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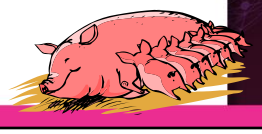
Understanding Feeding Behaviour and Daily Feed Intake of Sows

Prof. Dr. Bruno A. N. Silva
Swine Nutrition and Environmental Adaptation

UFMG Universidade Federal de Minas Gerais
Instituto de Ciências Agrárias
Campus Montes Claros



Nutritional Requirements and Body Condition Dynamics

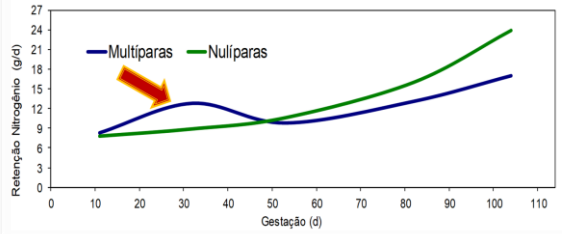
40 kg	**Piglets/ year**	(12,5 x 2,5 x 1,25)	**36,6 % Body mass/ year**
62,5 kg	**Weight conceptus**	(24 x 2,5)	
560 L	**Milk production**	(24 x 9,7 x 2,5)	**200 % Body mass/ year**
32 kg	*Protein excreted*		
56 kg	*Fat excreted*		
28 kg	*Lactose excreted*		

Adapted from Lebreton P. (2019/ Even Nubiote)

Dynamics of Body Weight Change and Growth

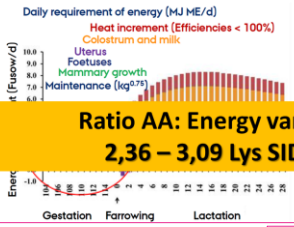
Higher metabolic weight
Less fat
More protein
Reduced Feed intake!!

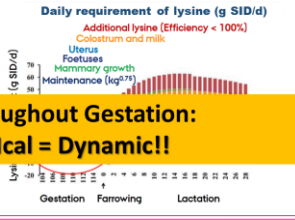
BW Dynamics and Parity Order



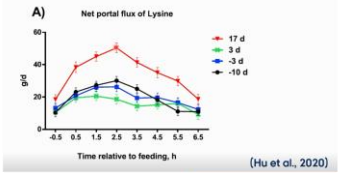
Adapted from Clowes et al. (2003); and De Bettio et al. (2014)

Energy and AA Requirements are Dynamic!!

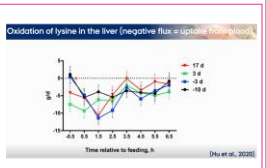




Ratio AA: Energy varies throughout Gestation:
2,36 – 3,09 Lys SID/ ME Mcal = Dynamic!!



(Hu et al., 2020)



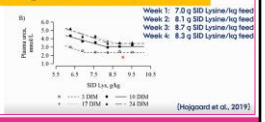
(Hu et al., 2020)

Dia 3: 3 g/d Lys for the GI
Dia 17: 11 g/d Lys for the GI

Dia 3: 6 g/d Lys for hepatic oxidation
Dia 17: 4 g/d Lys for hepatic oxidation

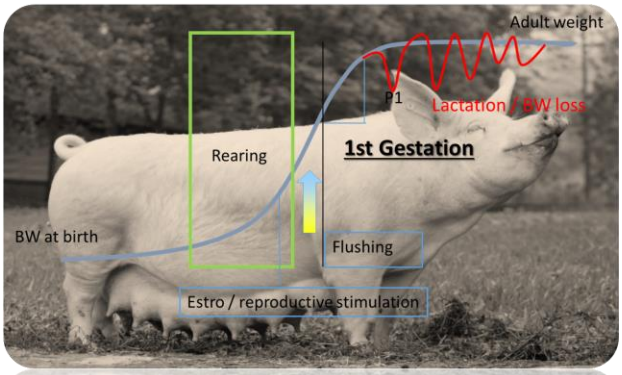
Dia 3: 21 g/d Lys for mammary gland usage
Dia 17: 50 g/d Lys for mammary gland usage

30 g/d - 65 g/d Lys Throughout Lactation



(Hojgaard et al., 2019)

How to feed sows properly to meet its nutritional needs?



