Feeding challenges of modern farm

Catalin Necula

17.12.2020

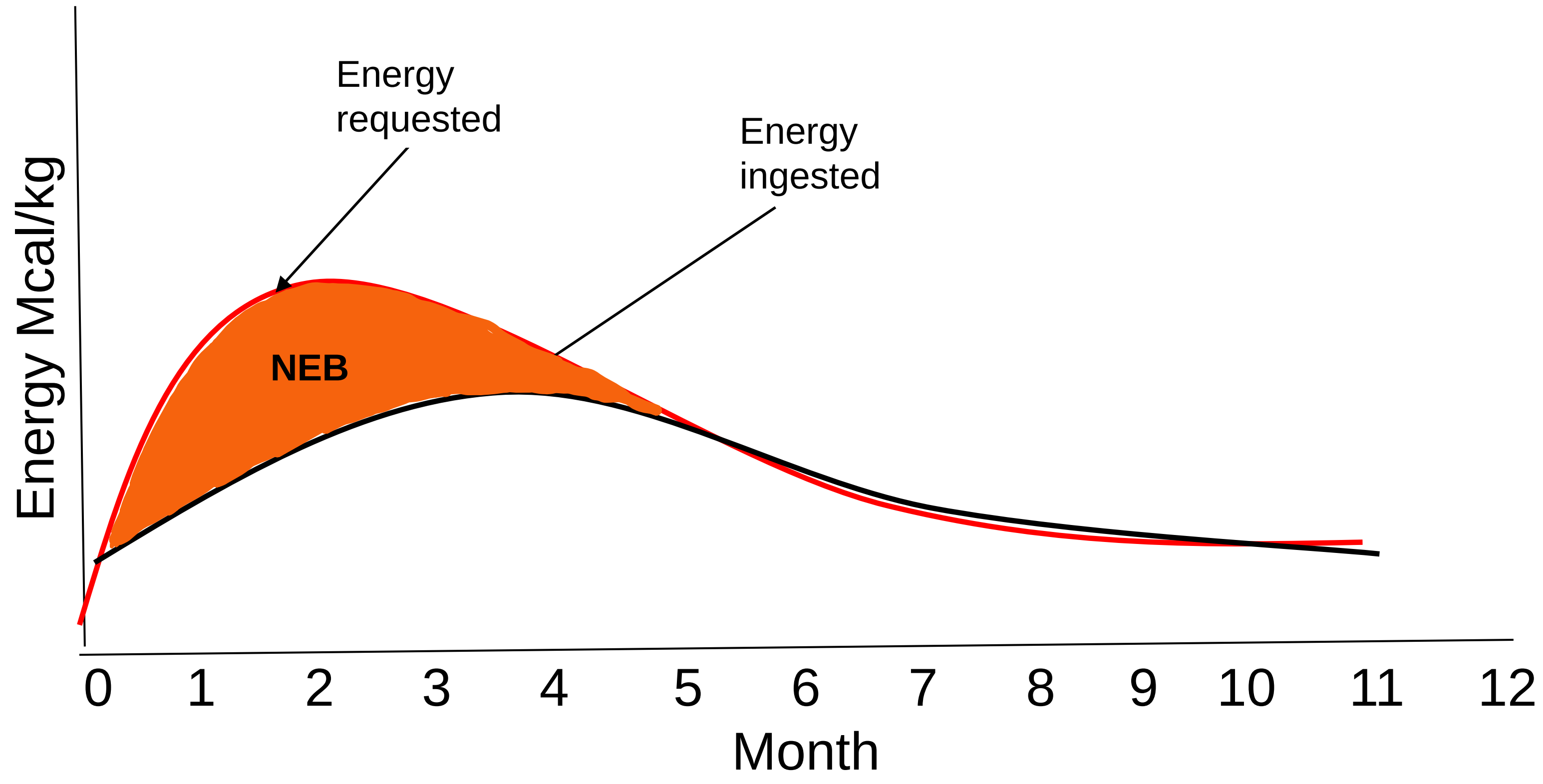
Challenges

- High yields are **negatively** corelated with milk components, metabolic diseases, fertility etc.
- **Limited** DMI
- **Low** feed efficiency /ECM/kg dm

