

# Welfare issues related to nutrition, milking frequency and heat stress in dairy goats

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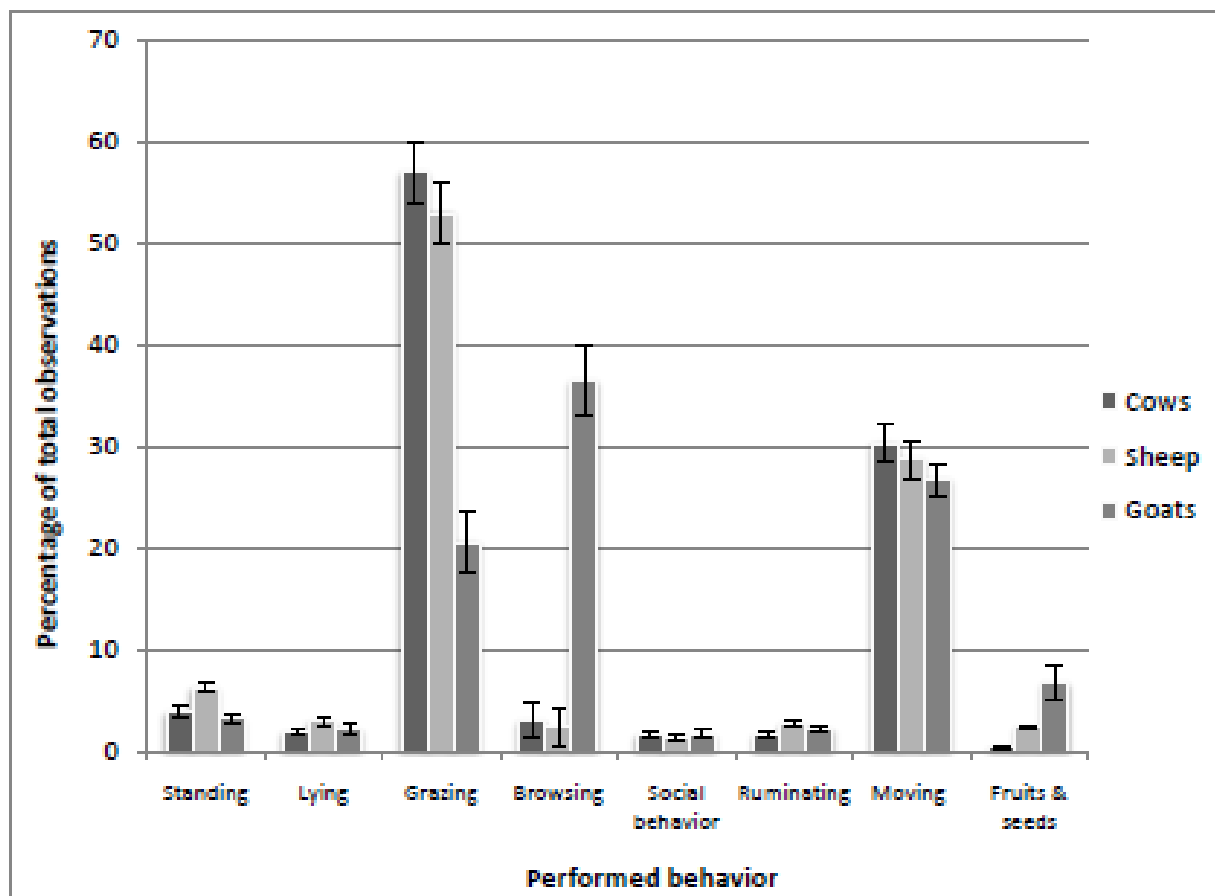
CONSEJO SUPERIOR  
DE INVESTIGACIONES  
CIENTÍFICAS