What factors can Impact on Sow Voluntary Feed Intake?

Feeding Management vs. Feeding Behaviour

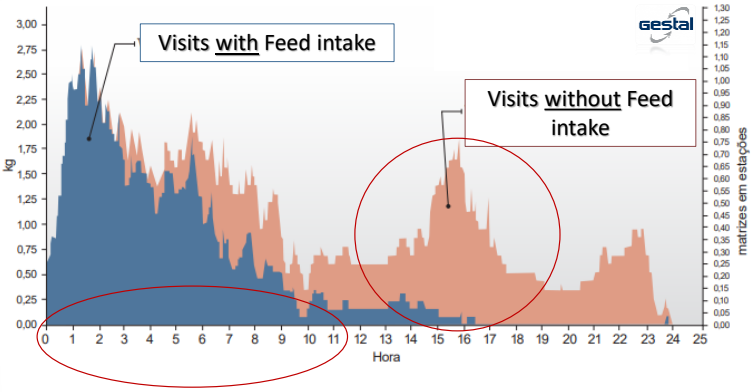
Its not the same!!!

Feeding Behaviour during Gestation and Lactation...

- **Does the number of meals make a difference?**
- **Stress x Intake: cortisol ??**
- **Formulation x Absorption Efficiency**

Bahnsen et al. (2021) - Saliva cortisol levels increased during gestation ($p < 0.01$), and lower concentrations were observed in sows belonging to free access stations (4.80 nmol / L), compared to hand fed (7.03 nmol / L).

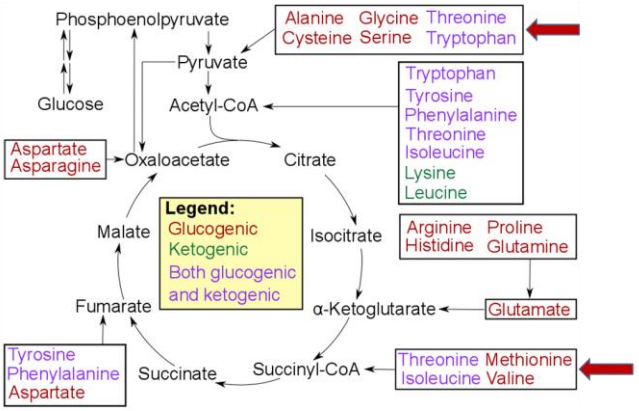
Kinetics of Feeding Behavior during Gestation with ESF Corn/Soybean based diets



Adapted from NEPSUI (2019/2020)

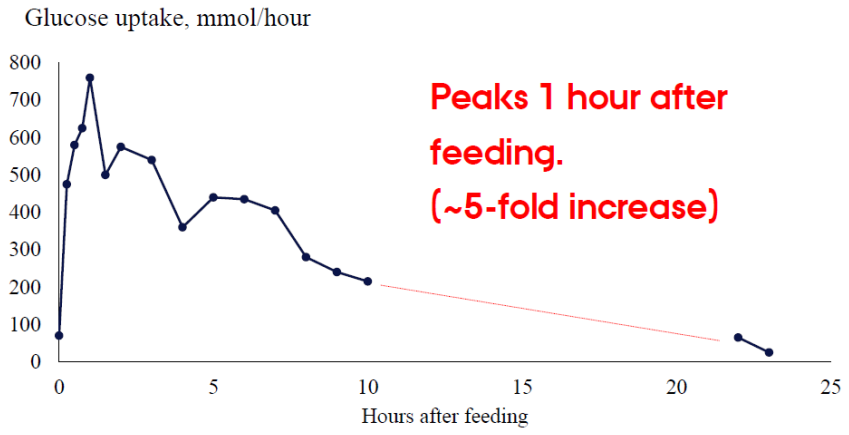
Nutrient Absorption Efficiency

Fasting time *vs.* Gluconeogenesis *vs.* AA Efficiency absorption



Prolonged fasting time activates hepatic Gluconeogenesis » ingestion of free AA are redirected for energy synthesis!!
Unbalance ratio AA!!

