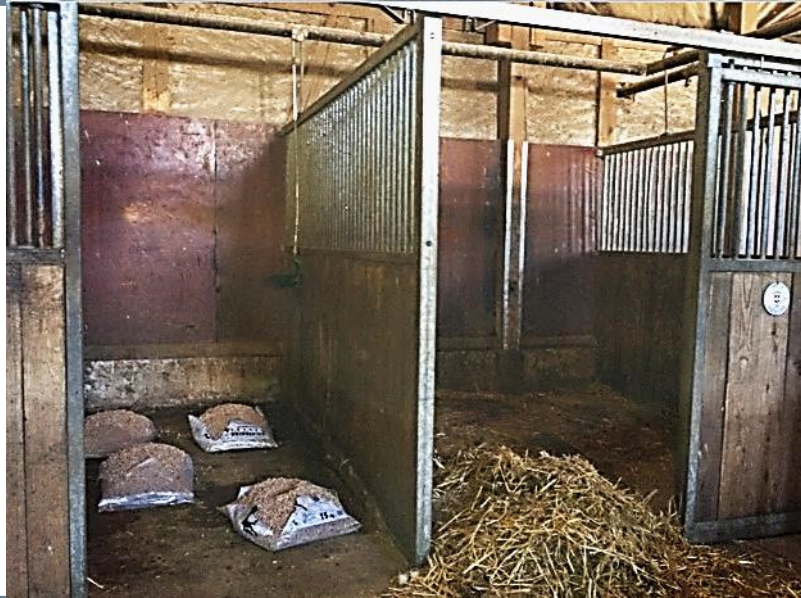




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Testing of a wood pellet product as bedding material in horse stables

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Introduction



Bedding materials used for horse keeping

- ▶ Over 80% of all horses are stabled in box stalls in Switzerland (Bachmann *et al.*, 2002)
- ▶ A conventional horse box is around 12 m² per horse (fulfils the requirements of the Swiss Ordinance on Animal Welfare)
- ▶ Approximately 7 litres urine & 10 kg feces are excreted by a horse per day (Richter *et. al*, 1992)
- ▶ Bedding materials have different effects on horse health, welfare, behaviour and stable environment (Fleming *et al.*, 2008)



The wood pellet product

- ▶ The bedding material EQ-Bedding[®] consists of wood pellets supplemented with five different herbs
- ▶ It has been used for different animals (e.g. pigs, chicken, rabbits)
- ▶ the material is also characterized by a rapid compostability

The manufactures recommended:

- ▶ The wood pellets should be strewn only once and complete exchange of bedding is not necessary until after 40 days
- ▶ 7 bags à 15 kg for a 12 m² box
- ▶ 4 liters of water per bag, pellets need 10 minutes soaking time before distribution within the box

Objective of the study

- ▶ Testing of wood pellets (EQ-Bedding®) as alternative bedding material for horses



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Materials and Methods



Experimental setting

In situ experiment

- ▶ Two different horse keeping farms:
Farm A: predominantly leisure sport horses
Farm B :professional sport & breeding horses
- ▶ Three boxes on each farm (n=6)
- ▶ All horses were turned out between 4-6 hours per day
- ▶ 7-day control period on the horses usual bedding
(straw n=5, linen shives n=1)
- ▶ 42 days testing period with EQ-bedding®
- ▶ 10 bags initially (instead of 7 as recommend by the manufacturer)