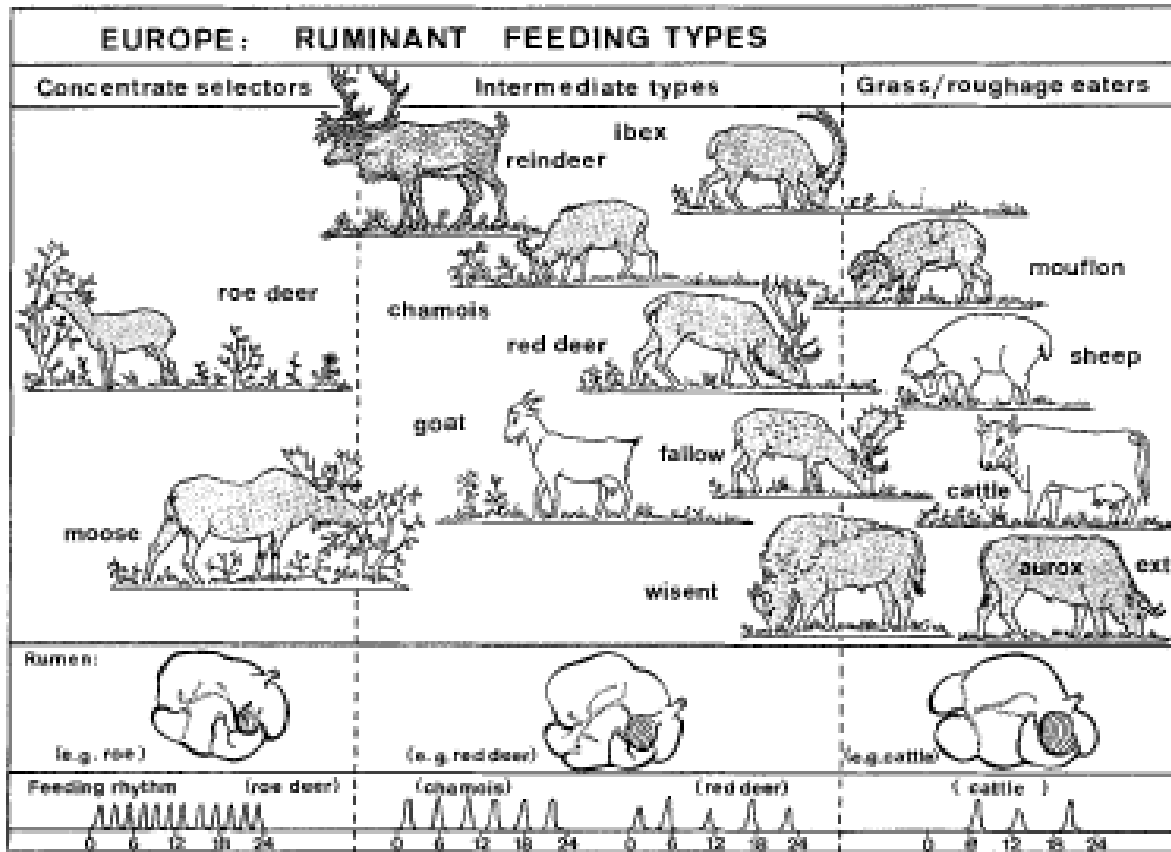


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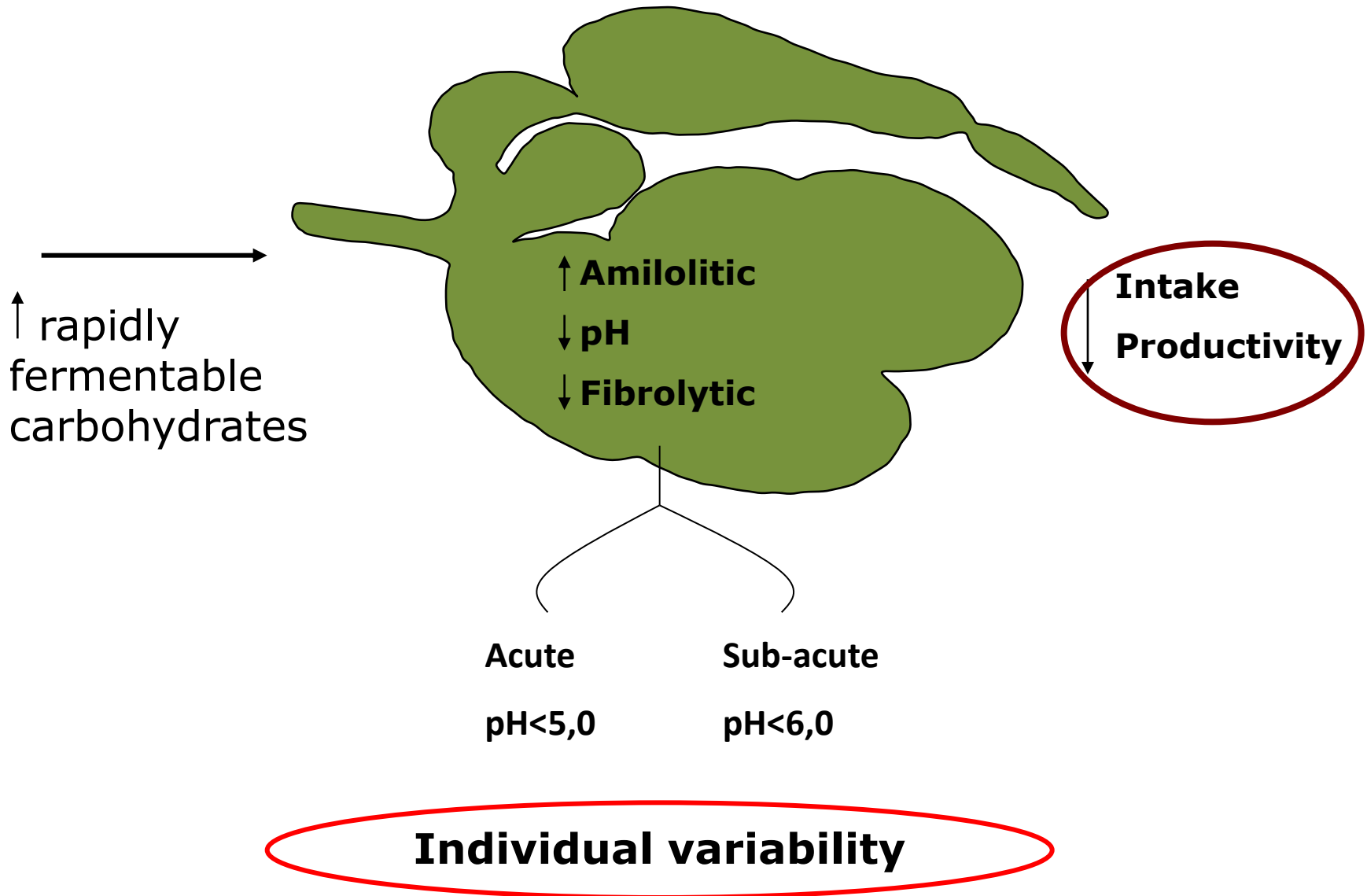






- Rumen size
- Salivary gland
- Passage rate
- Different sensitivity to acidosis ?

# Acidosis



# Intensive confined dairy goats systems

Indicators	Confined systems	
	7 <sup>a</sup> (Sánchez et al., 2006)	8 <sup>a</sup> (Mena et al., 2005)
Breed	Murciano-Granadina	Malagueña
Goats presents	179	382
Grazing surface per goat (ha)	NA	0.31
Labour per 100 goats (YWU <sup>b</sup> )	0.74	0.69
Concentrate per goat (kg)	343	392
Forage supply per goat (kg)	288	199
Milk produced per goat, per year	487	440