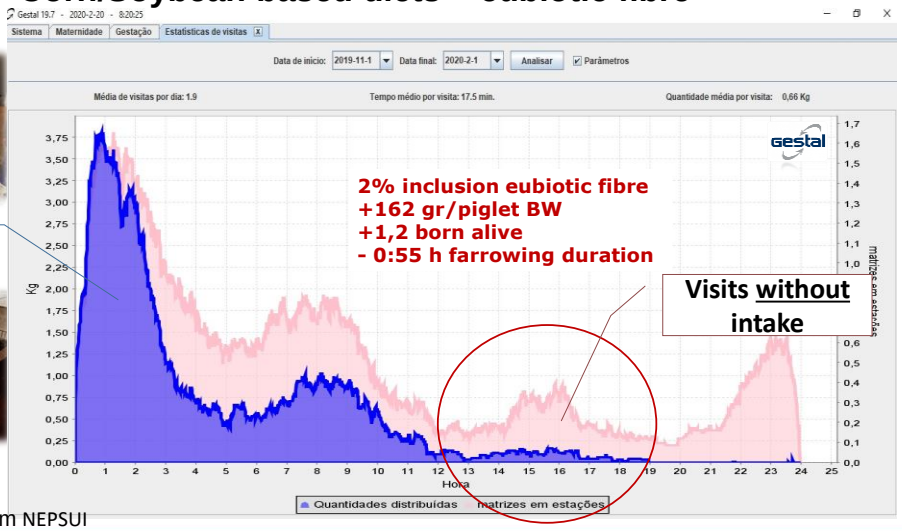
Dietary Formulation impacts on Feed Intake!!



Adapted from Serena et al. (2009)

Kinetics of Feeding Behavior during Gestation with ESF Corn/Soybean based diets + eubiotic fibre

Visits with intake

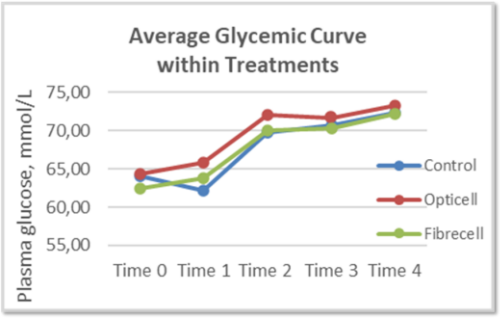


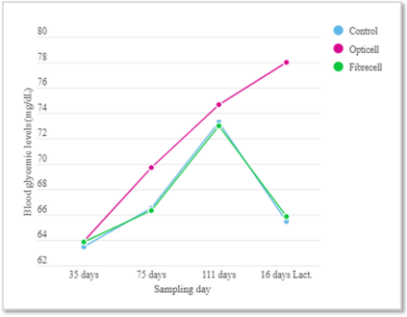
2% inclusion eubiotic fibre
+162 gr/piglet BW
+1,2 born alive
- 0:55 h farrowing duration