Metabolic diseases incidence

Patology	Incidence	Target	Cost	Milk lost
Milk fever	> 4	< 2	280 €	540 kg
Subclinical hypocalcemia	>50 multi >25 primi	<15	190 €	215 kg
Ketosis clinical	>10	<2	236 €	470 kg
Ketosis subclinical	>35	<10	130 €	240 kg
Retained Placenta	> 18-25	<5	280 €	415 kg
Metritis/Endometritis	> 30	<10-15	350 €	380 kg
Mastitis at 30 DIM	> 20	<10	380 €	700 kg
LDA	> 5	<2	600 €	700 kg

DMI is limited in early lactation



Feed Efficiency

FE = ECM/DMI

~~FE = Milk yield/DMI~~

ECM [4% fat; 3% protein]
= (milk yield * (0.383 * % fat + 0.242 * % protein + 0.7832) / 3.1138)

lactation	DIM	FE	
fresh	<21	1,2	1,5
1st	<90	1,4	1,5
1st	>200	1,1	1,3
2nd+	<90	1,5	1,6
2nd+	>200	1,2	1,4
One herd	150 to 200	1,3	1,5
Problem herds	150 to 200	<1,2	

ECM [3,5% fat; 3,2% protein]
=(0,327*milk yield kg)+(12,95*(milk yield kg*fat%)) +(7,65*(milk yield kg*protein%))

lactation	DIM	FE	
fresh	<21	1,3	1,6
1st	<90	1,5	1,7
1st	>200	1,2	1,4
2nd+	<90	1,6	1,8
2nd+	>200	1,3	1,5
One herd	150 to 200	1,3	1,6
Problem herds	150 to 200	<1,3	

Forage digestibility unexplored solution

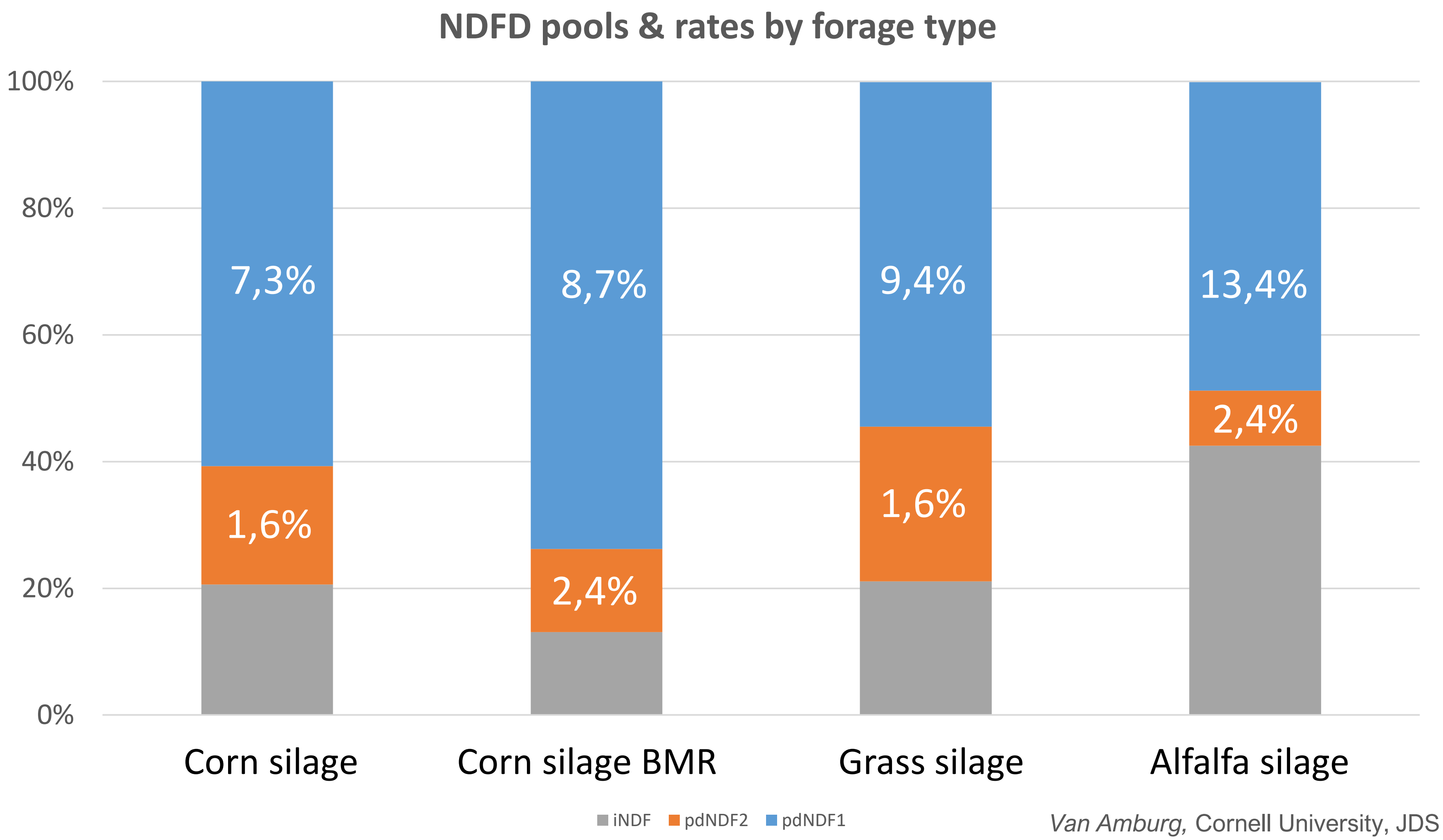
- **Minimize** health disorders related to high concentrates
- **Improve** energy & protein balance
- **Reduce** feed cost