*Castel et al., 2010 Small Ruminant Res.*

10 dairy  
goats farms  
survey in  
South Spain

## LACTATION

- 2.5 kg concentrate
- 1 kg hay

## DRY

- 0.3 kg concentrate
- Straw ad libitum

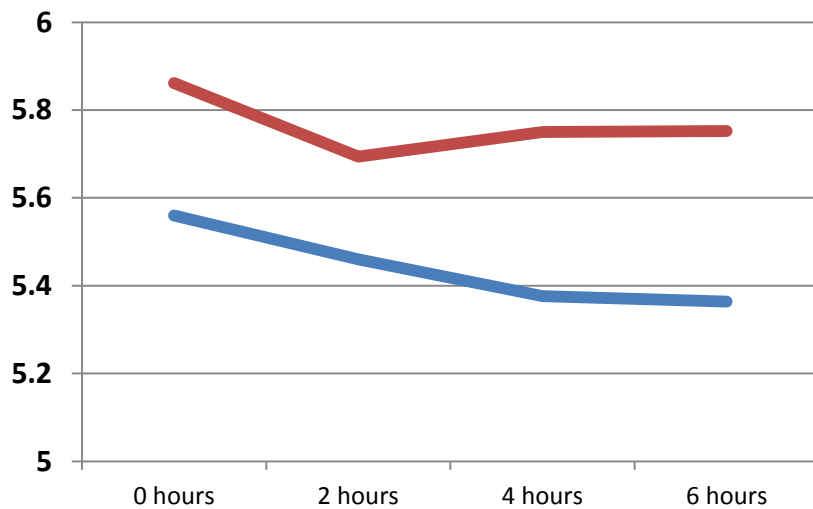
## PREGNANCY

- 1.5 kg concentrate
- Straw ad libitum

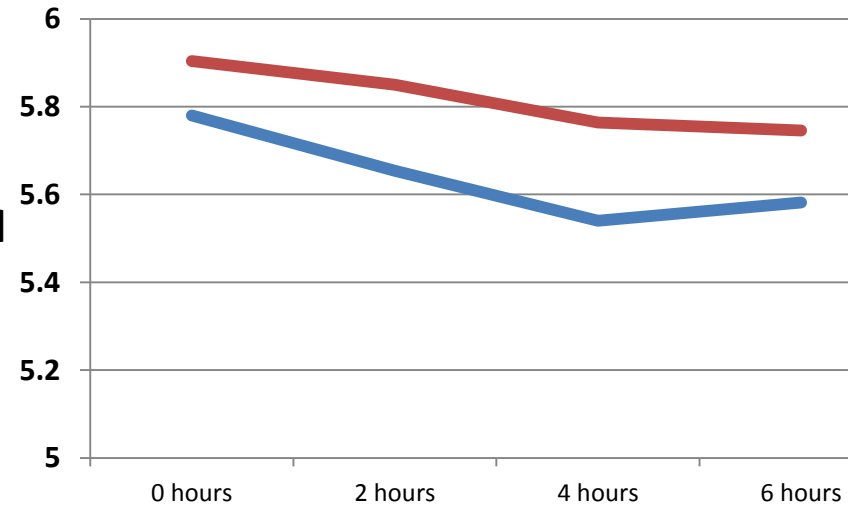
# Yeast probiotics in high concentrate feeding systems

