



AMINO ACID LOSS IN LIQUID FEED

Niels Kjeldsen, Senior Specialist

Vet Team
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AGENDA

- Amino acid loss - current recommendation
- Effect of benzoic acid?
- Effect of formic acid?
- Amino acid loss - new recommendation
 - Residual feed
 - Addition of acid

St. F. Råprotein	g	33,96	126,00
St. Ford. lysin	g	2,30	8,53
St. Ford. lysin i vådfoder	g	2,06	7,63

CURRENT RECOMMENDATIONS COMPENSATE AND MINIMIZE

Formulation of liquid feed

- FK = 75% for free lysine and threonine
- Loss of free methionine, tryptophan and valine not included

AND

- Feeding asap after mixing
- If possible, raise protein level in feed formulation



Photo: Skiold



RECENT LAB TRIAL – BENZOIC ACID

Group	1	2	3
Benzoic acid, % of dry feed	0	0.5	1.0

Four rounds with inoculum from four herds (finisher feed)

16 replicates per group
(four replicates per round)



RECENT LAB TRIAL – BENZOIC ACID

Mixing:

50% residual feed + 50% fresh liquid feed

Fermentation at 20 °C

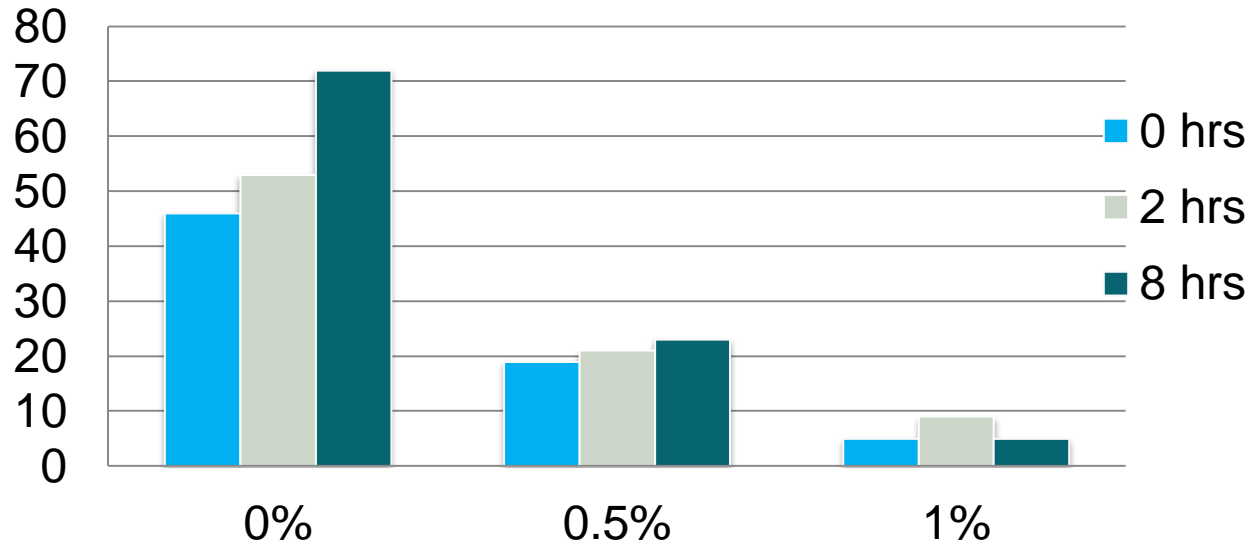
Sampling d 7 after 0, 2 and 8 hours



Photo: Nuria Canibe

Day	1	2	3	4	5	6	7
Mixing	At 12:30 (start)	At 8:30 & 14:30	At 8:30	At 8:30	At 8:30 & 14:30	At 8:30 & 14:30	At 8

RESULTS BENZOIC ACID LOSS OF FREE LYSINE, % (PRELIMINARY RESULTS)