Laboratory experiment

- ▶ Water binding capacity
- ▶ Ammonia emission test with wind tunnels

Farm A



Farm B





Experimental setting: test parameters

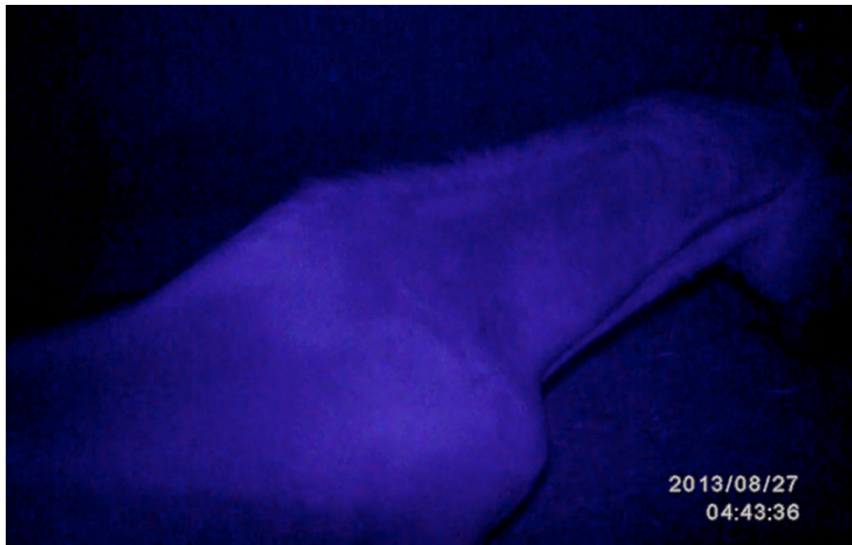
In situ experiment:

- ▶ General health & hoof health (veterinary check)
- ▶ Lying behaviour (video surveillance from 10 pm to 5 am)
- ▶ Laboratory parameters:
 - dry matter,
 - the content of major nutrients (nitrogen, phosphorus, potassium)
 - microbial cell counts
- ▶ Observation protocol of the horse keepers: welfare, feeding habit & occupation of the horses, absorptive capacity, dust development, smell, user friendliness, work load



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General & hoof health, lying behavior



Experimental setting: Laboratory experiments

Water binding capacity

- ▶ Straw, linen, wood shavings, wood pellets
- ▶ 50 g bedding material,
- ▶ Water binding capacity after 2h and 24 h





Experimental setting: Laboratory experiments

Ammonia emission

- ▶ 15 bowls with 500 g bedding material each (straw, wood pellets)
- ▶ Daily pour-on of 25 ml urine
- ▶ Daily stirring of the bedding according to the manufactures recommendations
- ▶ Measurement of NH_3 emission on day 0, 17, 34, 46 in wind tunnels

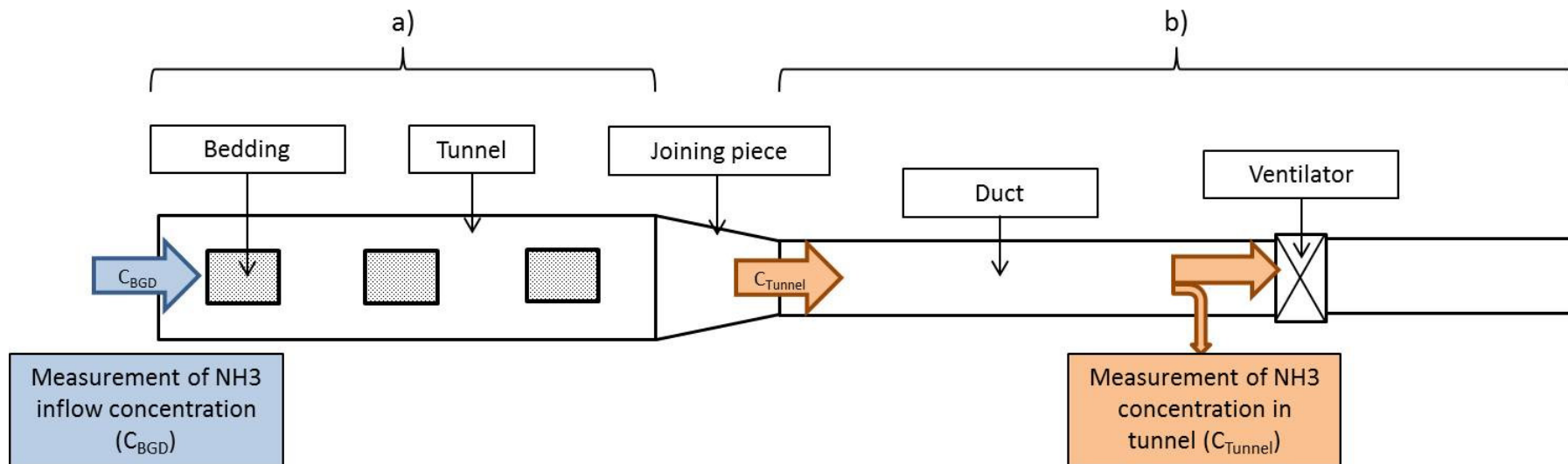


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Measurement of ammonia emission



