

# Energy and protein values of Lucerne Leaf Meal (LLM) in growing pigs

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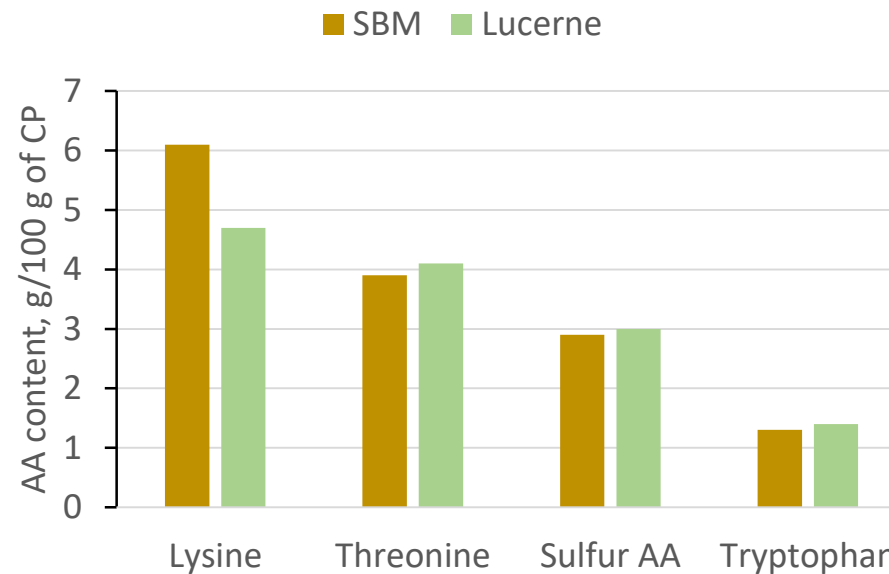
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## GENERAL CONTEXT OF THE STUDY

- Main interests of Lucerne
  - Easy to produce (adapted to a wide range of conditions/No fertilization)
  - High protein yield (# 2 T/ha)
  - High protein quality



*From INRA Tables*



## GENERAL CONTEXT OF THE STUDY

- Main interests of Lucerne
  - Easy to produce (adapted to a wide range of conditions/No fertilization)
  - High protein yield (# 2 T/ha)
  - High protein quality
  
- Main limits of Lucerne
  - High fibre content in the whole plant (30 to 40% NDF)
  - Presence of others ANF (saponins, etc. )
  - Low digestibility



## GENERAL CONTEXT OF THE STUDY

- The chemical composition of Lucerne leaves and stems differs widely

	Leaf	Stem
Fraction yield, %	35.6	64.4
CP, %	27.7	10.7
NDF, %	26.6	64.1
ADF, %	17.8	42.1
ADL, %	3.6	4.9

*From Bourquin and Fahey, 1994*

- Objectives of the present study
  - Evaluate the energy and protein values of Lucerne Leaf Meal (LLM)
  - Evaluate if these values change with different rates of incorporation



# MATERIAL AND METHODS

## Trial 1 : Apparent Total Tract Digestibility

- 5 experimental diets (0, 5, 10, 15 and 20% of LLM)

	1	2	3	4	5
Wheat	80.3	78.3	75.3	72.3	69.3
SBM	16.0	13.0	11.0	9.0	7.0
LLM	0	5.0	10.0	15.0	20.0
Others	3.7	3.7	3.7	3.7	3.7

- 30 growing pigs (60 kg)
- Feeding level :  $160 \text{ g/kg}^{0.60}$
- 14 d adaptation and 7 d collection