n = 20

## Rumen pH



**14 days**

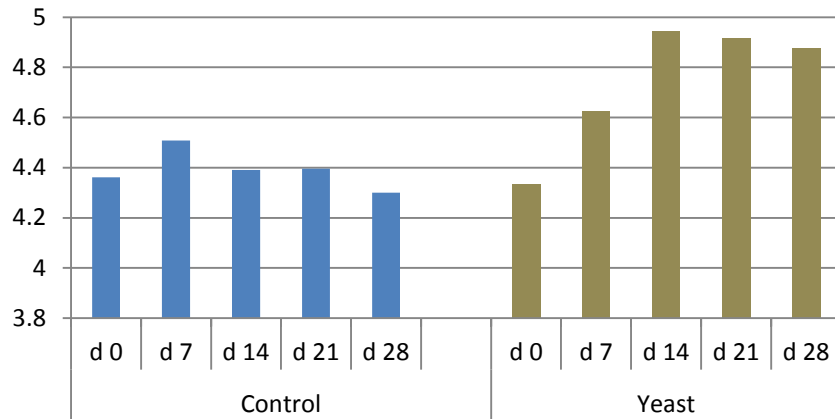


**28 days**

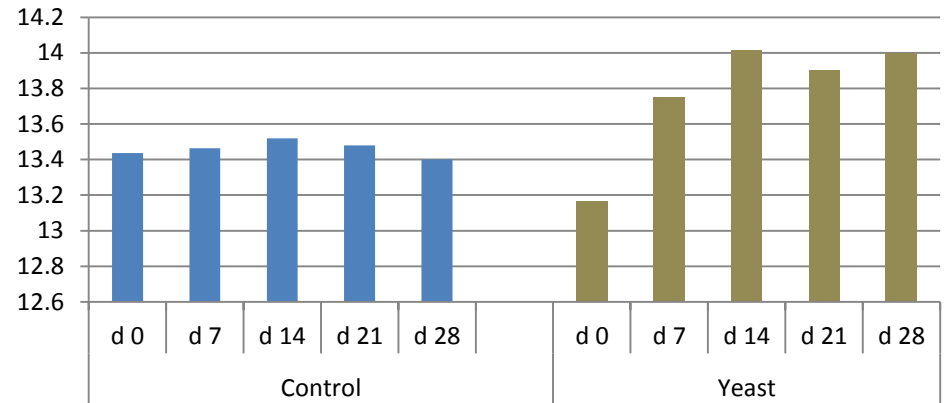


# Yeast probiotics in high concentrate feeding systems

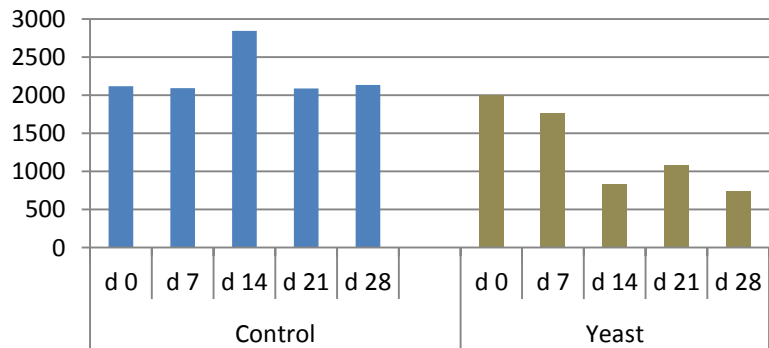
**Milk Fat, %**  $P = 0.014$



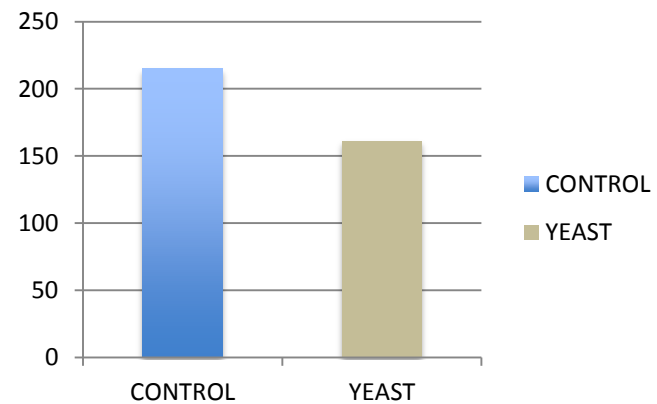
**Milk dry extract, %**  $P = 0.056$



**Somatic cells counts**  $P = 0.044$



**Plasma Ig G mg/ml**  $P = 0.083$







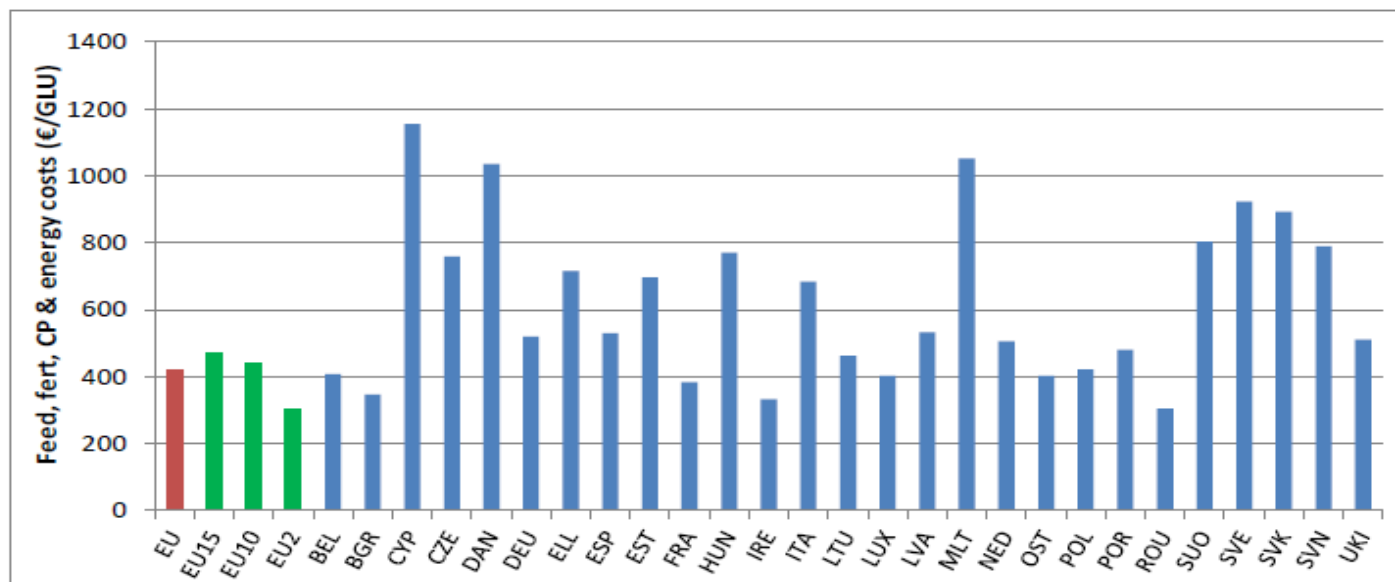
# Organic and Low Input Systems

What is **LOW INPUT**?



- Feed
- Fertilizer
- Crop protection
- Energy

**Figure 5 Low input cut-off values for dairy cow holdings at EU, EU region and member states (weighted FADN data, 2007 & 2008)**



# Rapid Assessment Tool (RAT) for sustainability

Spur	Score
Biodiversity	0 to 5
Landscape and heritage features	0 to 5
Soil management	0 to 5
Water management	0 to 5
Fertiliser management	0 to 5
Energy and carbon	0 to 5
Food security	0 to 5
Agricultural systems diversity	0 to 5
Social capital	0 to 5
Farm business resilience	0 to 5
<b>Animal health and welfare</b>	0 to 5

*Excel file*

Questions	Scoring methodology	
<b>Animal Health</b>		
Do you have a <b>health plan</b> ?	Regularly reviewed	5
	Drawn up	3
	No	1
Was your <b>vet</b> involved in drawing it up?	Yes, worked closely with them	5
	Yes, they drew it up with no input from farm staff	3
	No/don't have one	1
What is the average number of <b>lactations</b> in your dairy herd (sheep & goats)?	N/A	N/A
	below 3	1
	3 to 4	3
	5 or more	5
How would you describe <b>mastitis</b> incidence in your herd (n/a of you do not have a dairy herd)	N/A	N/A
	<10 clinical cases per 100 cows per year	5
	10-25 clinical cases per 100 cows per year	4
	25-35 clinical cases per 100 cows per year	3
	35-50 clinical cases per 100 cows per year	2
	>50 clinical cases per 100 cows per year	1
How would you describe <b>lameness</b> incidence in your animals?	N/A	N/A
	<10 cases per 100 animals	5
	10-20 cases per 100 animals	4
	20-30 cases per 100 animals	3
	30-40 cases per 100 animals	2
	>40 cases per 100 animals	1

## Ability to perform natural behaviours

In the grazing seasons, how much access do the animals have to pasture?

out day and night	5
outside only during the day	3
not out	1

When not on pasture, do they have access to outdoor run?

Yes	5
No	1

How many months do the animals have access to pasture?

no access to pasture	1
1-3 months	3
3-6 months	4
6 months or more	5

How do you judge your animals' ability to perform natural behaviours - feeding, resting, social/comfort

fully able to	5
somewhat restricted	3
unable to do so	1

## Feeding

How much space is available to the animals when eating?

Sufficient room for all animals to eat at once (for goats at least 40cm width per animal)	5
Insufficient room for all animals to eat at once (for goats less than 40cm width per animal)	1

What is the feeding strategy?

Ad lib feed (feed freely available when the animals want it)	5
Access to feed limited for less than 3 hours per day	3
Access to feed limited for more than three hours a day	1