Visits without intake

Adapted from NEPSUI

Glucose Curve during Gestation
Corn/Soybean based diets + eubiotic fibre



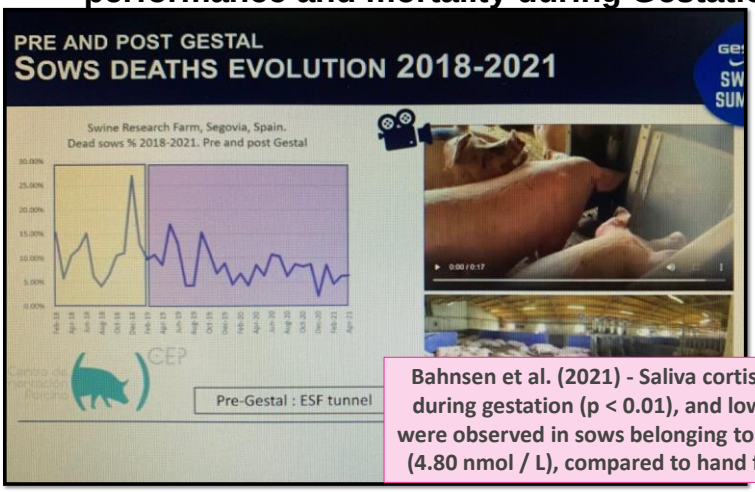


Adapted from M.G.B. Filho (non-published)

Feeding management/ pattern can impact on performance and mortality during Gestation!!

Adapted from C. Piñeiro (Gestal Summit 2021)

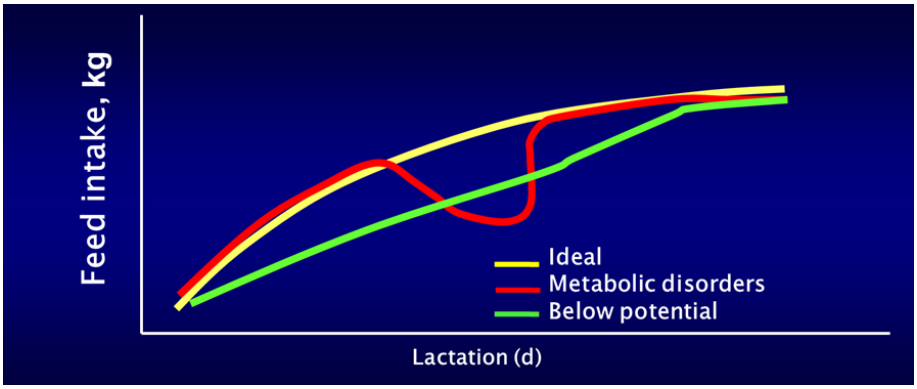
Feeding management/ pattern can impact on performance and mortality during Gestation!!



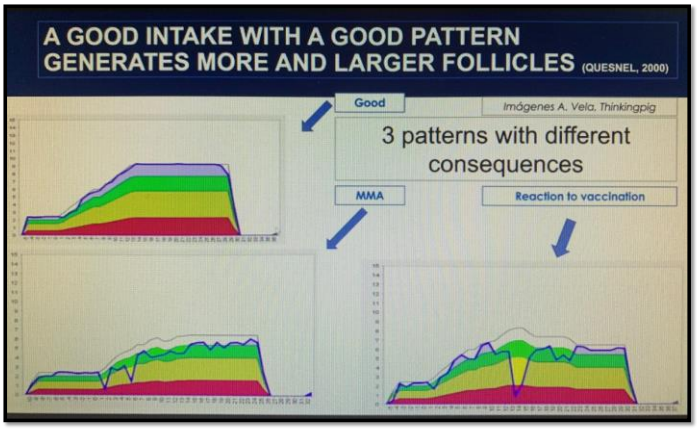
Bahnsen et al. (2021) - Saliva cortisol levels increased during gestation ($p < 0.01$), and lower concentrations were observed in sows belonging to free access stations (4.80 nmol / L), compared to hand fed (7.03 nmol / L).