## Trial 2 : Ileal AA digestibility

- 5 experimental diets (0, 5, 10, 15 and 20% of LLM) + a PF diet

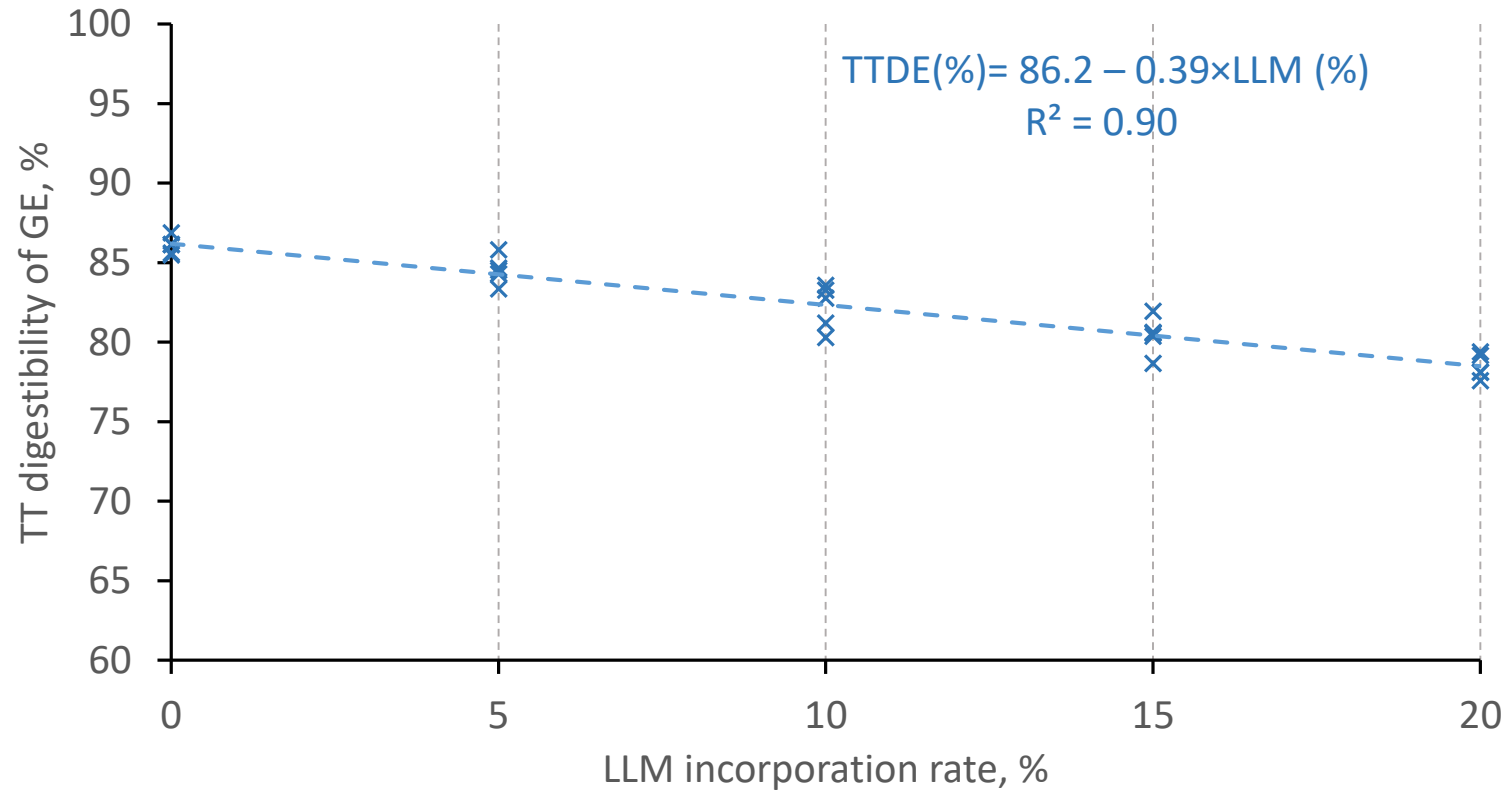
	1	2	3	4	5	PF
Corn starch	67.5	65.7	61.9	58.2	54.4	82.8
Casein	15.3	14.1	12.9	11.6	10.4	0.0
LLM	0.0	5.0	10.0	15.0	20.0	0.0
Others	17.2	15.2	15.2	15.2	15.2	17.2

- 5 growing pigs (35 kg) equipped with an IRA
- Feeding level :  $160 \text{ g/kg}^{0.60}$
- 4 d adaptation and 3 d collection

- Chemical analyses (DM, GE, N, AA) on faeces and digesta were performed on freeze dried samples