Main characteristic of forages

HIGH FIBER CONTENT

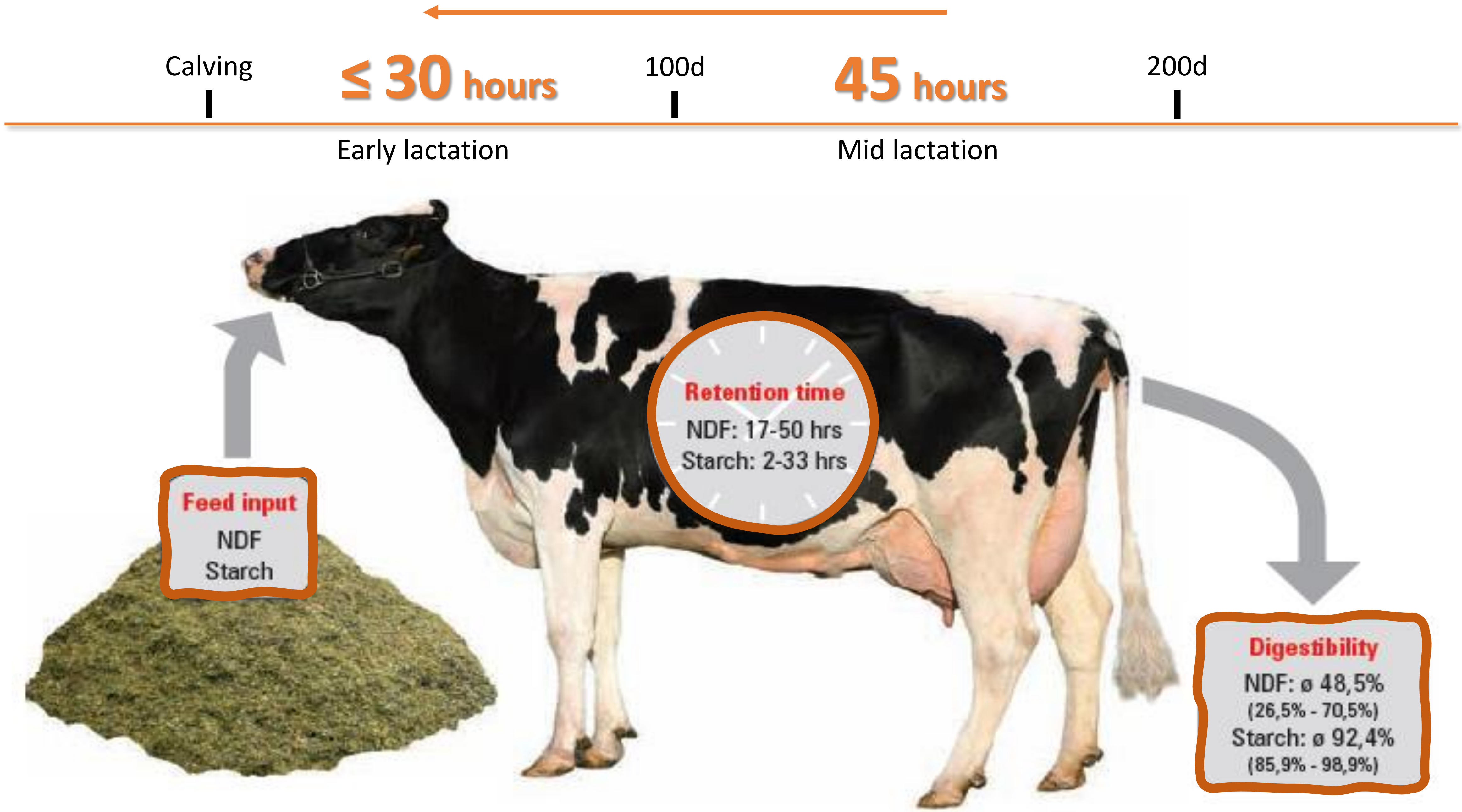
ADL = lignin	2 - 6%DM
ADF = lignin + cellulose	20 - 35%DM
NDF = lignin + cellulose + hemicellulose	35 - 60%DM

