

EFFECTS OF TROPICAL LEGUME HAYS ON INTAKE AND AVERAGE DAILY GAIN OF RUMINANTS: A QUANTITATIVE REVIEW

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Introduction

- Several studies have evaluated the effects of feeding tropical legume hays (TLH) to ruminants.
- Positive effects on average daily gain (ADG).
- Results are confounded by an increased crude protein (CP) supply when replacing grasses by legumes.

Objective

To assess the effects of feeding TLH correcting for the increased CP supply in goat, sheep, and cattle.

Methods

- Literature review with 233 studies and 1,083 dietary treatments:
 - Studies conducted under tropical/ subtropical environments;
 - Data on the proportion of legume in the diet, diet composition, and performance.

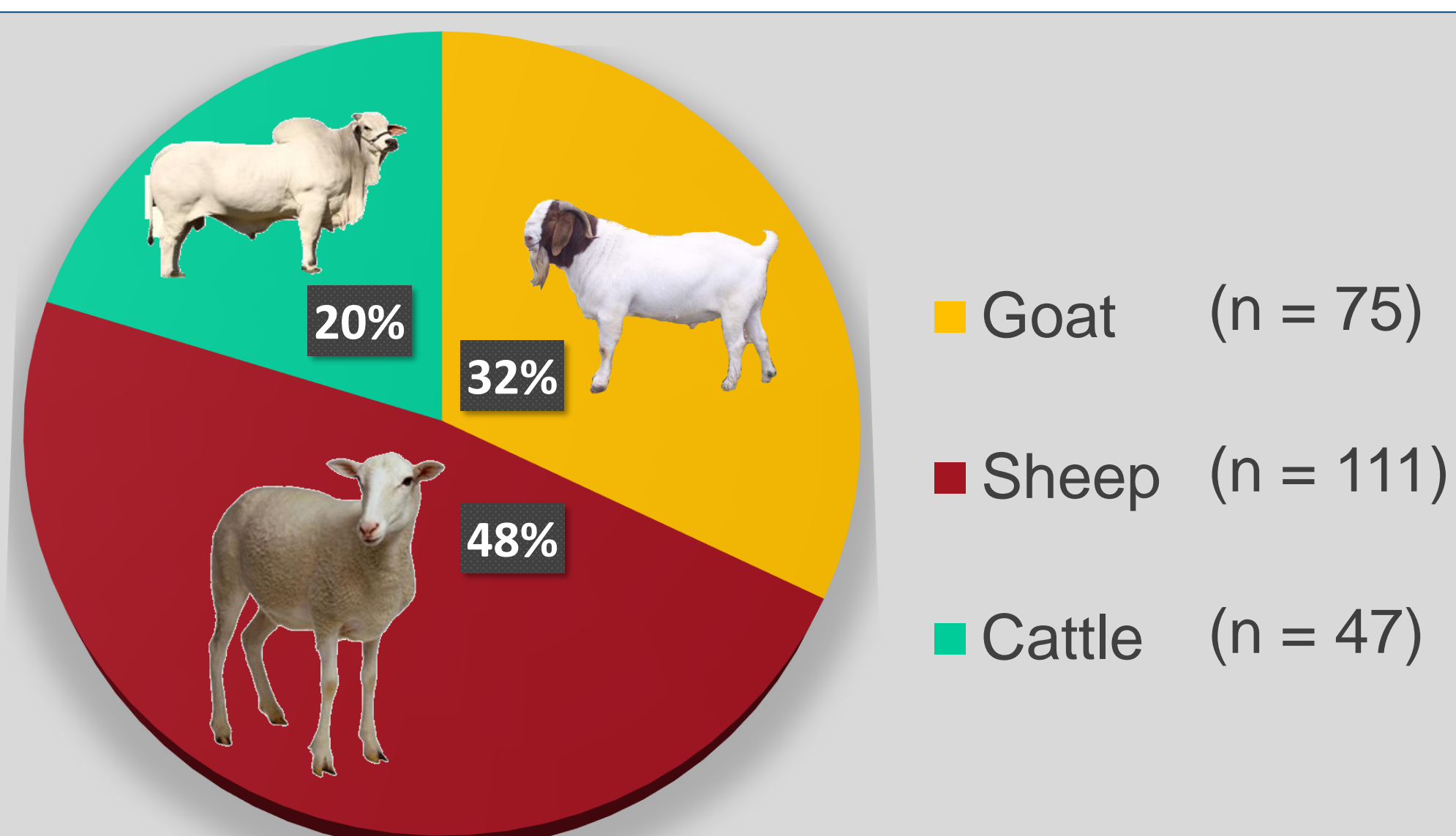


Figure 1. Number of studies included in the dataset by ruminant species

Results

- Ninety-seven legumes species were found, being the most commonly tested:
 - Leucaena leucocephala* (tree)
 - Gliricidia sepium* (tree)
 - Sesbania sesban* (tree)
 - Acacia spp.* (tree)
 - Lablab purpureus* (herb)
 - Stylosanthes spp.* (sub-shrub)
- The most common ranges at which TLH were included in animal diets were:
 - 100-300 g kg⁻¹ dry matter (DM; 39 % of treatments)
 - 300-500 g kg⁻¹ DM (28 % of treatments)