Wind tunnel system



► $E_{Bedding} = Q * (C_{Tunnel} - C_{BGD})$



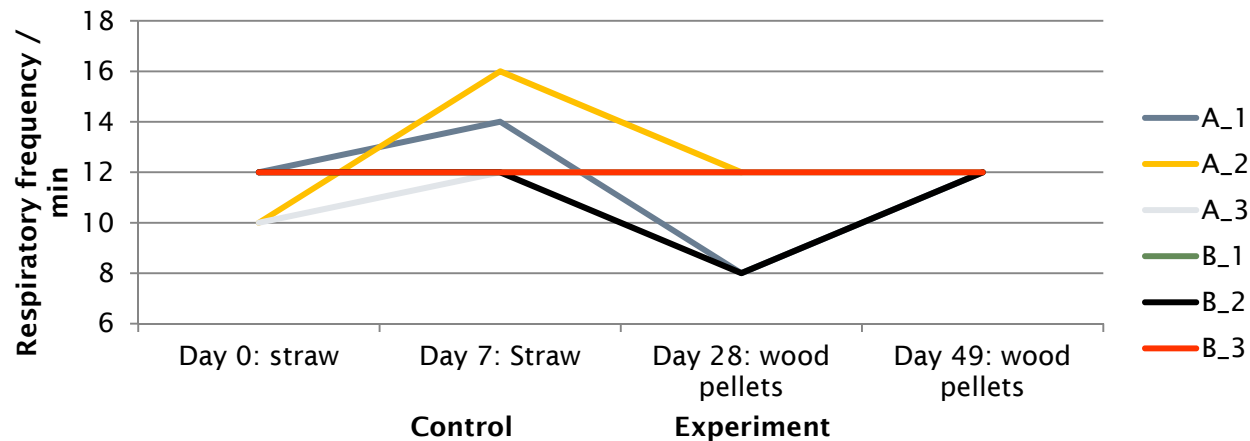
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Results