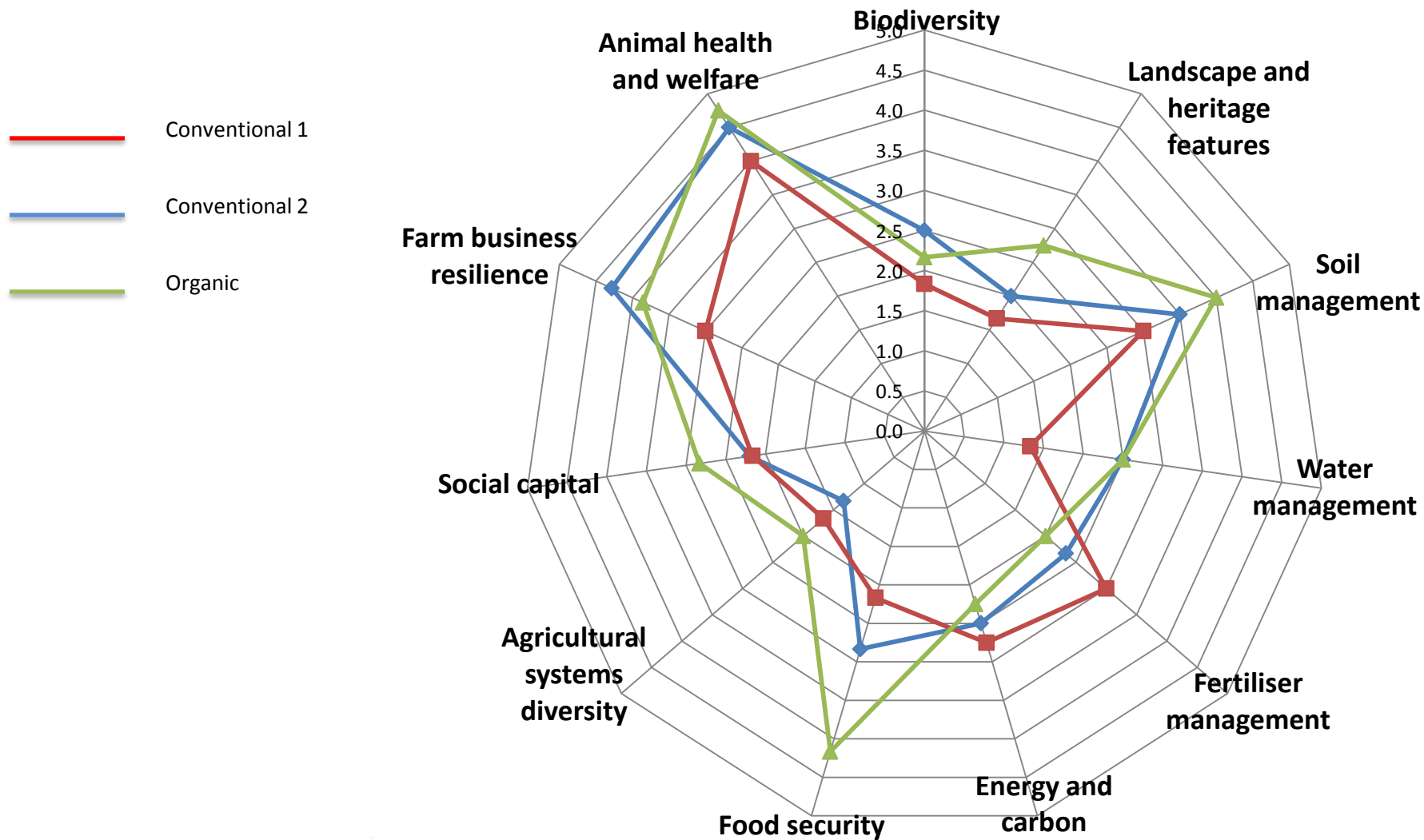
How much of the feed is roughage? (add to notes column whether this is on a fresh weight or dry weight basis)

>90%	5
80-89%	4
61-79%	3
40-60%	2
<40%	1

When is water available?

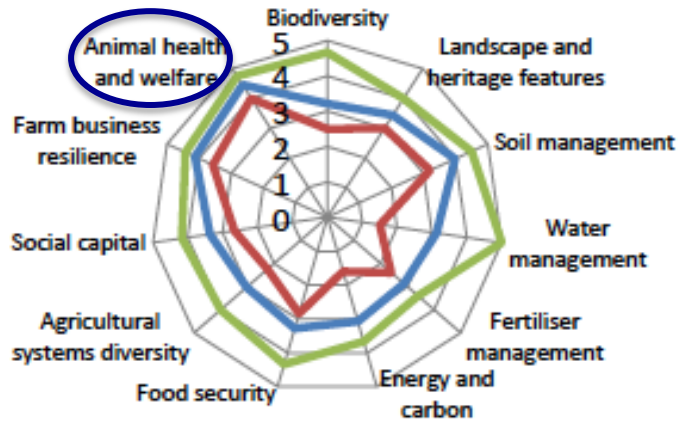
always available	5
available 20 hours out of 24	3

