

**Rumen Undegraded Dietary Protein and TCA Soluble Protein with Gambier Leave Residue Supplementation as a Source of Tannins in Cattle Feed Supplement**

[Dr. Ramaiyulis, S.Pt, M.P](#)

Email : [ramaiyulis@gmail.com](mailto:ramaiyulis@gmail.com)

**POLITEKNIK PERTANIAN NEGERI PAYAKUMBUH**

Jl. Raya Negara km 7 Tanjung Pati, Harau, Lima Puluh Kota, Sumbar 26674

Presented in ICALS 2020

# Gambier (*Uncaria gambir*) leaf residue



**GAMBIER PRODUCT**

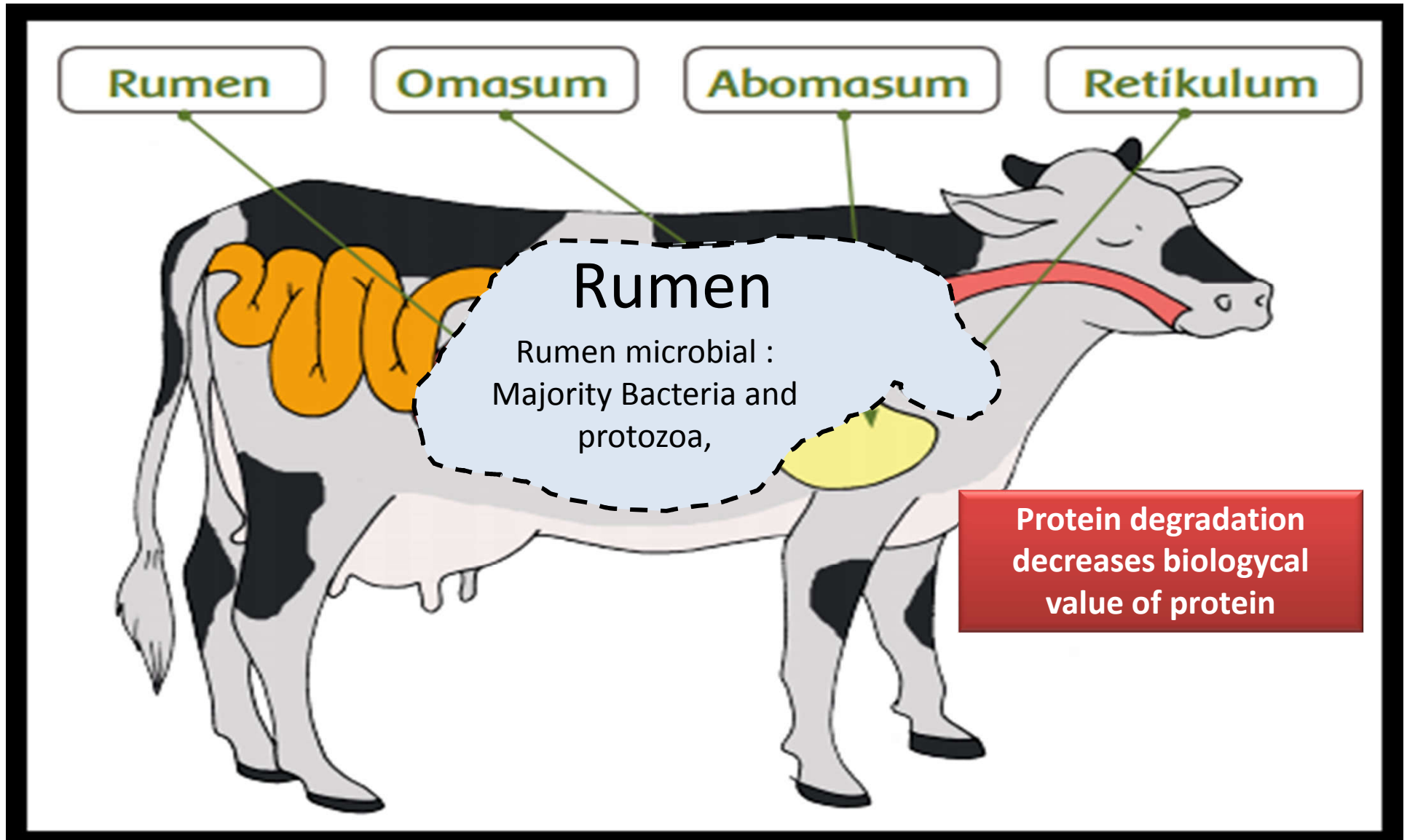


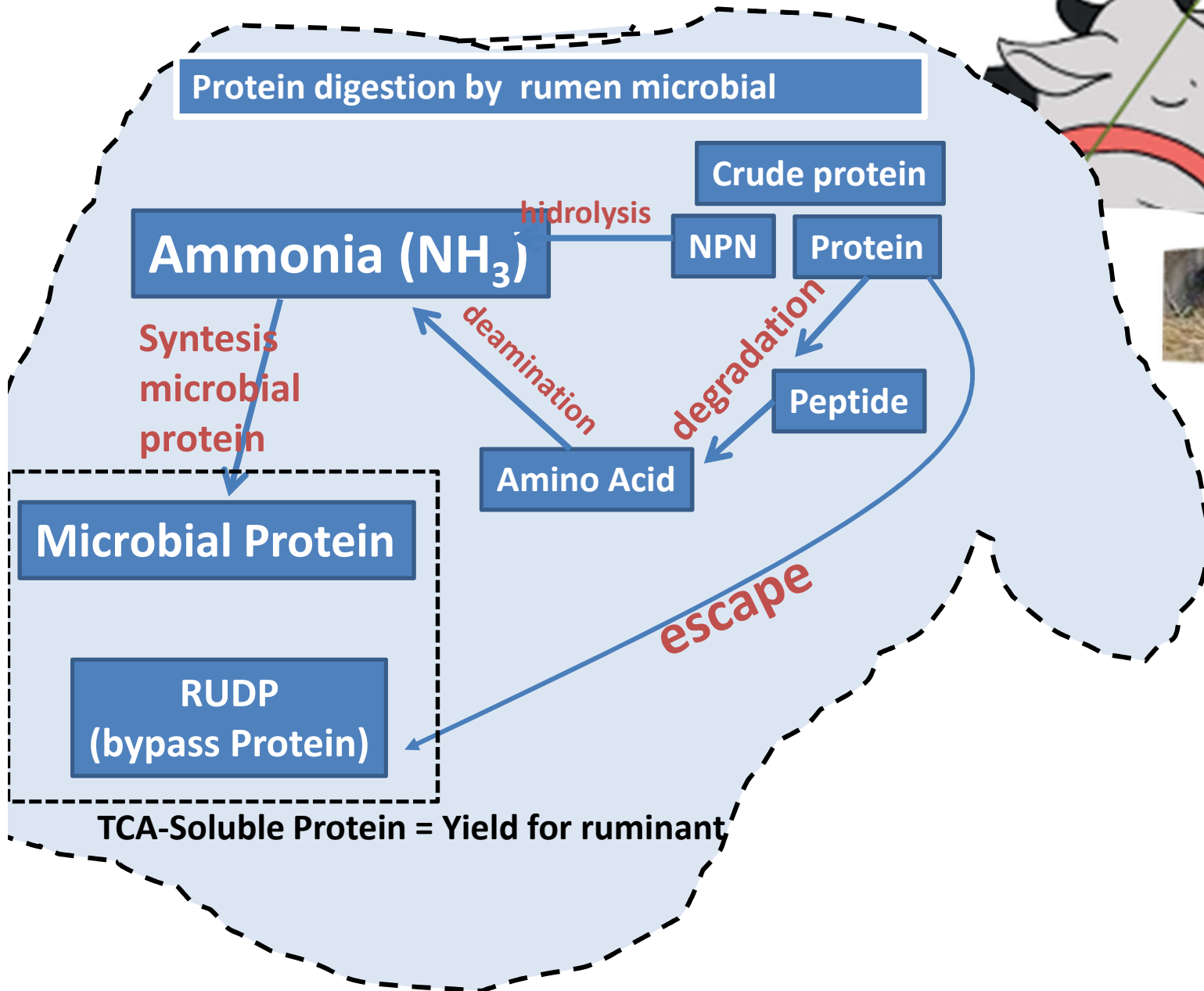
**GAMBIER LEAF RESIDUE (GLR)**

## GLR as a source of tannins and its functions

- GLR contains 9.98% condensed tannins (catechin)
- Tannins can precipitate protein so that they potential for protect proteins from degradation by rumen microbes of cattle.
- The end product of rumen fermentation of feed protein is (Rumen undegraded dietary protein (RUDP))
- RUDP together with microbial protein = TCA-soluble protein is a protein value available for ruminants to produce (daily gain, milk, and pregnancy)