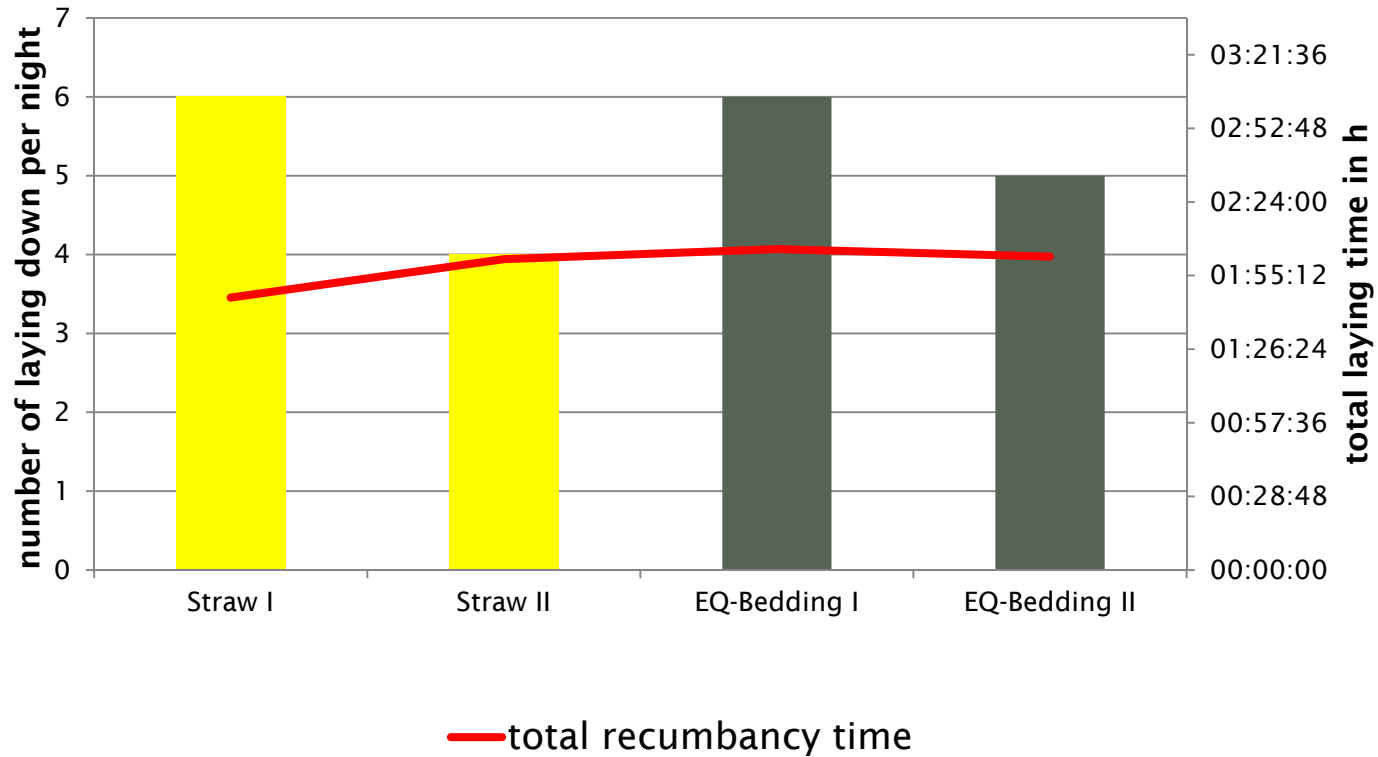
General health & hoof health (veterinary check)

- ▶ General clinical health status (pulse, respiratory frequency, temperature, mucus membranes, capillary refill time) indicated similar results for straw & EQ-Bedding
- ▶ Hoof health (pulsation, examination with hoof pincers) was not affected by the two beddings but hoof quality seemed to be improved after week 3 with regard to the shine and quality of the hoof horn on EQ-Bedding



