

Effects of phytogetic feed additives containing *Quillaja saponaria* on ammonia in fattening pigs

M. Veit¹, L. Jungbauer¹, K.R. Wendler¹, E. Zentner²

¹Delacon Biotechnik, Steyregg, Austria

²AREC Raumberg-Gumpenstein, Irdning, Austria

DELACON

Phytogetic Feed Additives



Lehr- und Forschungszentrum
Landwirtschaft
www.raumberg-gumpenstein.at

Agricultural Research & Education Centre

Introduction and Objectives

- Structural changes in agriculture towards fewer farms with higher numbers of animals per farm are causing problems due to ammonia and especially odor emissions.
- Feed additives including saponins have been reported to reduce ammonia emissions (Colina et al., 2001; Zentner, 2007).
- This effect might be explained through the inhibition of the bacterial enzyme urease (Nazeer et al., 2002; Yeo and Kim, 1997), which catalyzes the hydrolysis of urea into ammonia and carbon dioxide.
- Phytogetic feed additives (PFA) can reduce the ammonia production/concentration already at animal level, which is increasing animal welfare.

The objective of the two studies was to investigate the effects of two phytogetic feed additives **FRESTA® F Plus** and **AROMEX® ME Plus** on reduction of ammonia (NH₃) and odor concentrations as well as correlations between these factors in growing-finishing pigs. Both PFA contain the same amount of *Quillaja Saponaria*.

Materials and Methods

	Trial 1	Trial 2
Phytogetic feed additive	Aromex ME + (AME+)	Fresta F + (FF+)
Dosage, g/t	100	150
Control	Negative control	Negative control
Breed	(Large White x Landrace) x Pietrain	
Animals, n	32 (16 per treatment)	32 (16 per treatment)
Duration, day	78	78
Feeding	1 phase restricted	Grower (1-35), finisher (36-78) ad libitum

Table 1: Calculated dietary energy and crude protein content in trial 1 and trial 2

	AME+	FF+ Grower	FF+ Finisher
Energy (MJ/kg)	12.8	13.2	13.1
Crude protein (%)	17.0	17.5	16.0

Measurements

- Ammonia was measured with two portable devices (Dräger, Germany) at an interval of 10 minutes.
- Samples for odor measurement were taken 4 times during the trial. Each sample was analyzed by 2 teams composed of 4 persons each.
- For the evaluation of the odor reducing effect of the additives an olfactometer (Mannebeck, Germany) was used.
- Temperature and humidity were measured in the barns at animal level, the attic and outside continuously.
- Feed intake was recorded per group, while weights of animals were recorded individually.

Results and Discussion

- In both trials there were no significant differences in feed intake and performance between the control and the treatment groups.
- Ammonia concentration and odor units per m³ (OU/m³) were reduced through the addition of AME+ by 38% and 34%, respectively (Figure 1).
- The addition of FF+ reduced ammonia concentration by 32% and OU/m³ by 29% through the whole fattening period (Figure 2).
- In trial 2 lower ammonia reductions were shown in the grower phase (25%) than in the finisher phase (36%).
- The results of the olfactometric investigations showed a correlation of odor and ammonia concentrations in both trials.
- Same temperature and humidity values, as well as the equal feed intake and performance levels in the trial groups provide comparable conditions for control of feeding strategies on ammonia emissions.

Conclusion

The results of these trials indicate that *Quillaja Saponaria* is the active ingredient in these phytogetic feed additives reducing ammonia and odor levels. Reducing ammonia concentrations at animal level helps to improve health and stress status and thus, contribute to animal welfare. Reduction of OU/m³ achieved with the tested feed additives is of importance for production sites that have immediate neighbors, and improves working conditions.

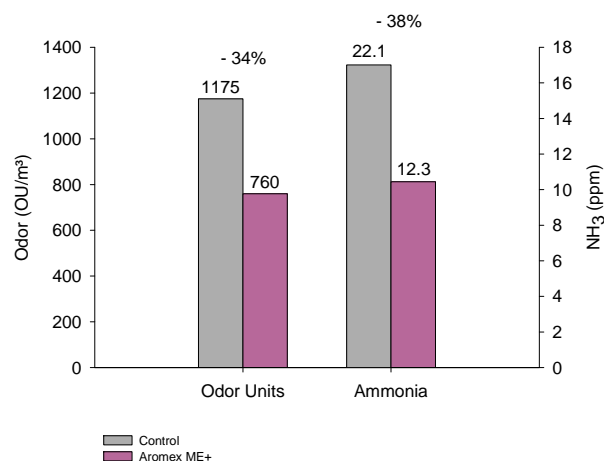


Figure 1: Odor (OU/m³) and ammonia concentration (ppm) in trial 1 (AME+)

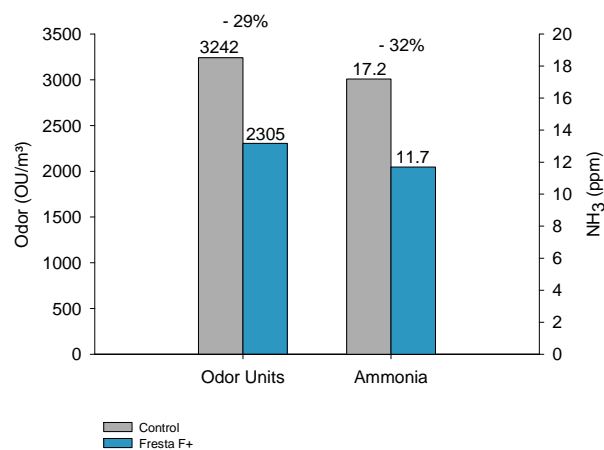


Figure 2: Odor (OU/m³) and ammonia concentration (ppm) in trial 2 (FF+)

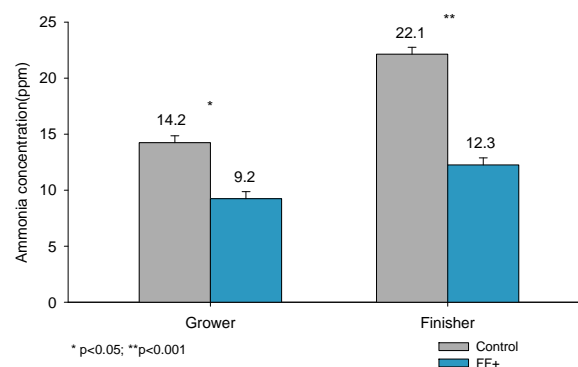


Figure 3: Ammonia concentration (ppm) in grower and finisher phase in trial 2 (FF+)

References

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