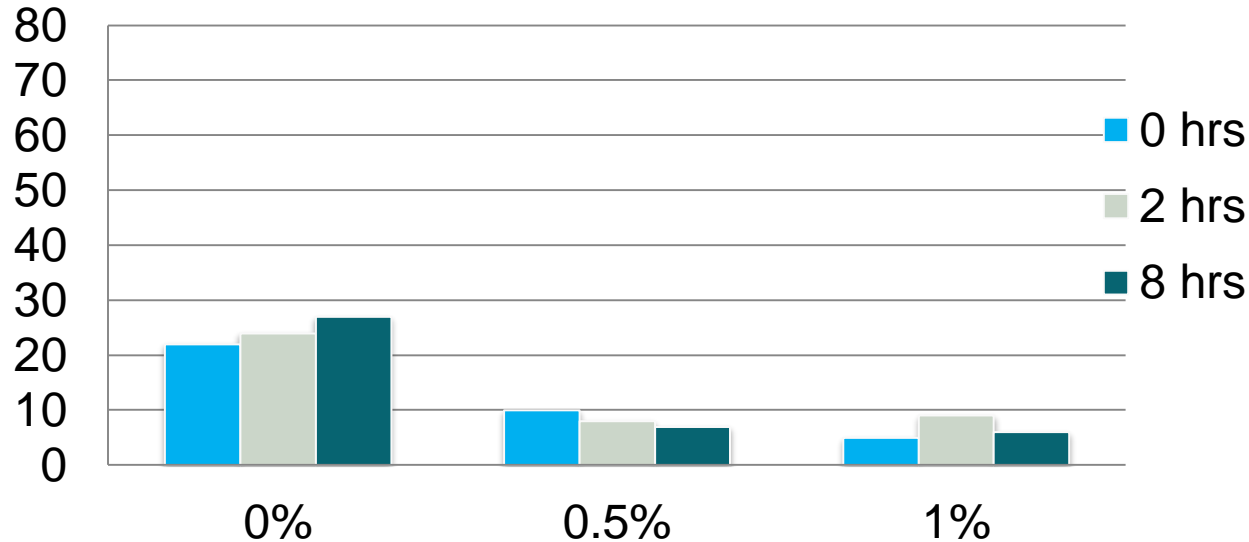


Factor	Effect
Benzoic acid	***
Time	*
Group x time	*

LOSS OF FREE THREONINE, %

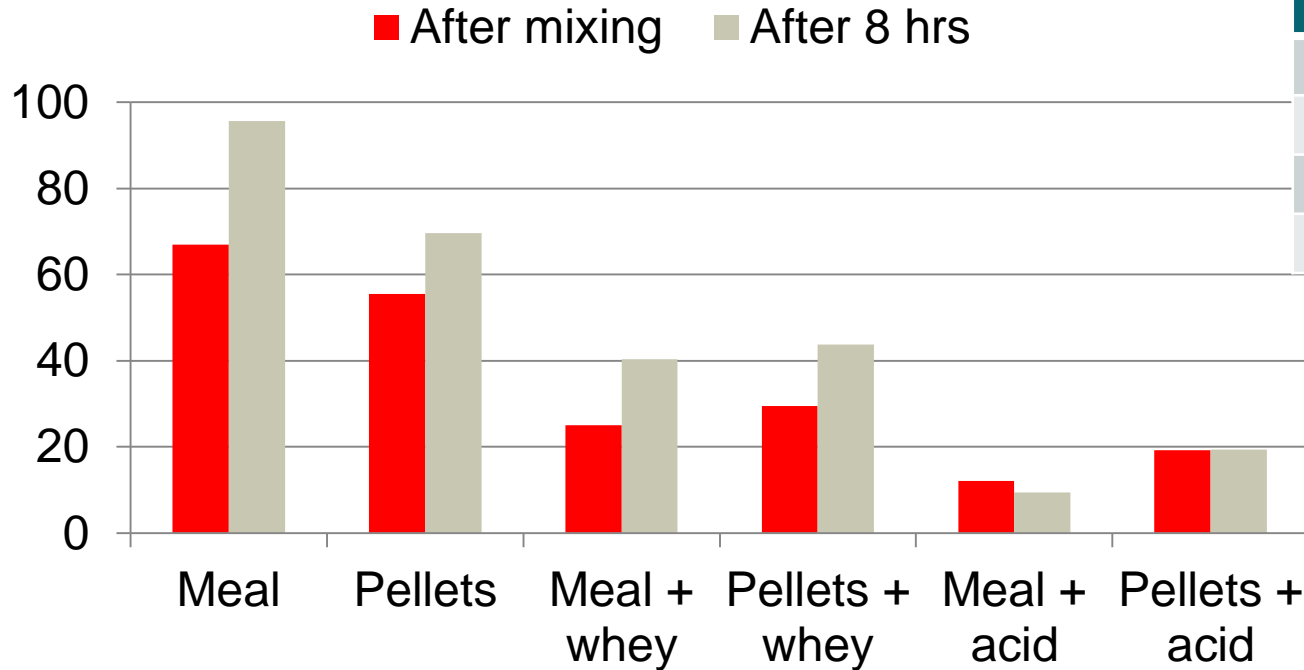
(PRELIMINARY RESULTS)