# Dairy goats farms in south Spain

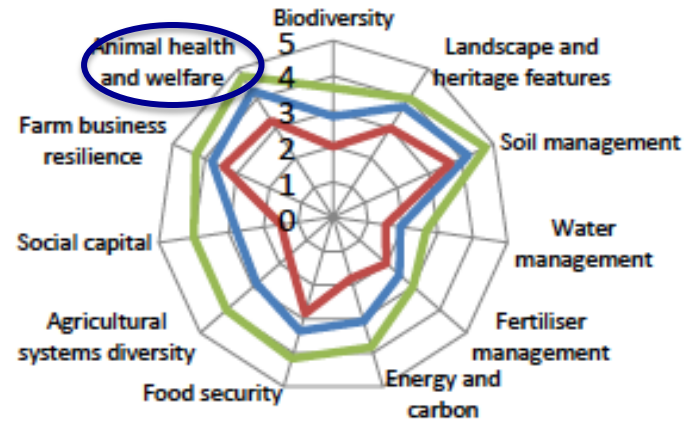


# Dairy cows: comparison among countries

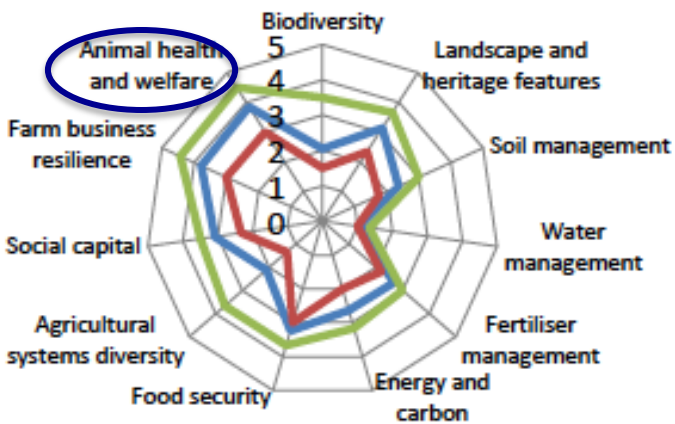
## England



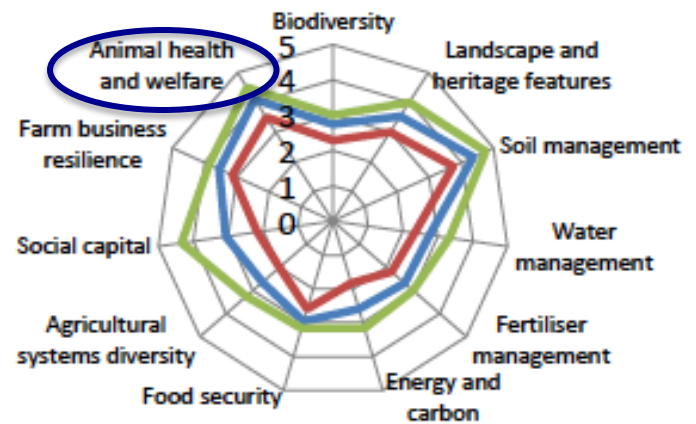
## Wales



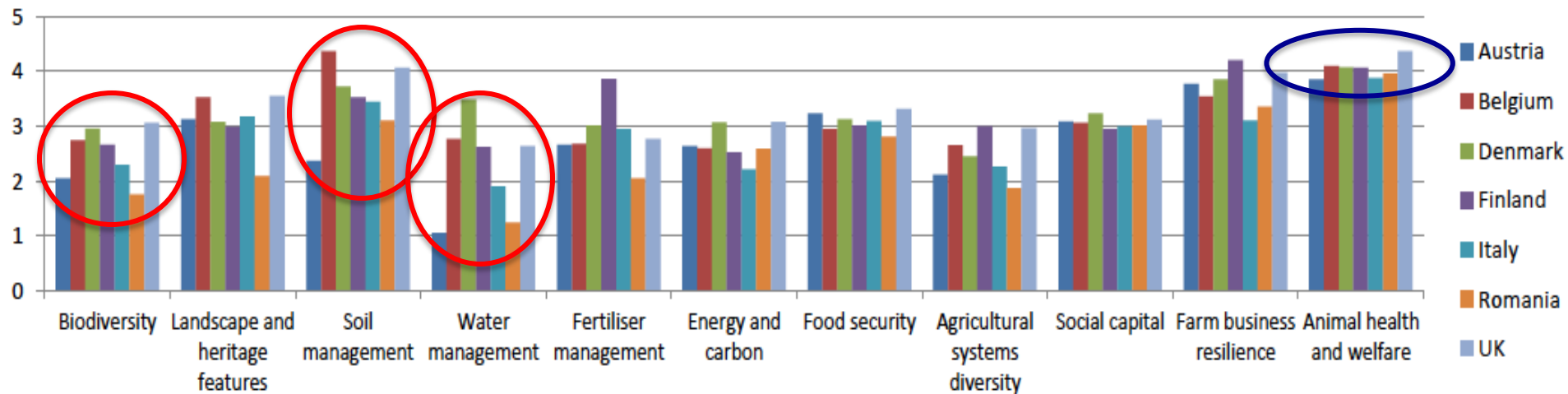
## Austria



## Belgium

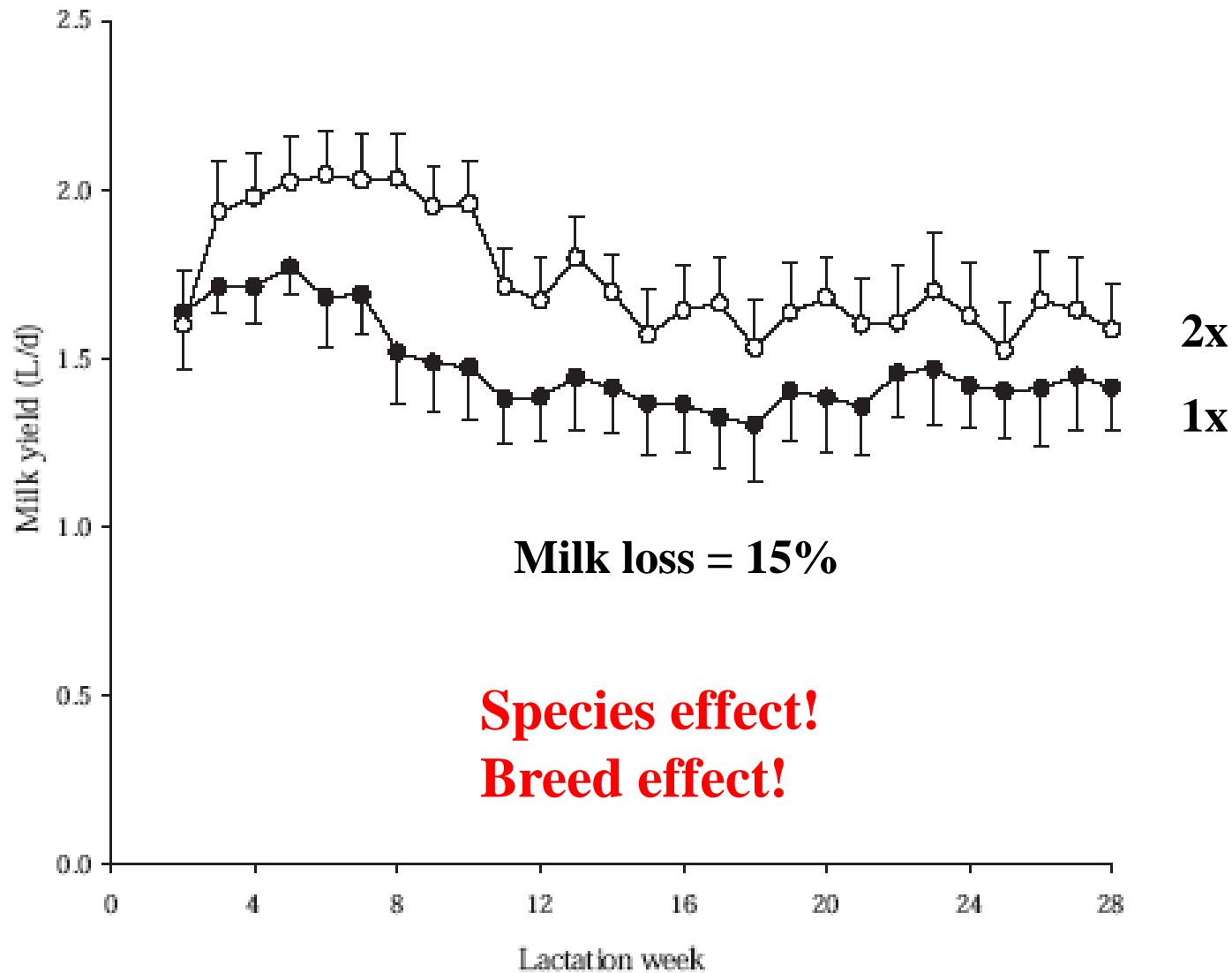


## Dairy cow farms - mean spur scores for each country





# Effect of once- (1X) vs. twice-daily (2X) milking throughout lactation in Murciano-Granadina dairy goats (Salama et al., 2003)



**Time–budget under once- (1X) or twice-daily (2X) milking and receiving a diet ad libitum or adjusted to their milk production and BW  
(Komara et al., 2010)**

Variables (h)	Milking frequency (MF)		Feeding level (FL)		Effects		
	2X	1X	<i>Ad lib.</i>	Adjusted	MF	FL	MF×FL
Time spent eating	4.26	3.23	4.48	3.00	**	***	†
Time spent drinking	0.32	0.3	0.38	0.25	NS	NS	NS
Time spent standing	8.4	7.5	8.1	7.8	NS	NS	NS
Time spent lying	14.3	15.1	14.5	14.85	NS	NS	NS
Time spent climbing	0.40	0.44	0.35	0.5	NS	NS	NS

