

How is the relationship of nutritional compositions and fiber digestibility parameters of tropical forage legumes with different maturity stages?

Salsabila Zaha Deriztian, Risma Rizkia Nurdianti*

Introduction



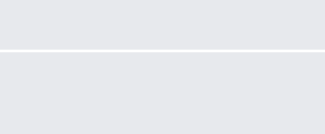
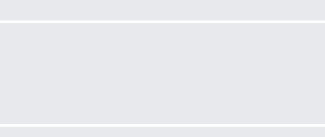
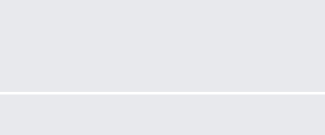
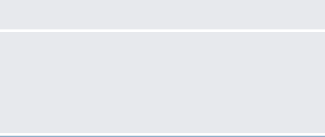
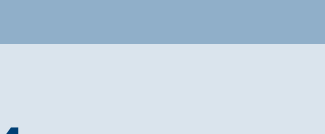
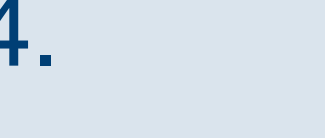
- Recently, the undigested neutral detergent fiber (uNDF) and potentially digestible fiber (pdNDF) concentrations can be the proxy of fiber digestibility.
- However, the relationship of the nutritional compositions with fiber digestibility parameters in tropical forage legumes have not been studied yet.



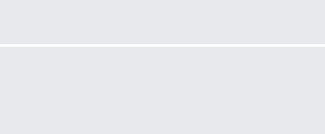

Objective




To determine the relationship between nutritional compositions and fiber digestibility parameters (uNDF and pdNDF concentrations) of tropical forage legumes with different maturity stages (i.e. young, medium, and old).



Materials and methods

- Eighteen fresh tropical forage legumes from Indonesia, Brazil, El Salvador, and Peru with different maturity stages.

<i>Calliandra calothyrsus</i> , young	
<i>Clitoria ternatea</i> , young	
<i>Gliricidia sepium</i> , young	
<i>Pueraria phaseoloides</i> , young	
<i>Vigna unguiculata</i> , young	
<i>Centrosema pubescens</i> , medium	
<i>Leucaena leucocephala</i> , medium	
<i>Macroptilium atropurpureum</i> , medium	
<i>Phaseolus lunatus</i> , medium	

<i>Arachis pintoii</i> , medium	
<i>Glycine max</i> , medium	
<i>Arachis pintoii</i> , old	
<i>Glycine max</i> , old	

<i>Canavalia ensiformis</i> , old	
<i>Pueraria phaseoloides</i> , old	
<i>Vigna unguiculata</i> , old	

<i>Arachis pintoii</i> , young	
<i>Stylosanthes guianensis</i> , medium	

- All data were analyzed using SAS 9.4.

Results

Table 1. Proximate nutrients of the samples (g/kg DM).

Samples	CP	aNDFom	ADF	ADL	uNDF	pdNDF
<i>Arachis pintoii</i> , young	158	300	244	77	144	156
<i>Arachis pintoii</i> , medium	240	340	268	98	151	188
<i>Arachis pintoii</i> , old	236	365	275	109	170	194
<i>Calliandra calothyrsus</i> , young	241	262	207	70	187	75
<i>Canavalia ensiformis</i> , old	185	411	308	67	279	132
<i>Centrosema pubescens</i> , medium	221	468	303	107	376	92
<i>Clitoria ternatea</i> , young	200	339	229	58	193	146
<i>Gliricidia sepium</i> , young	248	265	242	102	158	107
<i>Glycine max</i> , medium	174	377	333	78	247	131
<i>Glycine max</i> , old	159	376	310	87	269	107
<i>Leucaena leucocephala</i> , medium	251	291	212	68	168	123
<i>Macroptilium atropurpureum</i> , medium	174	441	328	73	321	120
<i>Phaseolus lunatus</i> , medium	239	319	218	57	165	155
<i>Pueraria phaseoloides</i> , young	218	376	277	63	218	158
<i>Pueraria phaseoloides</i> , old	149	488	357	109	276	212
<i>Stylosanthes guianensis</i> , medium	150	492	337	72	276	216
<i>Vigna unguiculata</i> , young	209	219	161	49	113	106
<i>Vigna unguiculata</i> , old	165	410	309	51	239	171

Table 2. Descriptive statistics of the samples.

Variable (g/kg DM)	Mean	SD	Min	Max
CP	201	37	149	251
aNDFom	363	79	219	492
ADF	273	54	161	357
ADL	77	20	49	109
uNDF	220	70	113	376
pdNDF	144	41	75	216

Table 3. Pearson correlation analysis.

Pearson Correlation Coefficients			
Prob > r under H0: Rho=0			
		uNDF	pdNDF
CP	CP	-0.47	-0.34
	aNDFom	0.05	0.17
aNDFom	ADF	0.86	0.47
	ADL	<.001	0.05
ADF	ADL	0.78	0.42
	ADL	<.001	0.08
ADL	ADL	0.25	0.17
	ADL	0.32	0.51

ADF, acid detergent fiber expressed inclusive of residual ash; aNDFom, amylase-treated, ash-corrected neutral detergent fiber with addition of sodium sulfite; CP, crude protein; DM, dry matter; ADL, acid detergent lignin; pdNDF, potentially digestible neutral detergent fiber; uNDF₂₄₀, undigested neutral detergent fiber estimated after 240 h of *in vitro* incubation.

Acknowledgement

The database used in this study is part of doctoral projects of Risma Rizkia Nurdianti funded by Lembaga Pengelola Dana Pendidikan (Indonesia Endowment Fund for Education) Scholarship. *Correspondence: risma_rizkia.nurdianti@uni-hohenheim.de

Conclusions

- Certain forages are recommended to be fed to the ruminant livestock.
 - ✓ *Leucaena leucocephala* medium fresh had highest CP concentration with relatively low concentrations of aNDFom, ADL and uNDF (291, 68, and 168 g/kg DM, respectively)
 - ✓ *Vigna unguiculata* young fresh had lowest aNDFom, ADL and uNDF concentrations but still had good CP concentration (209 g/kg DM).