Not all the forages are the same



Van Amburg, Cornell University, JDS 2019

PennState
College of Agricultural Sciences


Calving
≤ 30 hours
100d
45 hours
200d
Early lactation
Mid lactation
Feed input
NDF
Starch
Retention time
NDF: 17-50 hrs
Starch: 2-33 hrs
Digestibility
NDF: ø 48,5%
(26,5% - 70,5%)
Starch: ø 92,4%
(85,9% - 98,9%)

In conclusion

Potential forage NDF digestibility in first 100 DIM

≈ 60%

What this means?

≥

each 1% NDFD ≥ 0,25kg ECM4%

How to assess?

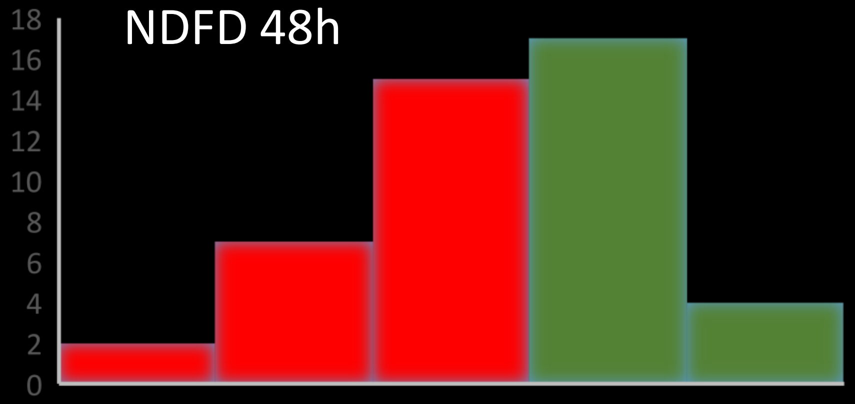
- **NDF digestibility**

FIBER	%NDFom	NDFom %DM	% NDF	% DM
ADF			66.1	28.1
aNDF		41.2		42.5
NDR (NDF w/o sulfite)				
peNDF				
Crude Fiber				
Lignin			10.4	4.41
NDF Digestibility (12 hr)				
NDF Digestibility (24 hr)				
NDF Digestibility (30 hr)	57.5	23.7	55.7	23.7
NDF Digestibility (48 hr)				
NDF Digestibility (120 hr)	66.5	27.4	64.4	27.3
NDF Digestibility (240 hr)	74.0	30.5	71.6	30.4
uNDF (30 hr)	42.5	17.5	44.3	18.8
uNDF (120 hr)	33.5	13.8	35.6	15.1
uNDF (240 hr)	26.0	10.7	28.4	12.0

Estonian grasses survey

>50%

below optimum



Increase the NDF digestibility

- Produce high NDF digestible forages
- Stabilization of rumen environment and microflora health status
- Strengthening proliferation and activity of cellulolytic bacteria
- Facilitate broke down faster the carbohydrates