Acknowledgements

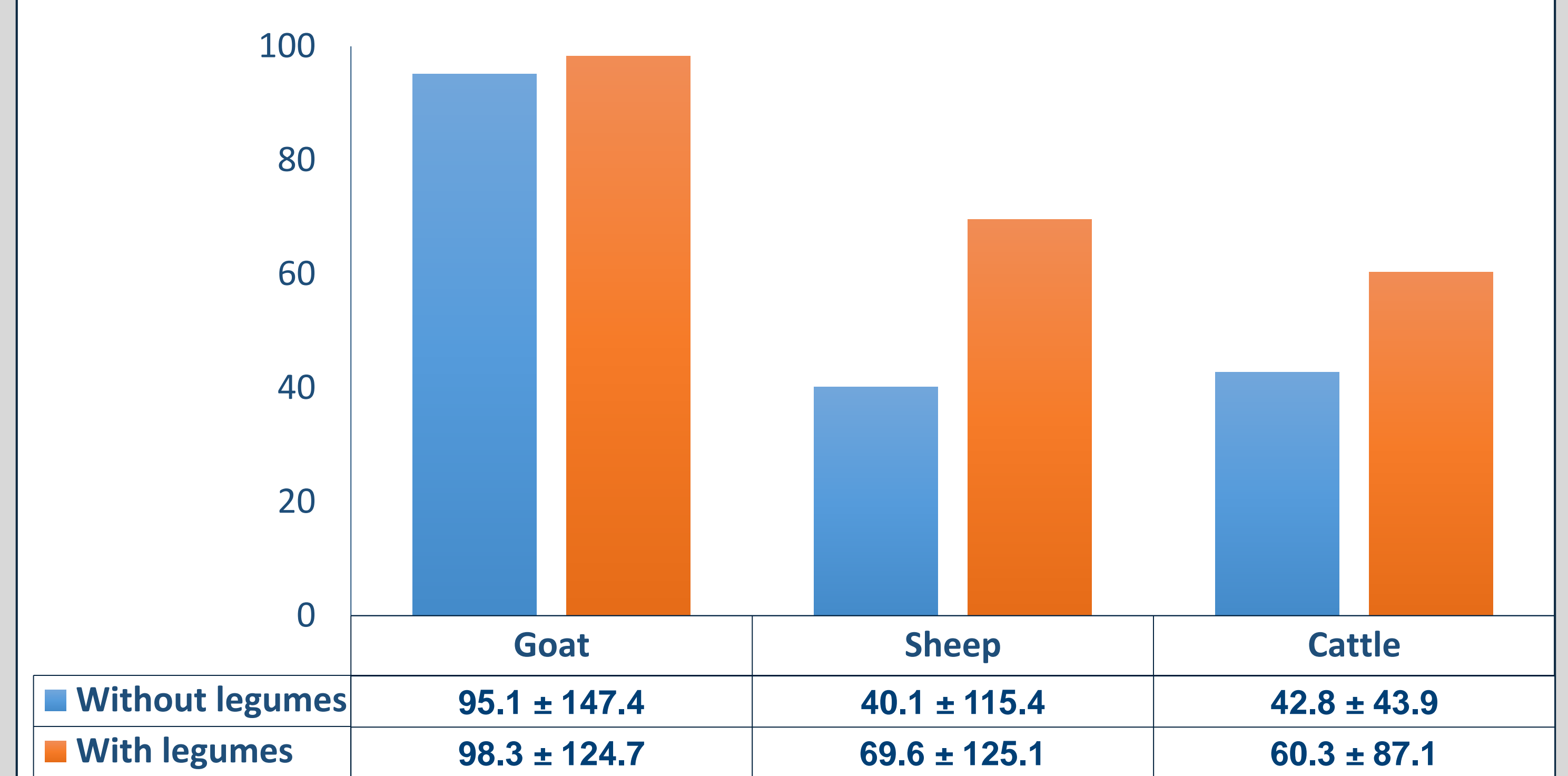
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Results

Table 1. Dietary crude protein (CP) concentration, dry matter intake (DMI) and average daily gain (ADG) of ruminants fed without and with tropical legume hays

	Goat		Sheep		Cattle	
	Without legumes	With legumes	Without legumes	With legumes	Without legumes	With legumes
Dietary CP (g kg ⁻¹ DM)	97 ± 63.1	127 ± 53.4	103 ± 54.1	139 ± 48.1	139 ± 114.7	171 ± 152.5
DMI (g kg ⁻¹ bodyweight ^{0.75})	56 ± 17.1	69 ± 17.0	54 ± 18.1	115 ± 164.1	86 ± 33.6	93 ± 30.0
ADG (g ⁻¹ day)	54 ± 57.2	98 ± 178.7	26 ± 26.9	53 ± 32.4	278 ± 225.8	358 ± 263