# Why proteins need to be protected from rumen degradation in ruminants ?



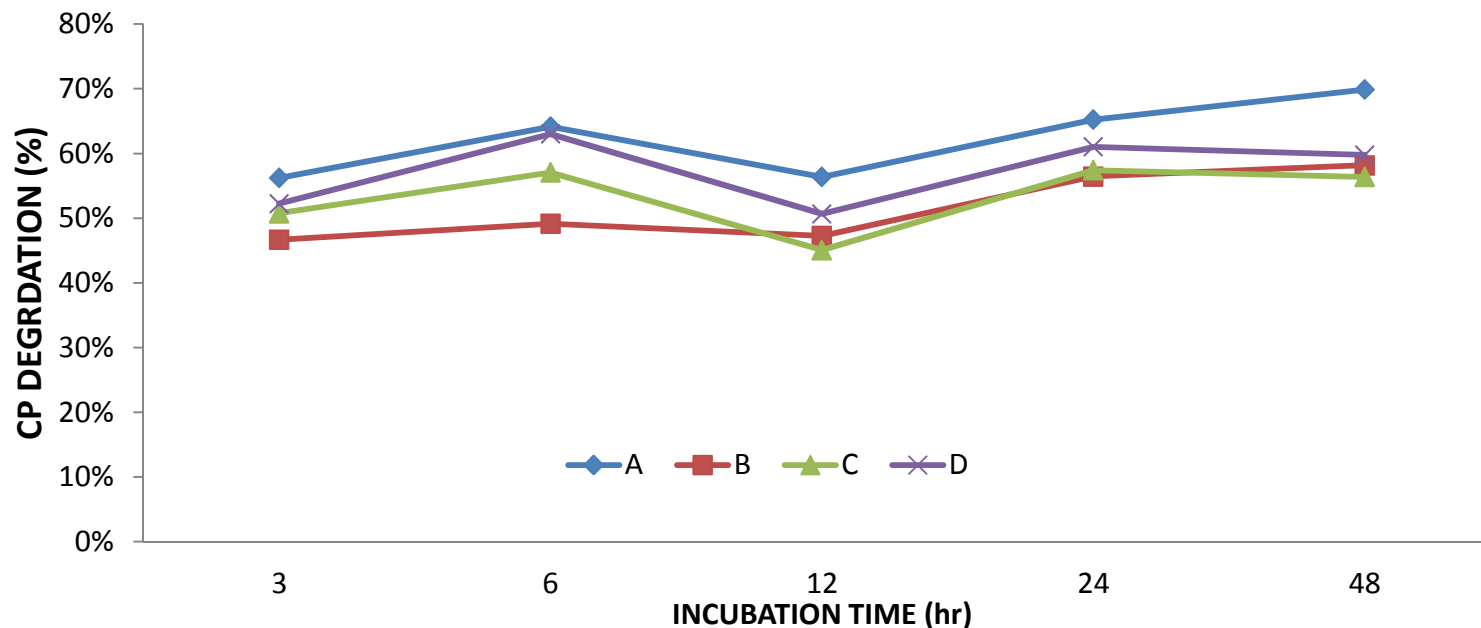


# GLR in Cattle Feed Supplement

	Feed supplement formula			
	A	B	C	D
<b>Ingredient</b>				
<b>Brown sugar</b>	15	15	15	15
<b>Bran</b>	29	28	27	26
<b>Coconut cake</b>	15	14	12	11
<b>Soybean meal</b>	15	15	15	15
<b>Tapioca</b>	15	15	15	15
<b>Urea</b>	5	5	5	5
<b>Salt</b>	3	2,5	3	2,5
<b>Mineral</b>	3	3	3	3
<b>Gambier Leaf Residues (GLR)</b>	0	2.5	5	7.5