High forages NDFD

- **harvest timing**
- **cutting height**
- **ensiling time**

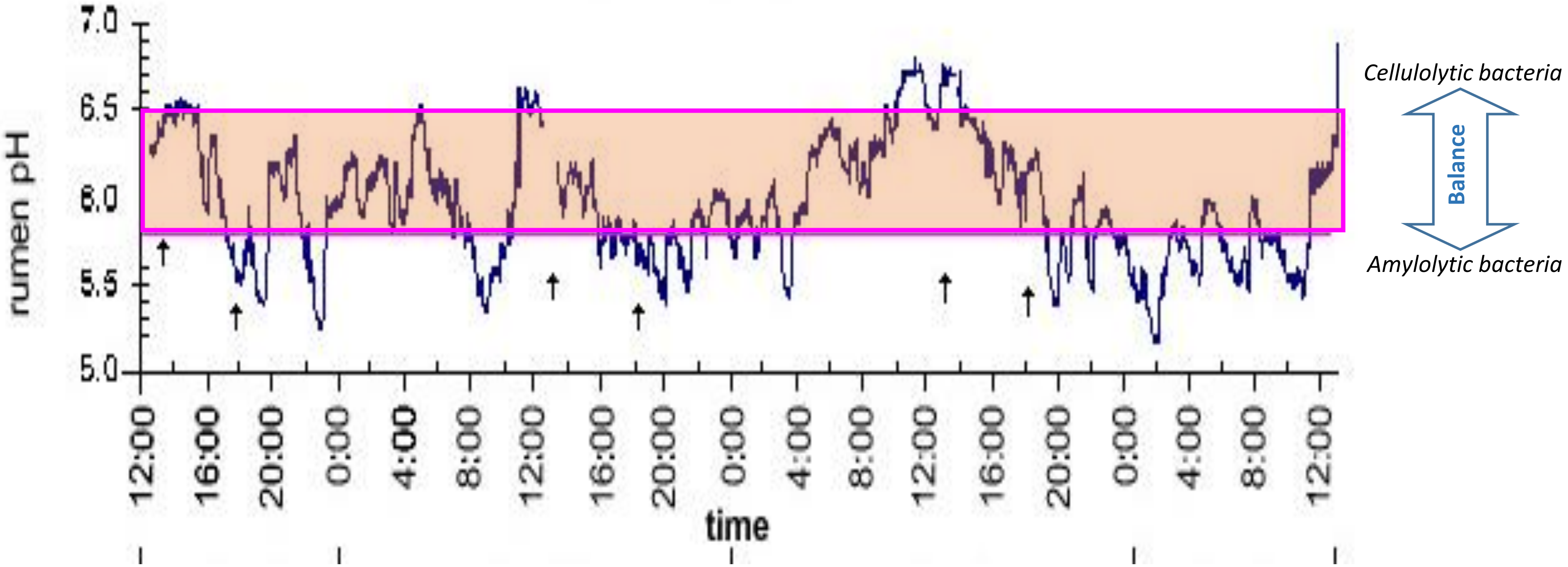
Corn silage harvest timing

Maturity	DM %	CP %	Mcal/kg	NDF %	ADF %	Lignin
Immature	<25	9,70	1,38	54,1	34,10	3,50
Normal	32-38	8,80	1,47	45,0	28,10	2,60
Mature	>40	8,50	1,36	44,5	27,70	3,10