(a) Feed conversion efficiency (g ADG kg⁻¹ DMI)



(b) Protein conversion efficiency (g ADG kg⁻¹ CPI)

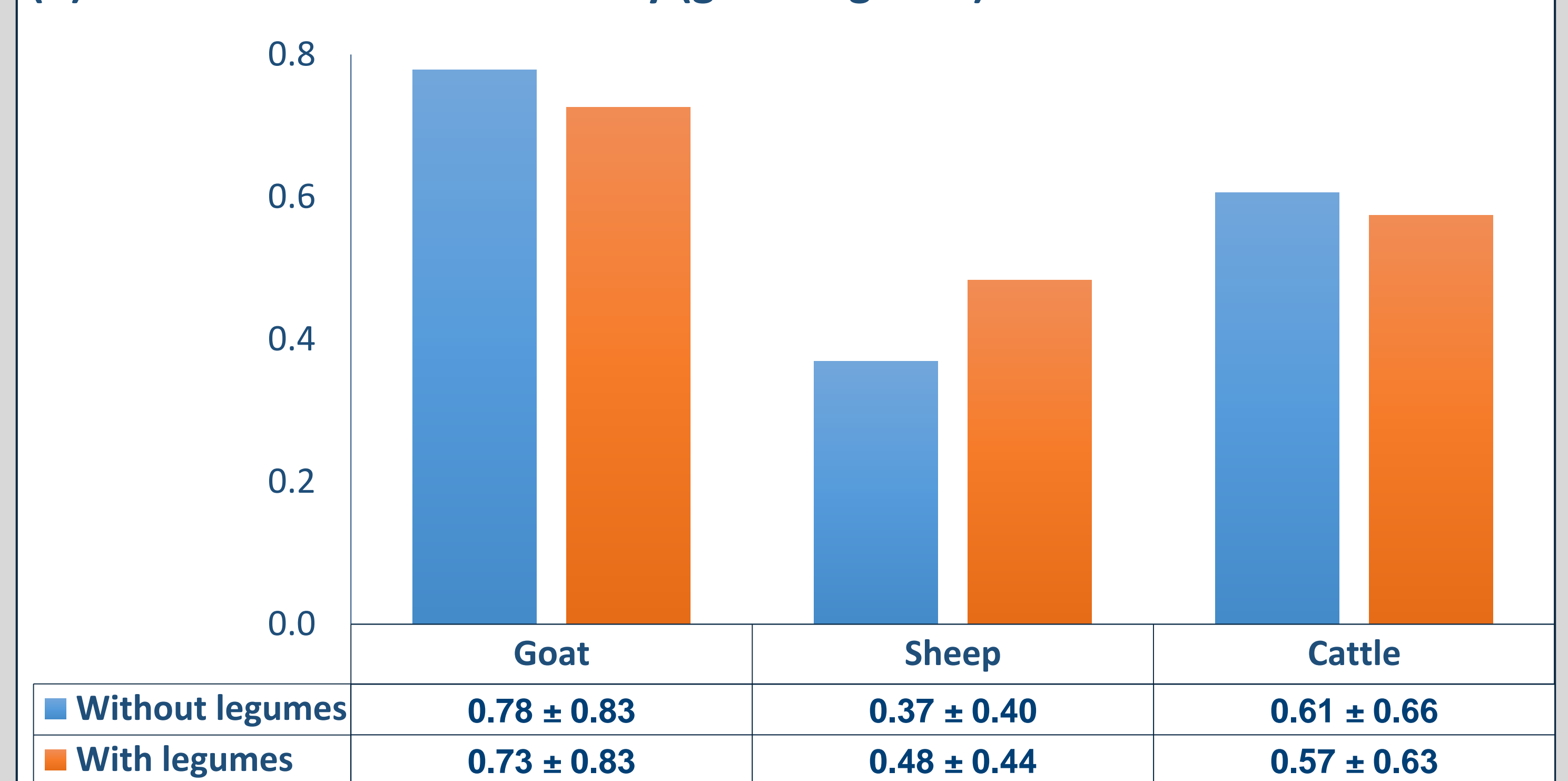


Figure 2. Feed (g ADG kg⁻¹ DMI) (a) and protein (g ADG kg⁻¹ CPI) (b) conversion efficiency for ruminants fed tropical legume hays

ADG: average daily gain; CPI: crude protein intake; DMI: dry matter intake

Conclusions

- Substituting tropical grasses by TLH increases average daily gain (ADG) in all ruminant species
 - Higher dietary CP concentration → higher DMI
- Differences in ADG disappears when this is expressed relative to DMI (goat) or relative to CPI (goat and cattle), and minimizes for sheep.