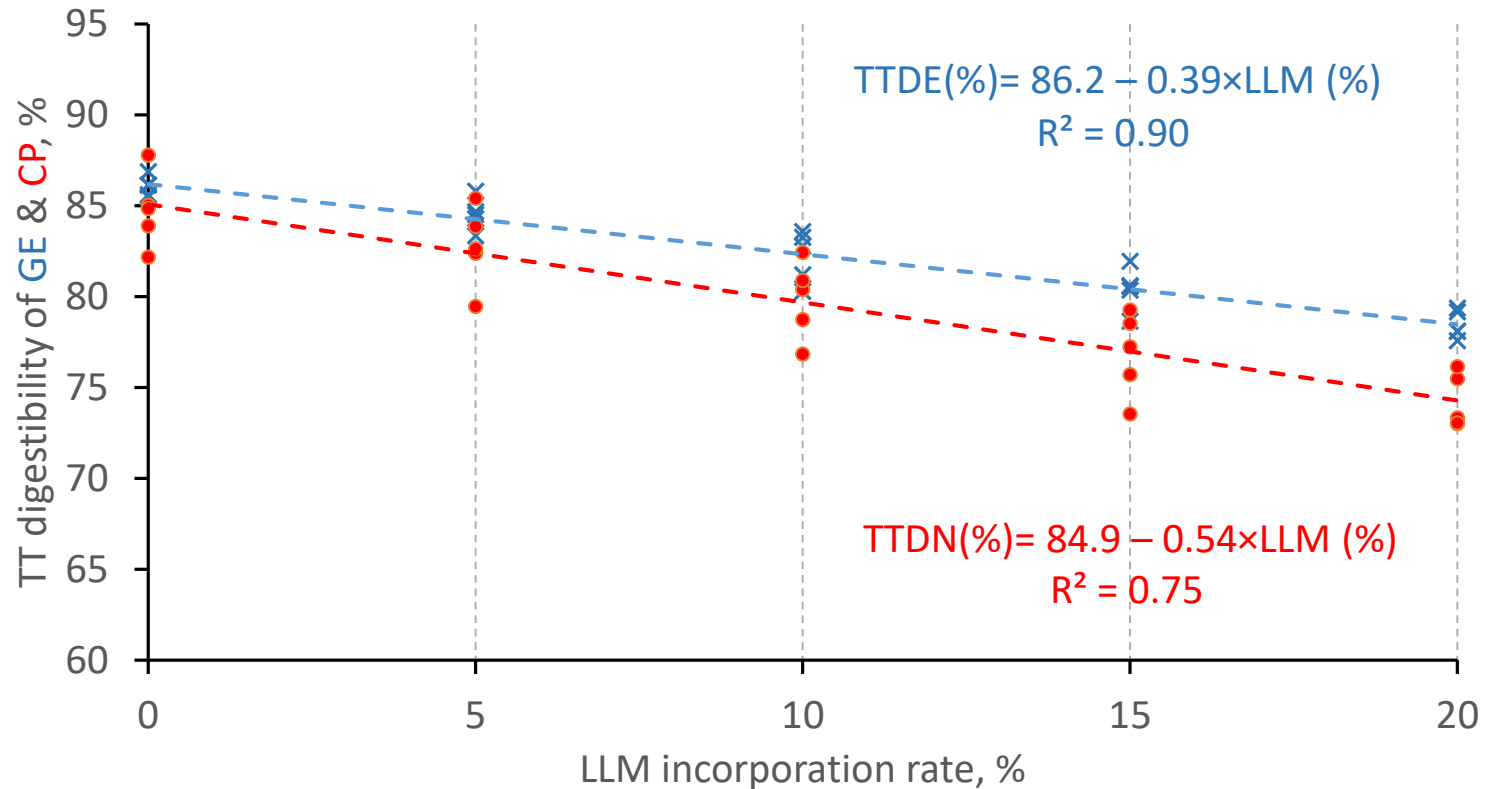
# RESULTS (TRIAL 1)

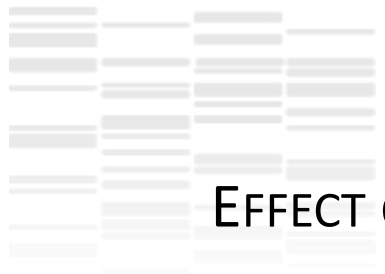
## EFFECT OF LLM INCORPORATION LEVEL ON ATTD OF DIETARY ENERGY