Factor	Effect
Benzoic acid	***
Time	NS



RESULTS FROM PREVIOUS TRIALS

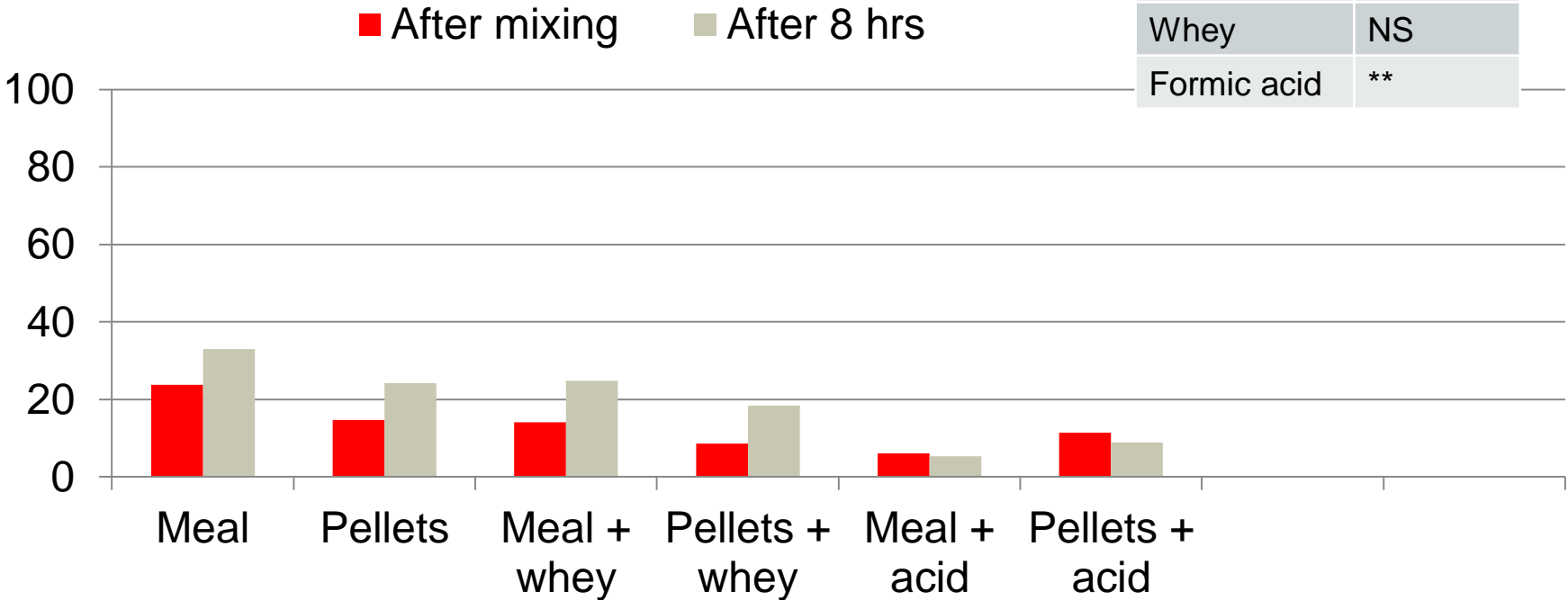
LOSS OF FREE LYSINE, %



Factor	Effect
Time	*
Meal/pellets	NS
Whey	***
Formic acid	***

PREVIOUS TRIALS

LOSS OF FREE THREONINE, %



Factor	Effect
Time	NS
Meal/pellets	NS
Whey	NS
Formic acid	**

FEED FORMULATION MODEL

	FK lysine	FK threonine
50% residual feed		
25% residual feed		

HOW TO DETERMINE % RESIDUAL FEED

Residual feed =

*residual feed in tank, kg +
pipe length, m x kg feed per m pipe*

Residual feed % =

$$\frac{\textit{residual feed} \times 100}{\textit{(residual feed} + \textit{amount fed)}}$$

