In vitro fermentation of lablab and jack bean with polyphenols affected by ensiling conditions

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Introduction

Substantial amounts of protein-binding polyphenols are present in many tropical forage legumes.

Yet, forage conservation by ensiling may modify the concentration of polyphenols in forage legumes.

Thus, it is expected that conservation length will elevate polyphenol activities in forage legumes, thereby binding the proteins available and reducing rumen fermentation.

→Assessment of *in vitro* ruminal fermentation of lablab (*Lablab purpureus*) and jack bean (*Cannavalia ensiformis*) forage with and without polyethylene glycol (PEG) addition as affected by conservation length and storage temperature.

Materials and methods

- Cultivation of lablab and jack bean forage
- Fresh, wilted and ensiled forage samples utilized
- Storage of silo indoor vs outdoor for 75 or 180 days
- Analysis of total polyphenol (TP) and measurement of *in vitro* gas production and rumen fermentation profile

Figure 1: Lablab and jack bean forage and silage

Results

- Conservation length and storage temperature interacted for TP of both forages ($P < 0.05$)

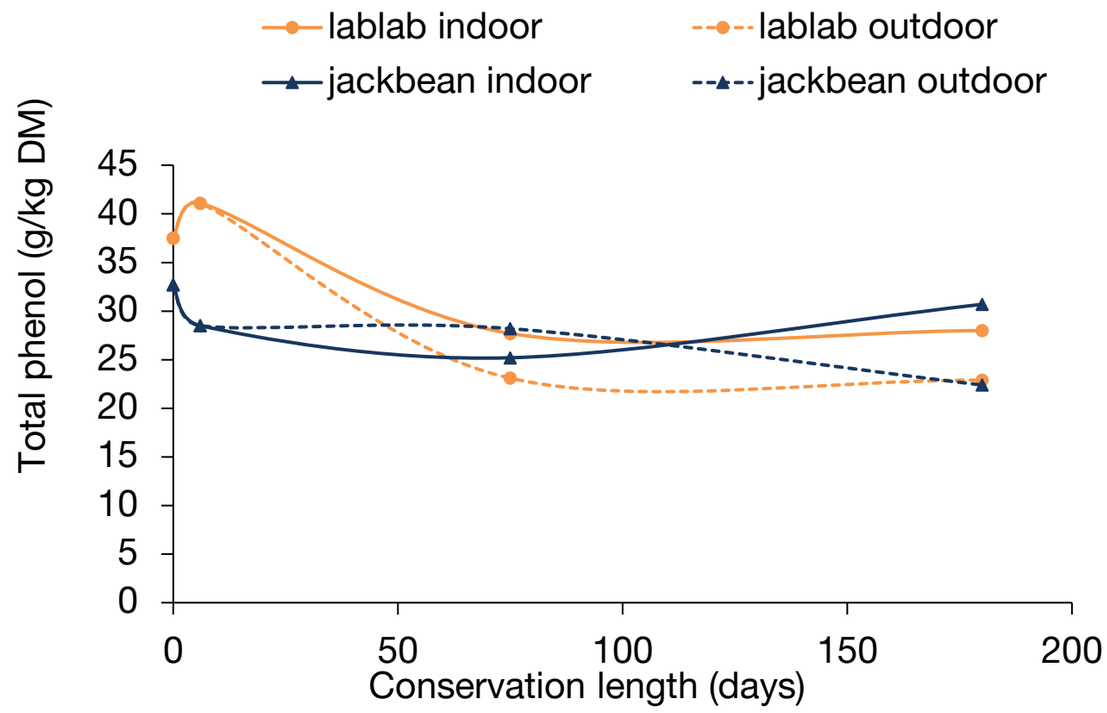

Figure 2: Effect of conservation length and storage temperature on total polyphenol concentration of lablab and jack bean

- Cubic responses to conservation length were found for *in vitro* rumen fermentation profile (Table 1).

Table 1: *In vitro* rumen fermentation characteristics of lablab and jack bean as affected by conservation length, storage temperature and polyethylene glycol (PEG)

Variables	Forage	*P* - value		
		Length	PEG	Length *PEG
Gas production (mL/g DM)	Lablab	<0.01	<0.01	
	Jack bean	<0.05		
Ammonia (mg/L)	Lablab	<0.01		<0.05
	Jack bean	<0.01		
Total SCFA (µmol/mL)	Lablab	<0.05		
	Jack bean			
Acetate proportion (µmol/mol total SCFA)	Lablab	<0.01		
	Jack bean	<0.01		
Propionate proportion (µmol/mol total SCFA)	Lablab	<0.01	<0.01	
	Jack bean	<0.01		
Valerate proportion (µmol/mol total SCFA)	Lablab	<0.01	<0.01	<0.01
	Jack bean	<0.01	<0.01	

- Addition of PEG decreases concentration of SCFA and individual proportion of SCFA
- No storage temperature effect.

Conclusion

- Conservation conditions did not protect the biological reactivity of the tannin present in lablab
- Weaker affinity for protein.
- Amount of tannin present in both legumes and the type of tannin responsible for weaker affinity for protein.

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