**NO effect of milking frequency or feeding level on plasma cortisol concentrations**

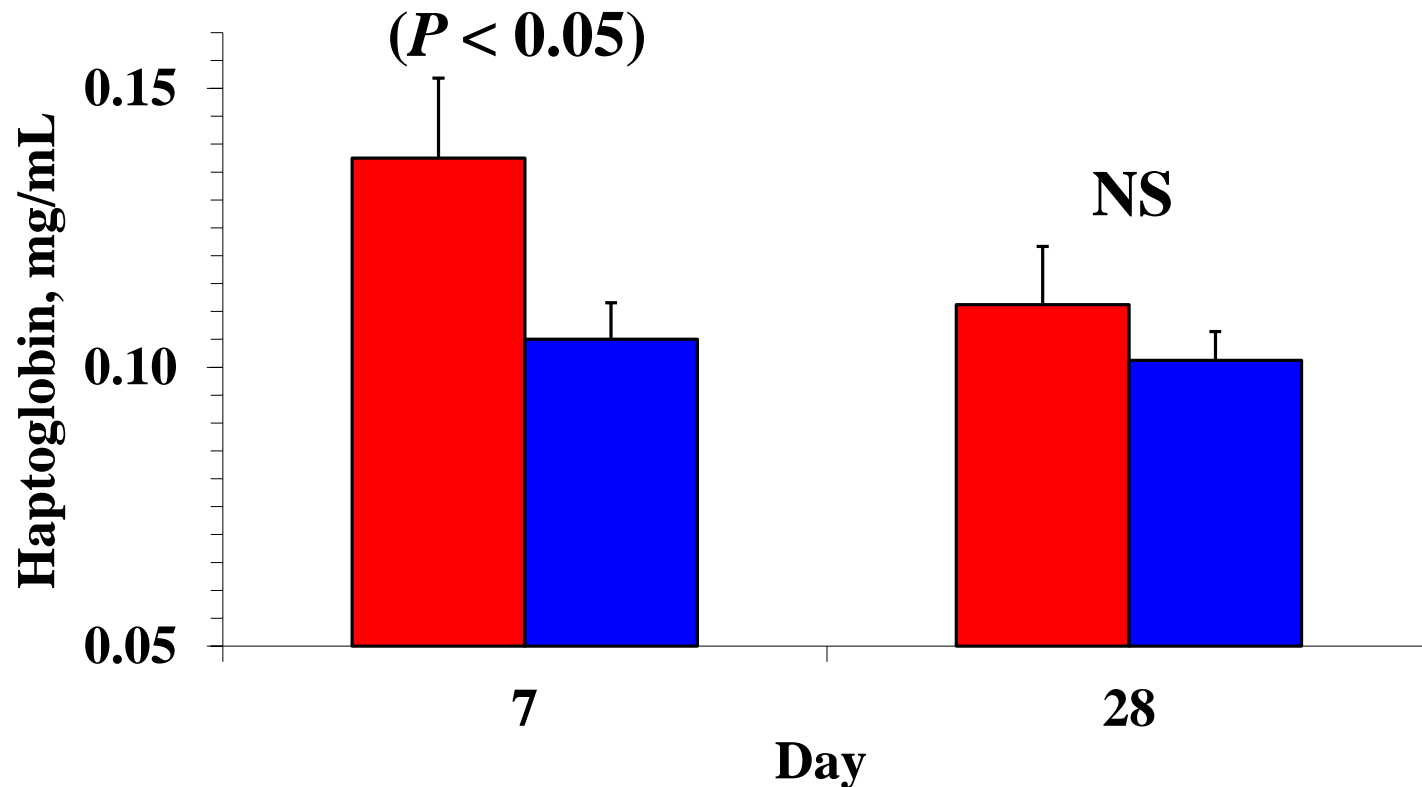
**Heat Stress -Cow vs. Goats**  
**-Extreme weather events**

**Feed intake and milk production of dairy goats at mid-lactation under thermal-neutral (TN) or heat stress (HS) conditions**

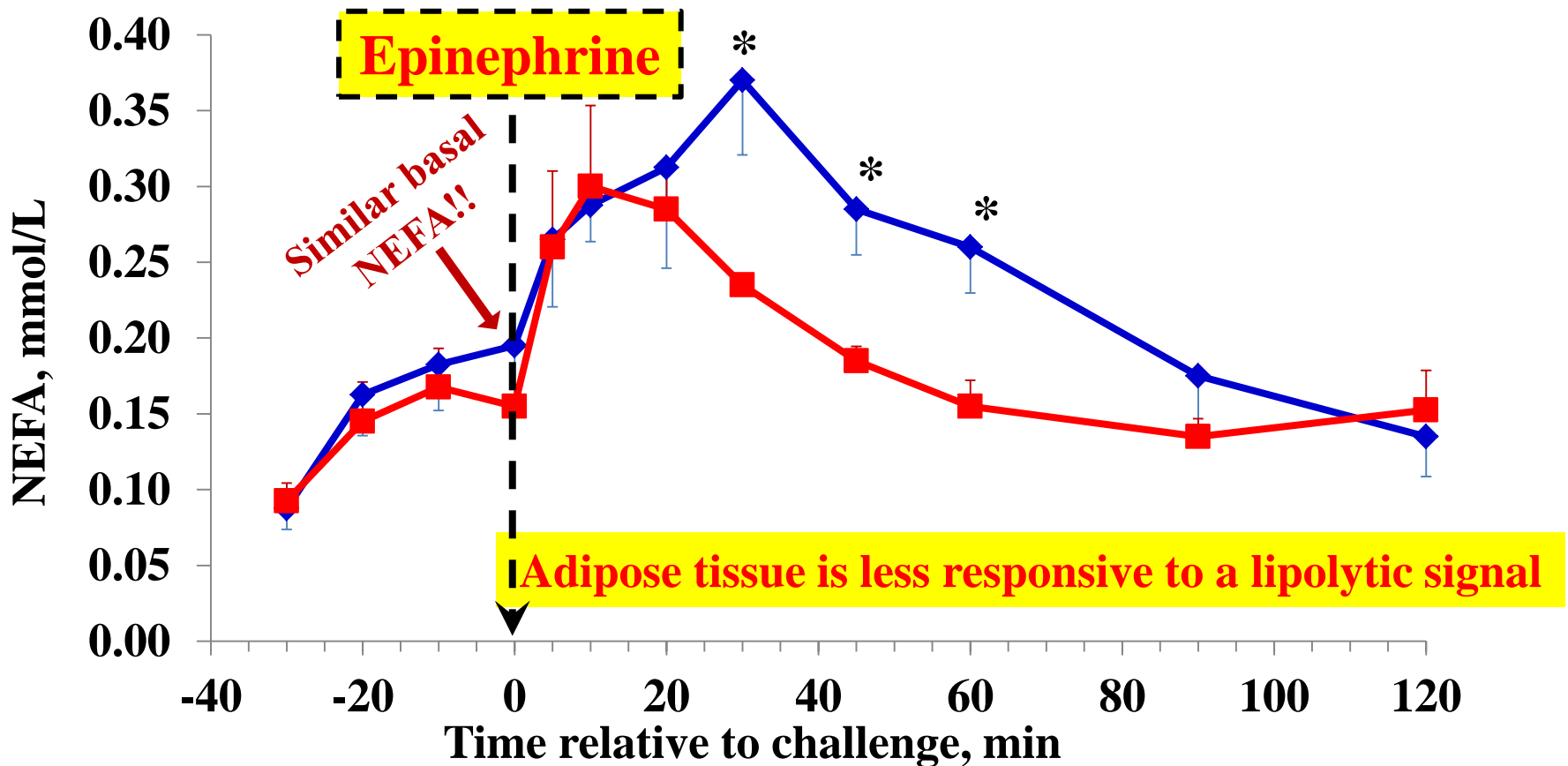
(Salama et al., 2014)