1 day delay = 1% NDFD lost

Rumen environment and microflora stabilization

- **TMR particle size**
- **Rumen pH enhancers**

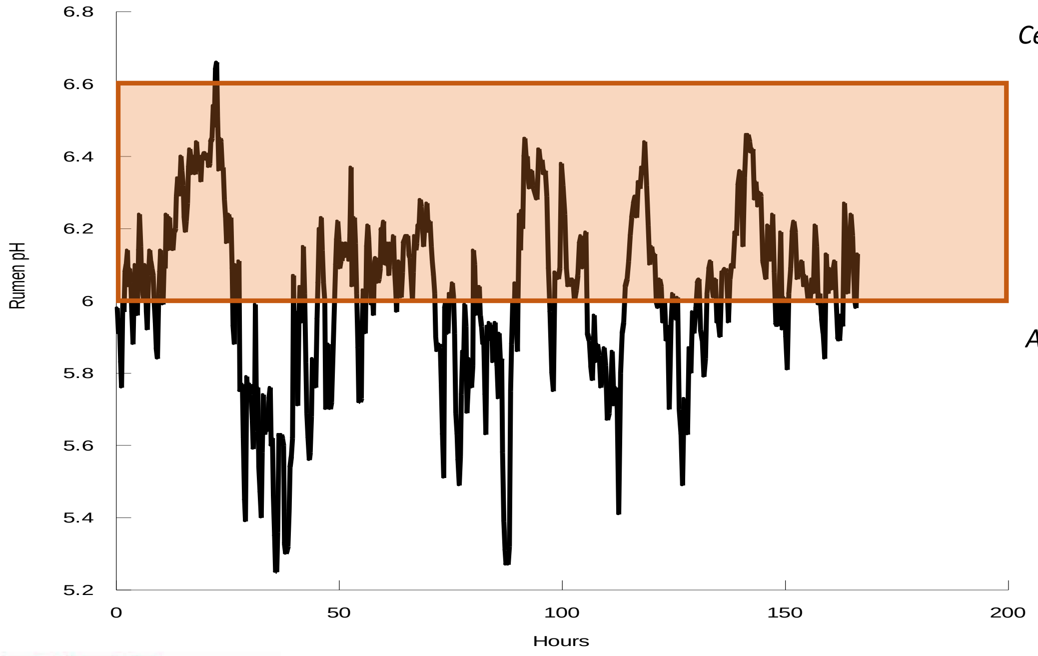


TMR particle size

- Reduce sorting behavior
- Regulate intake and passage rate
- Increase digestibility