<b>Analyzed composition</b>				
<b>Tannin, %</b>	0	0.68	1.17	1.60
<b>Crude protein (CP), %</b>	23.57	24.53	23.68	23.01
<b>CP non-urea, %</b>	12.09	12.59	12.15	11.81
<b>CP urea, %</b>	11.48	11.94	11.53	11.20
<b>Organic Matter, %</b>	84.32	84.51	85.95	86.96
<b>The ratio of Tanin: CP non-urea, gr</b>	-	17.87	10.38	7.59

# RESULT

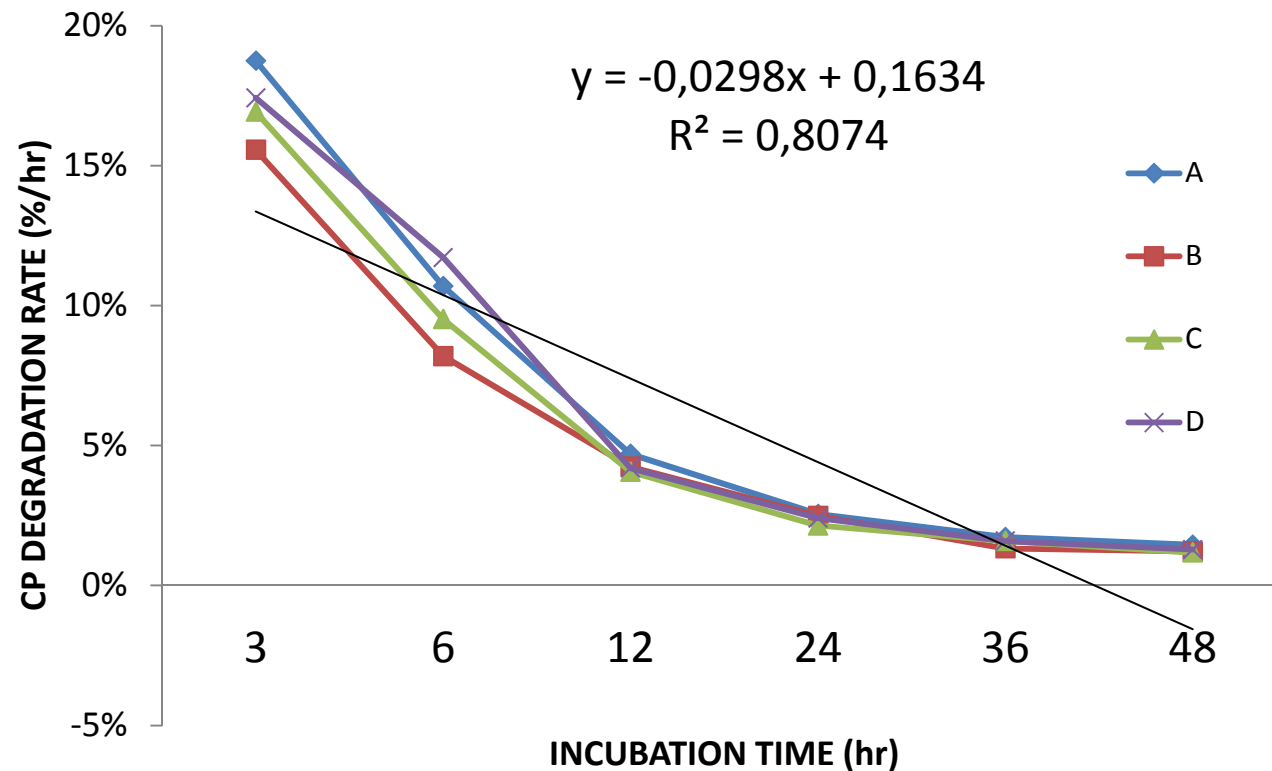
## Effect of GLR to rumen Crude Protein Degradability