Adapted from C. Piñeiro (Gestal Summit 2021)

Effect of Individual Sow on Voluntary Feed Intake during Lactation

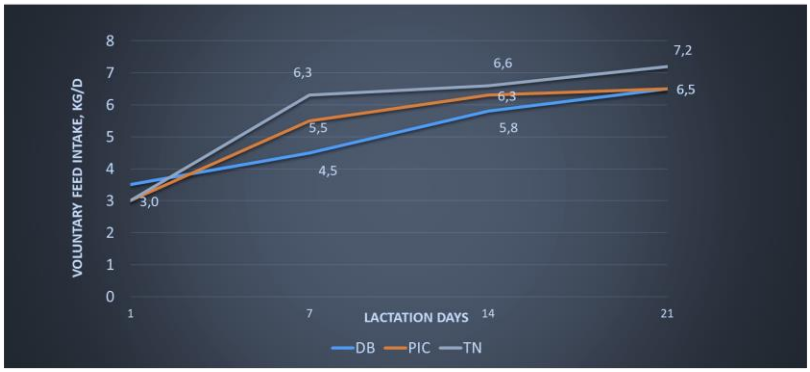


Lactating Sows have different Feeding Patterns



Adapted from C. Piñeiro (Gestal Summit 2021)

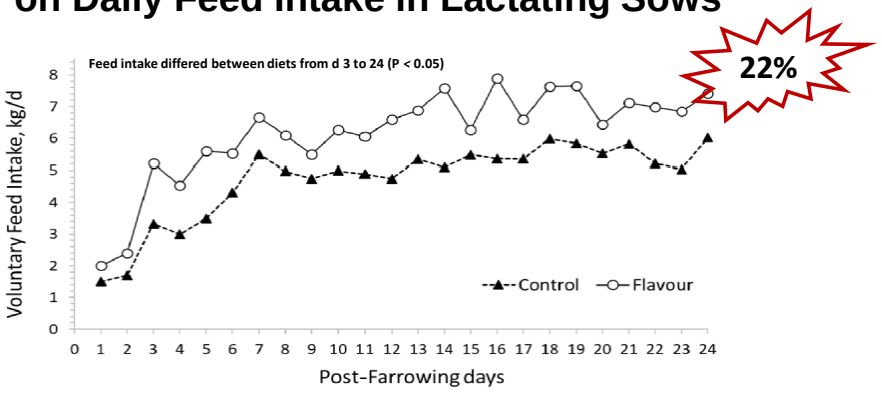
Effect of Genotype on Voluntary Feed Intake



Total 700 sows

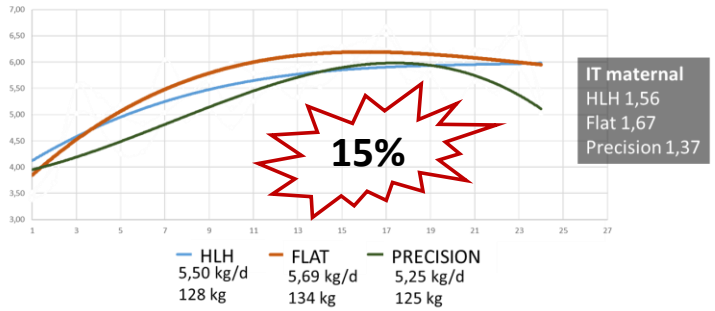
Adapted from Tolentino et al (2015); Taveira et al. (2016) and Silva et al. (2017) – UFMG/ICA

Effect of feed Flavor and Day of lactation on Daily Feed Intake in Lactating Sows



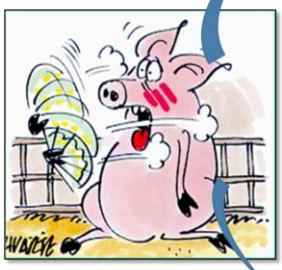
Adapted from Silva et al. (2021)

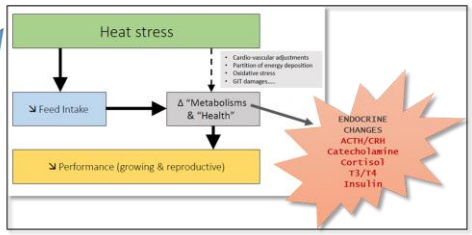
Effect of Feeding Program during Gestation on Lactation Voluntary Feed Intake