Lying behaviour

Lying behavior of the horse in farm B, box2

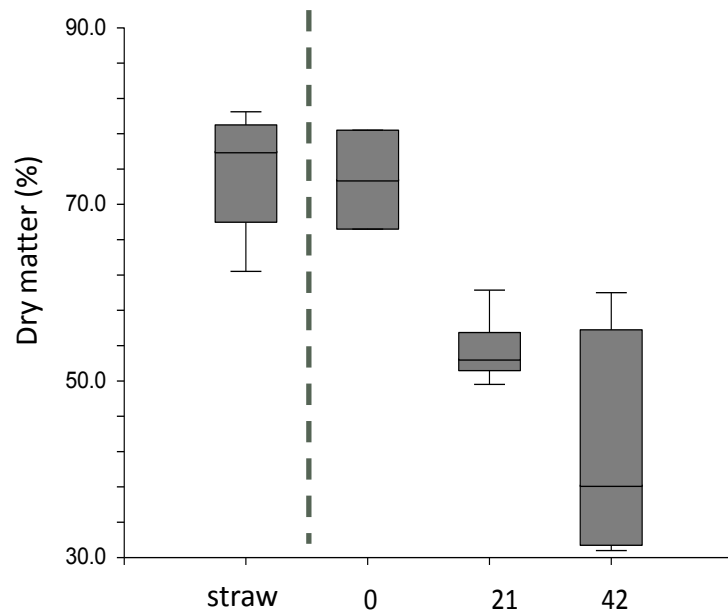


Laboratory parameters in situ

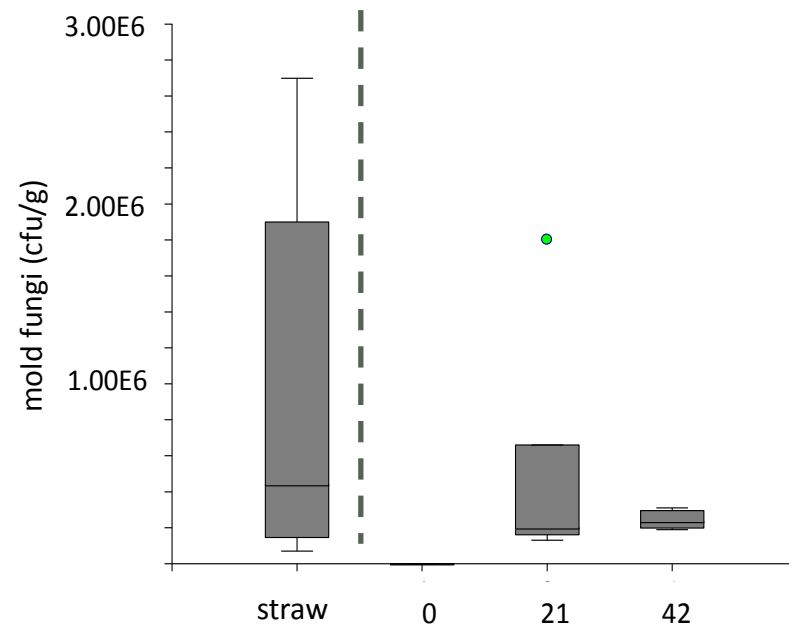
- ▶ The content of dry matter lowered from Ø 73% to 42%
- ▶ Content of major nutrients (nitrogen, phosphorus, potassium) increased during the experimental period
- ▶ Microbial cell counts were not different to straw
- ▶ Exception:
Less increase of mold fungus compared to the total cell count and yeast and less variation of the results between the analyzed samples
- ▶ A reason for this observation could be the decreasing dry matter content of the material EQ-Bedding

Laboratory parameters in situ

A: Dry matter content at different test phases compared to straw (%)

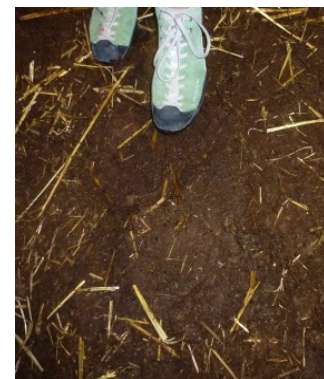


B: Mold fungi at different test phases compared to straw (cfu/g)



Observation protocol of the horse keepers

- ▶ Welfare: equal to straw
- ▶ Feeding habit: horses did not eat the wood pellets
- ▶ Occupation of the horses: disadvantageous to straw
- ▶ Dust development: increased in week one
- ▶ Absorptive capacity decreased after week 4
- ▶ Smell: good, equal to straw (until week 4)
- ▶ User friendliness, ease of handling: good
- ▶ Work load: in the beginning very low but increased after week 4