Item	Treatment		SED	Effect ( <i>P</i> <)
	TN	HS		Treatment
DMI, kg/d	2.47	-29% 1.75	0.03	0.001
Milk, L/d	1.68	-9% 1.53	0.02	0.001
Fat, %	4.26	-12% 3.76	0.10	0.001
Protein, %	3.74	-13% 3.26	0.09	0.001

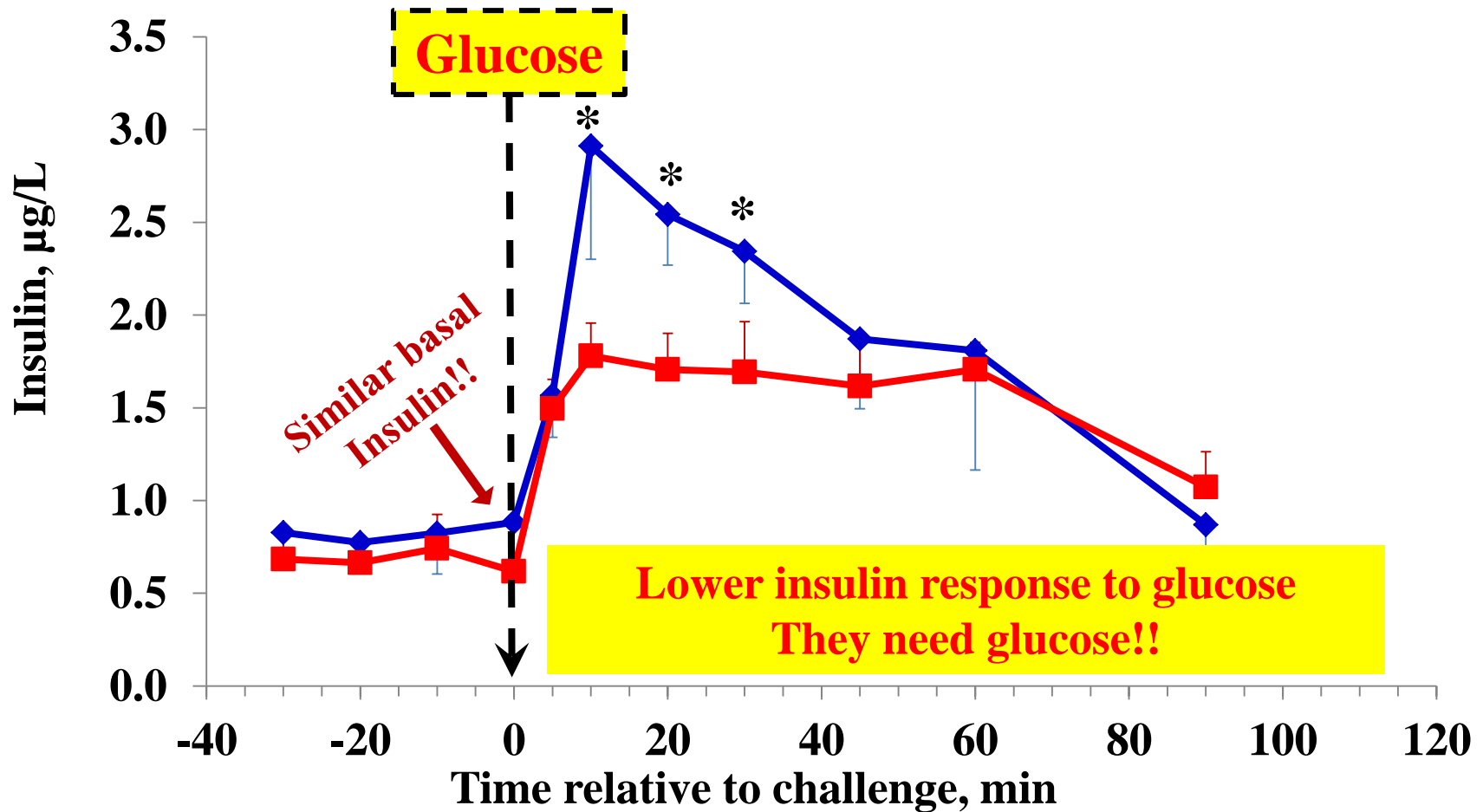
**Haptoglobin concentrations in plasma of dairy goats under thermal-neutral (■, n = 8) or heat stress (■, n = 8) conditions (Hamzaoui et al., 2013)**



**NEFA response to epinephrine challenge of dairy goats under Thermal-neutral (◆, n = 8) or heat stress (■, n = 8) conditions (Hamzaoui et al., 2012; Salama et al., 2014)**



# Insulin response to glucose tolerance test of dairy goats under Thermal-neutral ( $\blacklozenge$ , $n = 8$ ) or heat stress ( $\blacksquare$ , $n = 8$ ) conditions (Hamzaoui et al., 2012; Salama et al., 2014)



# Conclusions

1. Acidosis related alterations in dairy goats under confined systems

1. Milking 1 x day vs. 2 x day

- Early Lactation
- Compensate reduced revenue

1. Heat stress in dairy goats

- Blood glucose and pH
- Digestibility
- Early lactation
- Cheese-making
- Immunity and pregnancy



# Thank you

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