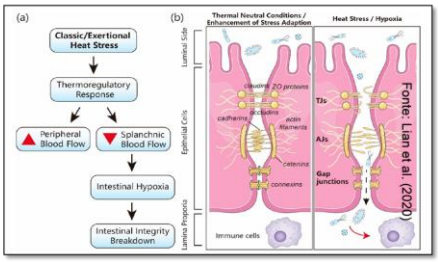


Adapted from R.L. Domingos (non-published)

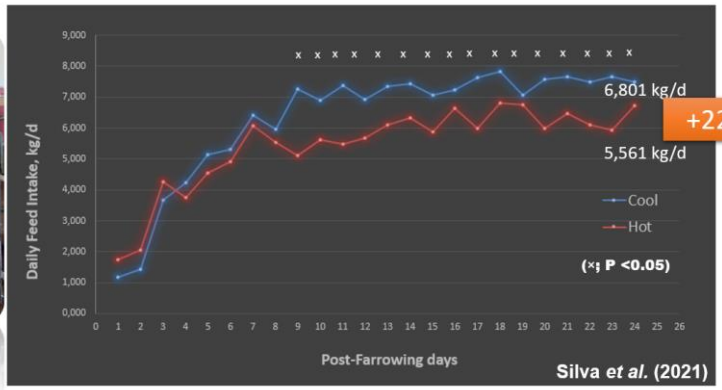
Heat stress impacts on feed intake, metabolism and intestinal health







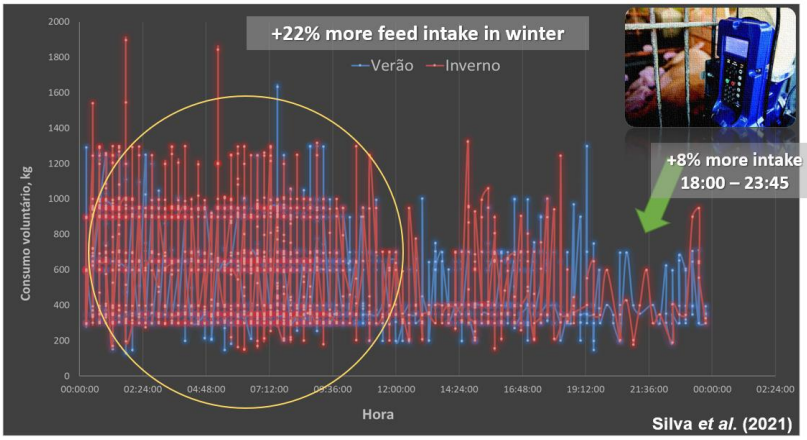
Feeding Behavior during Lactation according to Season



Kinetics of Feeding Behavior during Lactation according to Season

Summer
Av. Temp. 27,06°C
Av. RH 70%
ADFI 5,561 kg/d
75% Intake
00:00 – 10:00 h

Winter
Av. Temp. 23,05°C
Av. RH 56%
ADFI 6,801 kg/d
81% Intake
00:00 – 10:00 h

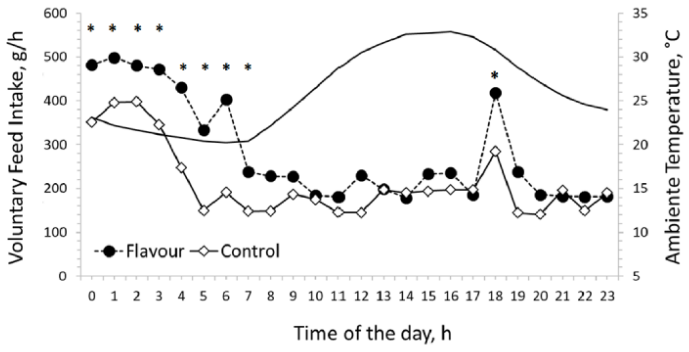


Kinetics of Feeding Behavior during Lactation with Flavour during Summer (7132 inputs)