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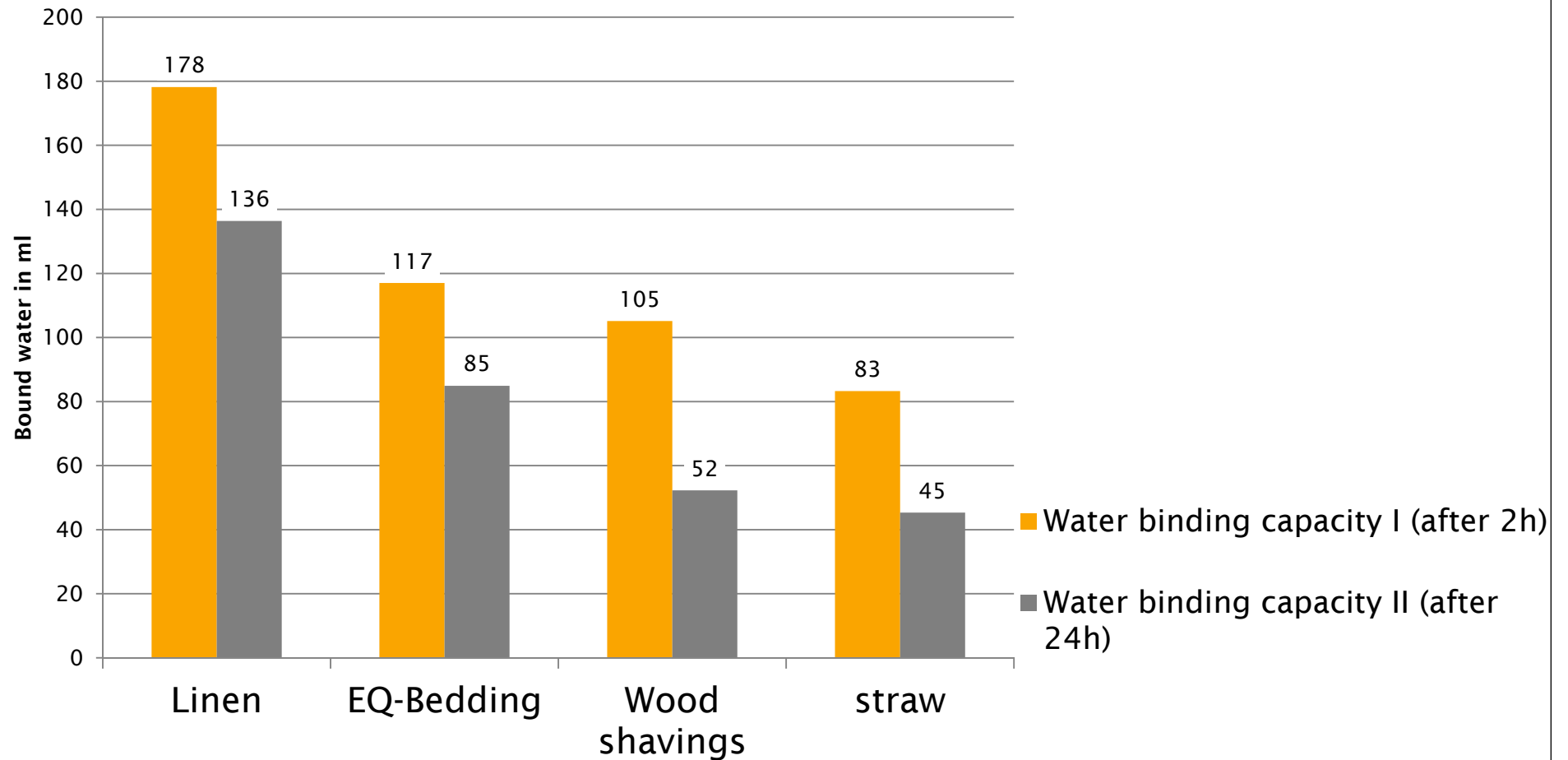
Day 7 (week 1)

Day 21 (week 3)