# RESULTS (TRIAL 1)

## EFFECT OF LLM INCORPORATION LEVEL ON ATTD OF DIETARY ENERGY & CP

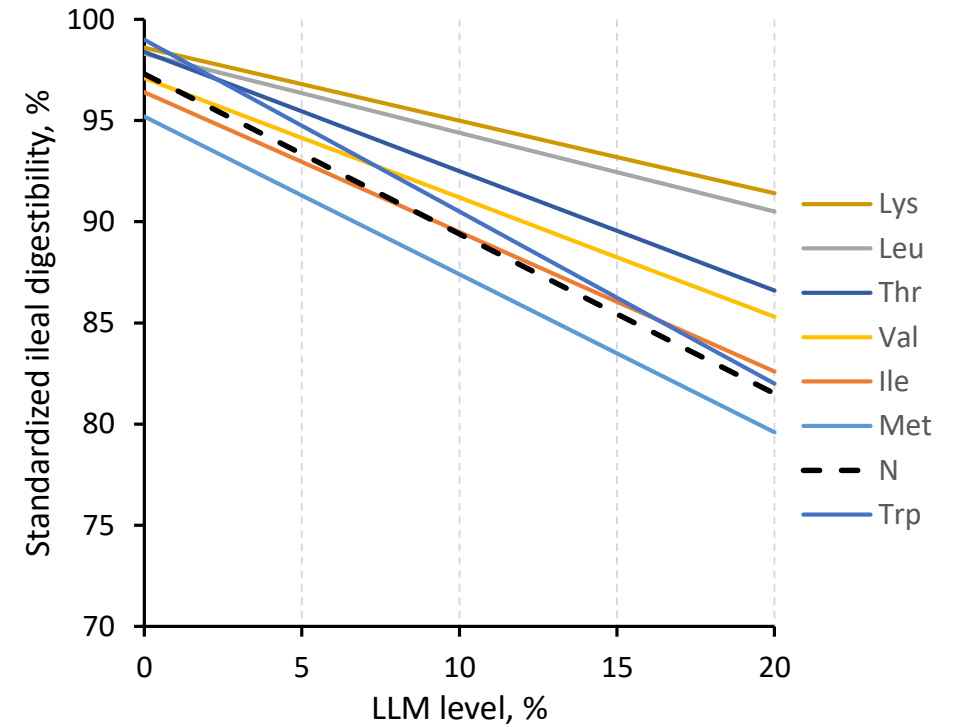




# RESULTS (TRIAL 2)

## EFFECT OF LLM INCORPORATION LEVEL ON SID OF DIETARY AA

SID, %	Intercept	Slope	R <sup>2</sup>
GE	100.0	-0.71	0.97
N	97.3	-0.79	0.98
Lys	98.6	-0.36	0.90
Thr	98.4	-0.59	0.94
Met	95.2	-0.78	0.94
Ile	96.4	-0.69	0.96
Leu	98.3	-0.39	0.94
Val	97.1	-0.59	0.96
Trp	99.0	-0.85	0.92







# RESULTS (TRIALS 1 & 2)

## ENERGY AND PROTEIN VALUES OF LLM

### ENERGY VALUES

	Dehydrated Lucerne		SBM *
	Leaves	Whole plant*	
ATTD of GE, %	46.4	51.0	85.0
DE, MJ/kg	8.5	8.2	14.7
ME, MJ/kg	8.1	7.6	13.4

\*From INRA Tables

### PROTEIN VALUES

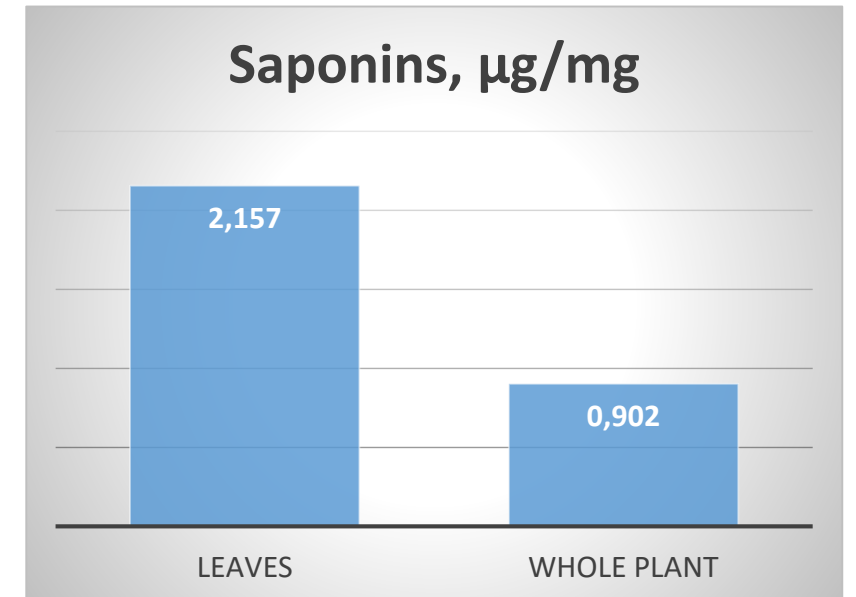
	Dehydrated Lucerne			
	SID, %		SID, g/kg	
	Leaves	Whole plant*	Leaves	Whole plant*
Lys	65.4	67	6.5	7.0
Thr	42.3	69	3.5	6.0
Met	58.3	77	2.6	2.7
Trp	60.4	46	2.8	1.4
Ile	56.1	46	5.5	6.5
Val	56.4	70	6.4	8.1
Leu	66.3	75	10.0	11.8

\*From INRA Tables



## CONCLUSIONS

- The fractionation of leaves does not significantly improve the nutritional value of Lucerne for pigs
  - The energy values of LLM = the whole plant
  - The SID AA values of LLM ≠ the whole plant
- How to explain these low nutritional values ?
  - High fibre content (/SBM)
  - Presence of others ANFs (saponins, phenolic compounds, ..)
- How to manage these ANF ?
  - Protein extraction from the leaves
  - Production of silage from the leaves



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