Temp. Max. 35,16°C
Temp. Min. 19,05°C
RU Max. 94%
RU Min. 35%

Control
AVFI 4,78 kg/d
76% Intake
00:00 – 10:00 h

Flavour
AVFI 5,91 kg/d
87% Intake
00:00 – 10:00 h



Adapted from Silva et al. (2021)

Effects of dietary protein concentration on Feeding Behaviour of lactating sows in a tropical humid climate

Effects of exposure to high ambient temperature and dietary protein level on performance of multiparous lactating sows[1]

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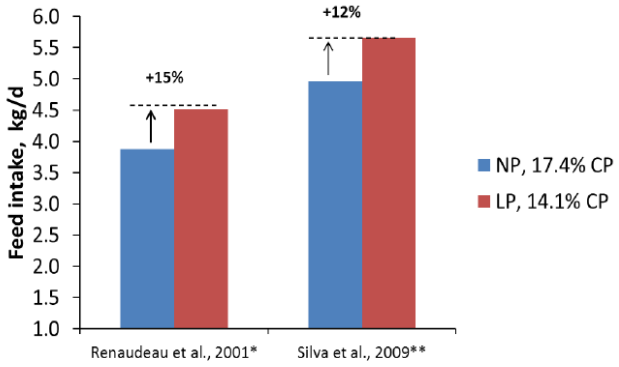
*Station de Recherches Porcines—Institut National de la Recherche Agronomique, 35590 Saint Gilles, France and †Institut Technique du Porc, 35650 Le Rheu, France

Effects of dietary protein level and amino acid supplementation on performance of mixed-parity lactating sows in a tropical humid climate[1]

B. A. N. Silva,*† J. Noblet,‡ J. L. Donzele,§ R. F. M. Oliveira,† Y. Primot,‖ J. L. Gourdine,* and D. Renaudeau*#

*INRA, Unité de Recherches Zootechniques INRA UR143, 97170 Petit Bourg, Guadeloupe, French West Indies; †Animal Science Department/Departamento de Zootecnia, Universidade Federal de Viçosa (UFV), 36571-000 Viçosa, MG, Brazil; ‡INRA, UMR Systèmes d'Elevage, Nutrition Animale et Humaine INRA UMR 1079, 35590 St-Gilles, France; and §Ajinomoto Eurolysine SAS 153, rue de Courcelles, 75817 Paris Cedex 17, France



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Livestock Science 120 (2009) 25–34
LIVESTOCK SCIENCE
www.elsevier.com/locate/livsci

Effect of floor cooling and dietary amino acids content on performance and behaviour of lactating primiparous sows during summer

B.A.N. Silva [a,*], R.F.M. Oliveira [a], J.L. Donzele [a], H.C. Fernandes [b], A.L. Lima [a], D. Renaudeau [c], J. Noblet [d]

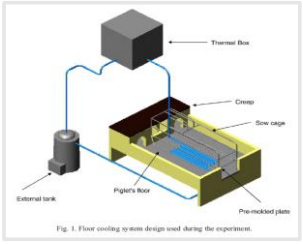

Fig. 1. Floor cooling system design used during the experiment.

16%

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Livestock Science 105 (2006) 176–184
LIVESTOCK SCIENCE
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Effect of floor cooling on performance of lactating sows during summer ☆

B.A.N. Silva [a,*], R.F.M. Oliveira [a], J.L. Donzele [a], H.C. Fernandes [b], M.L.T. Abreu [a], J. Noblet [c], C.G.V. Nunes [a]

Concluding Remarks

- ✓ Sows have “changed” production and body.
- ✓ Feeding Behavior *vs.* Feeding Management.
- ✓ Sows are “hungry” during gestation - impact on behavior.
- ✓ Feeding behavior is more nocturnal indepent of season during lactation.
- ✓ Feed additives and feed formulation have an important impact on voluntary feed intake.

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Merci!!

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