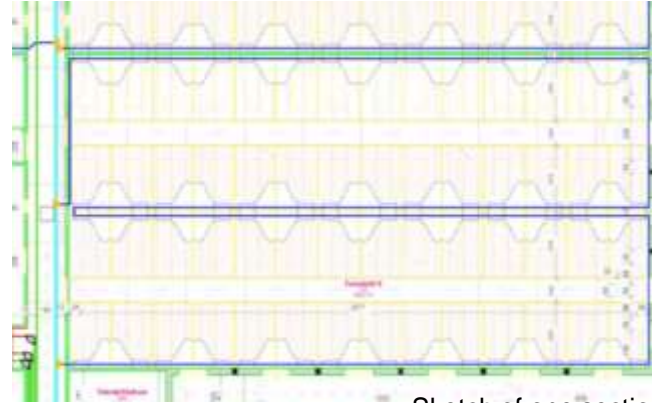
DETERMINE RESIDUAL FEED – EXAMPLE: FARROWING FACILITY WITH FIVE SECTIONS

Ø63mm pipe,
approx. 2.6 kg
per m

Ø50mm pipe,
approx. 1.5 kg
per m



Photo: Skiold



Sketch of one section

Residual feed: $800 \text{ m} \times 1.5 \text{ kg/m} + 100 \text{ kg} = 1300 \text{ kg}$

Feeding (3 x a day): $6 \text{ kg per sow} \times 280 \text{ sows} = 1680 \text{ kg}$

Residual feed in pipe %: $1300 \text{ kg} / (1300 + 1680) \text{ kg} = 44\%$

REVISED RECOMMENDATION 2018 (PRELIMINARY)

	FK lysine	FK threonine
35-50% residual feed, acid not added	50	75
15-35% residual feed, acid not added	75	75

REVISED RECOMMENDATION 2018 (PRELIMINARY)

	FK lysine	FK threonine
35-50% residual feed, acid not added	50	75
15-35% residual feed, acid not added	75	75
Addition of 2‰ formic acid, liquid feed, or addition of 1% benzoic acid, dry feed	100	100
Feeding, no residual feed	100	100

REVISED RECOMMENDATION 2018 (PRELIMINARY)

	FK lysine	FK threonine
35-50% residual feed, acid not added	50	75
15-35% residual feed, acid not added	75	75
Addition of 1‰ formic acid, liquid feed, or addition of 0.5% benzoic acid, dry feed, and max 50% residual feed	75	75
Addition of 2‰ formic acid, liquid feed, or addition of 1% benzoic acid, dry feed	100	100
Feeding, no residual feed	100	100

LOSS OF FREE LYSINE: CONSEQUENCE AND PRICE

- EXAMPLES

Diet for	Lactating sows	Weaned pigs	Finishers
Standard: Dig. lysine, g/FU	7.7	10.6	7.7
At loss 25%	7.1	9.8	7.0
FK 75 cost per sow/year/pig	DKK 5	DKK 0.5	DKK 2.1
At loss 50%	6.6	9.0	
FK 50 cost per sow/year/pig	DKK 15	DKK 1.4	

LOSS OF FREE THREONINE: CONSEQUENCE AND PRICE - EXAMPLES

Diet for	Lactating sows	Weaned pigs	Finishers
Standard: Dig. threonine, g/FU	5.0	6.5	5.1
At loss 25%	4.8	6.2	4.8
FK 75 cost per sow/year/pig	DKK 1.6	DKK 0.2	DKK 0.8

PRICE OF ADDING ACID

2‰ formic acid: DKK 670 per 100 kg =

DKK 1.34 per 100 kg: 0.3 FUgp/100 kg = DKK 0.045 per FUgp

1% benzoic acid in dry feed: DKK 1,050 per kg = DKK 0.10 per FUgp

CONCLUSION

Significant loss of free lysine and threonine during fermentation of liquid feed.

Benzoic acid and formic acid reduce fermentation losses.

New recommendations for compensation for fermentation loss depend on:

- % residual feed
- The addition of acid

TAK og husk!

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