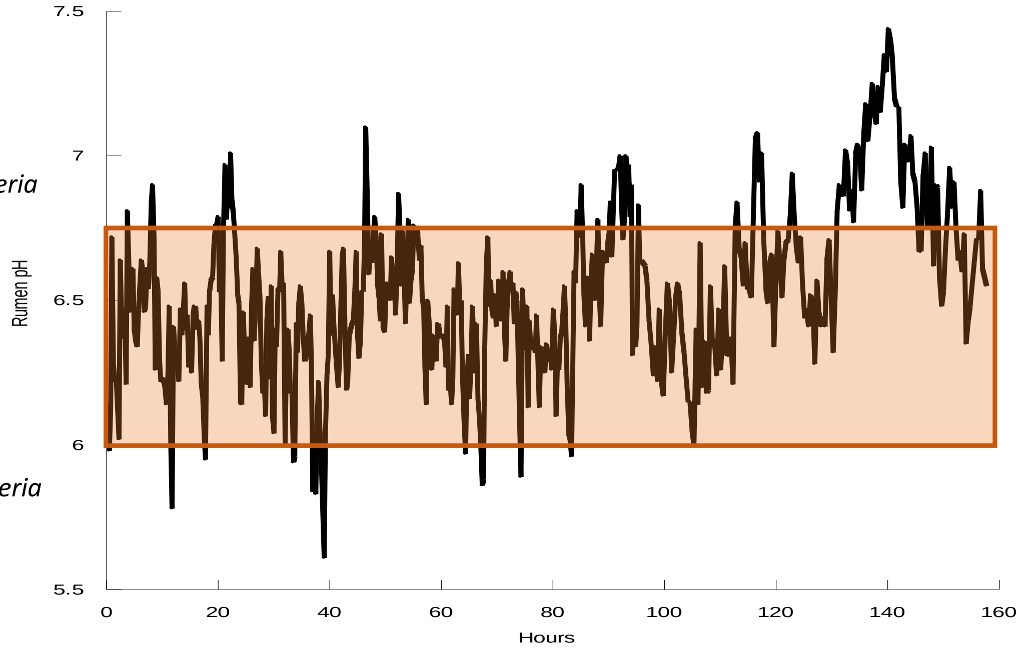
Rumen pH enhancers

- **Yea-Sacc®**



Cellulolytic bacteria

Amylolytic bacteria

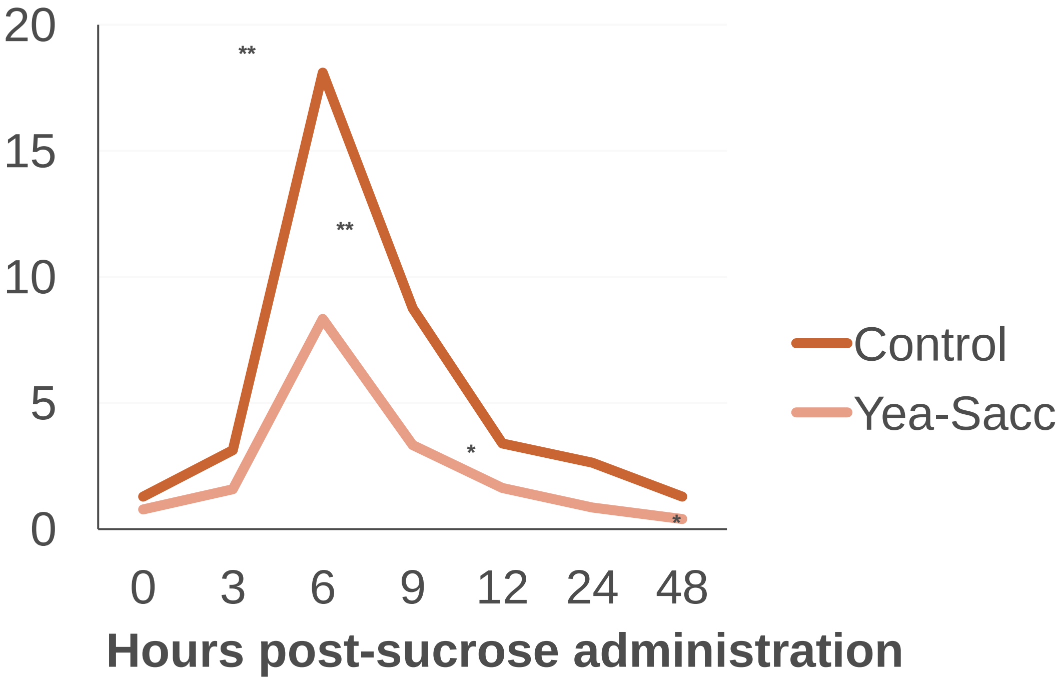


with *Yea-Sacc®*

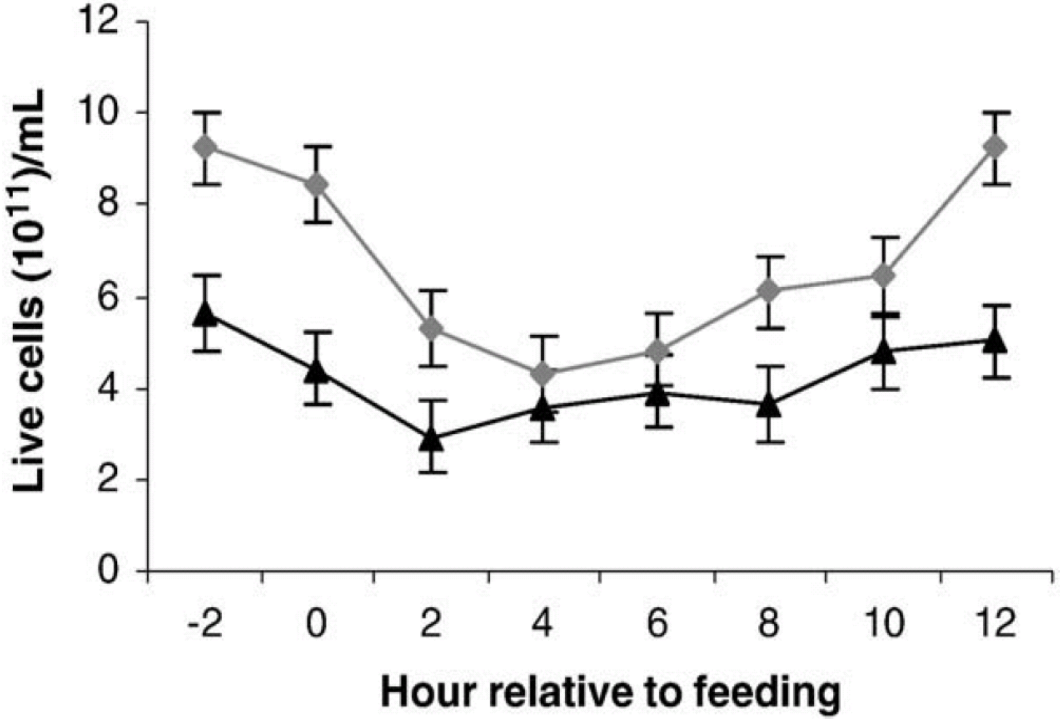
IRTA, Spain, 2005

YEA-SACC EFFECT ON RUMEN

Yea-Sacc keeps rumen lactate in check!



Yea-Sacc increased number of live rumen bacteria

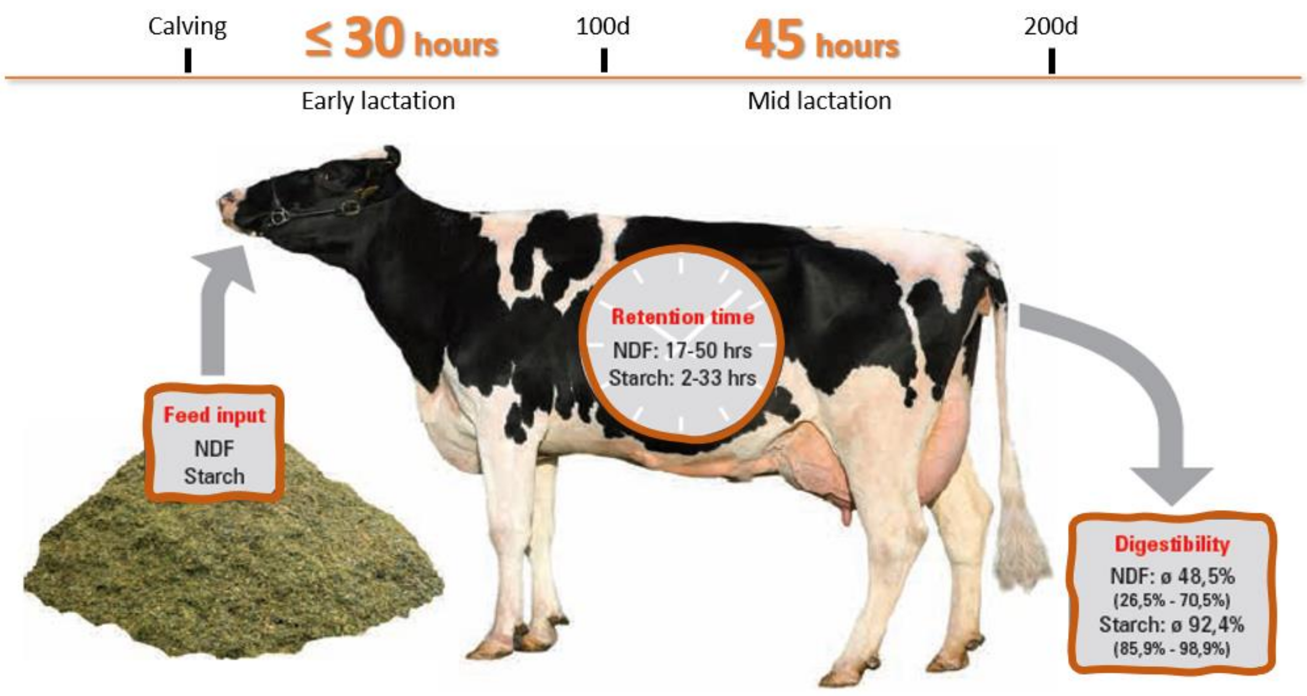


OPTIGEN® EFFECT ON DIGESTIBILITY

	Control	OPTIGEN®	P-value
OM digestibility	0.37	0.49	0.103
Fibre digestibility	0.45	0.57	0.046
Microbial-N output	0.35	0.39	NS

Fibre digestibility increased 27% (Statistical significant)
OM digestibility improved 33% (Strong relationship)
11% more Microbial Protein output (Numerical Increase)

Liam Sinclair, UK, 2008- BSAS



Broke down faster complex carbohydrates

- **NRG100**

Thank you!