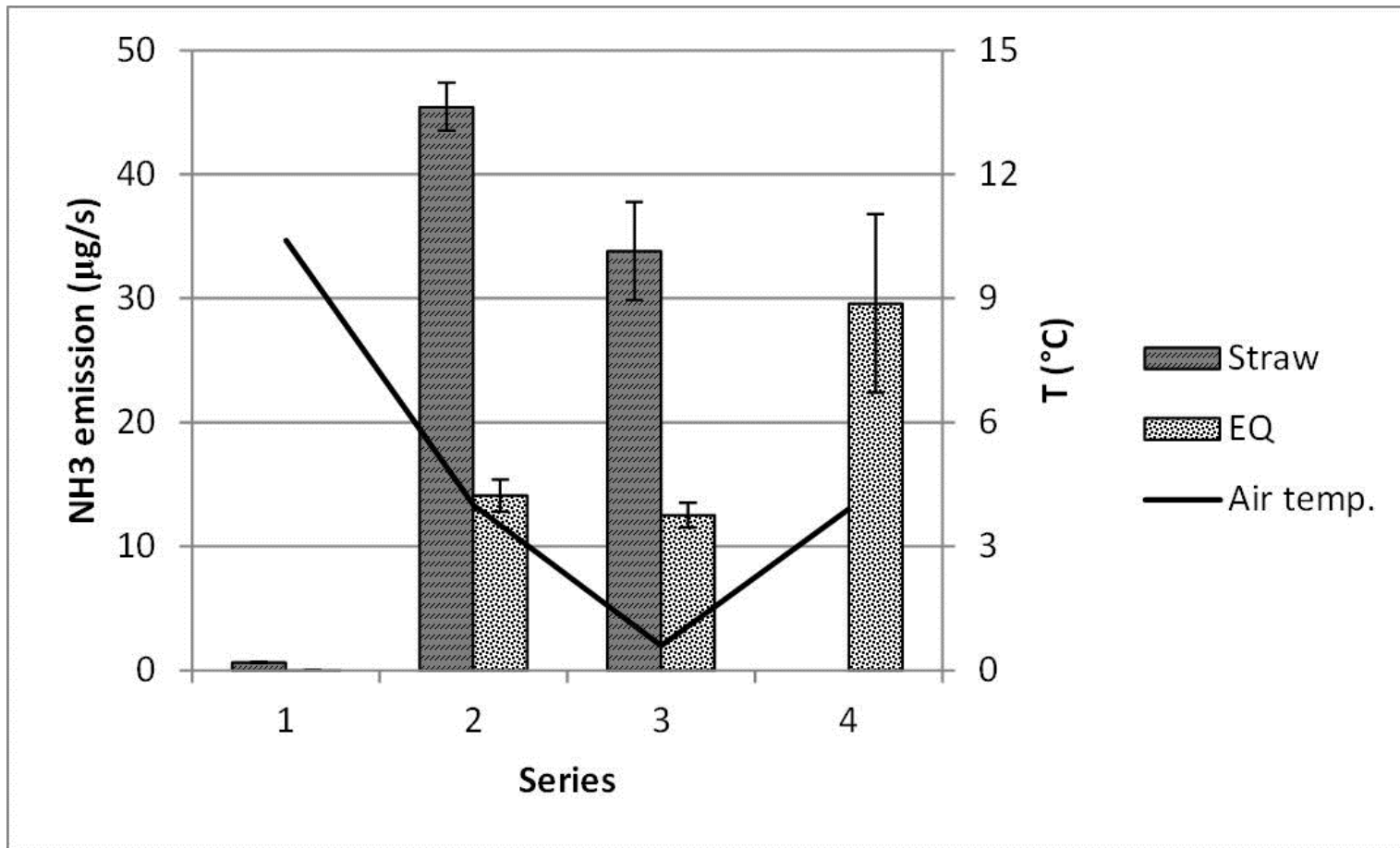
Day 31 (week 4)

Day 49 (week 6)

Water binding capacity



Ammonia emission





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Discussion & conclusion

Discussion

- ▶ General health, hoof health, welfare, lying behavior & feeding habit were good to very good
- ▶ To increase the occupation of the horses hay and straw nets should be provided
- ▶ Absorptive capacity, user friendliness, ease of handling and work load until week 4 were good to very good
- ▶ Total resting time of 30 days of the wood pellets until complete mucking out can be recommend (instead 40 days)
- ▶ Horse boxes of 12 m² need initial 10 bags instead of 7 as recommended & replacement with additional 2-3 bags was necessary
- ▶ To increase the duration of usage before complete mucking out, replacement of wet material and early & regular mixing of the material is recommended



Conclusions

- ▶ Wood pellets (EQ-Bedding[®]) appear to be a viable option as bedding material for horses
- ▶ Its use may be preferred in urban horse stables (storage capacity, ease of handling, manure volume)
- ▶ In horses suffering from respiratory problems EQ-Bedding[®] is advantageous due to its lower ammonia generation

What Stinks!

Not my stall.