CP = Crude protein; A = 0%; B= 2.5%; C= 5.0%; D= 7.5% of GLR

- \* The highest protein degradation was found at GLR 0% (control)
- \* Protein protection from rumen degradation was found at GLR levels of 2.5-5.0%

## Effect of GLR to Rumen Crude Protein Degradation Rate

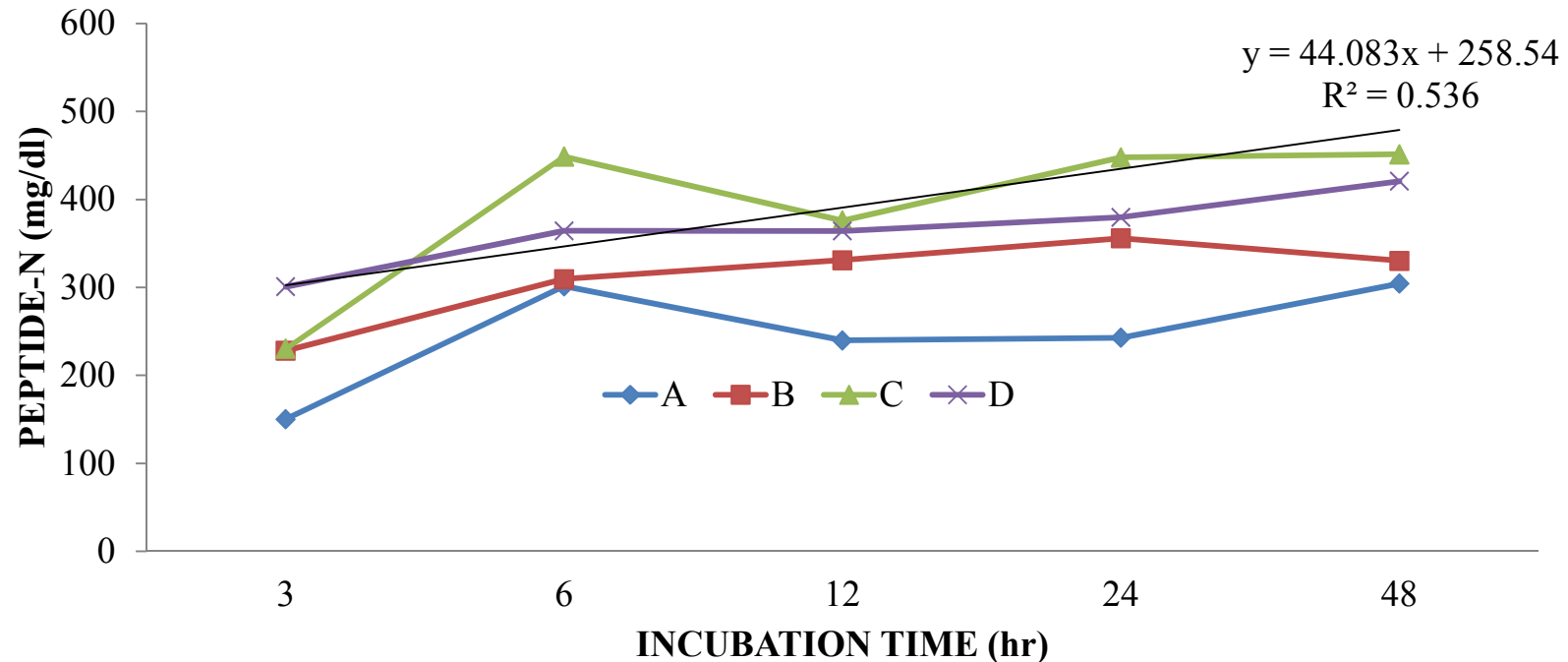


CP = Crude protein; A = 0%; B= 2.5%; C= 5.0%; D= 7.5% of GLR

- \* The highest protein degradation occurred at 3 hours incubation and decreased with the longer incubation
- \* GLR significantly decreased protein degradation at the level of 2.5-5.0% at 3-6 hours incubation



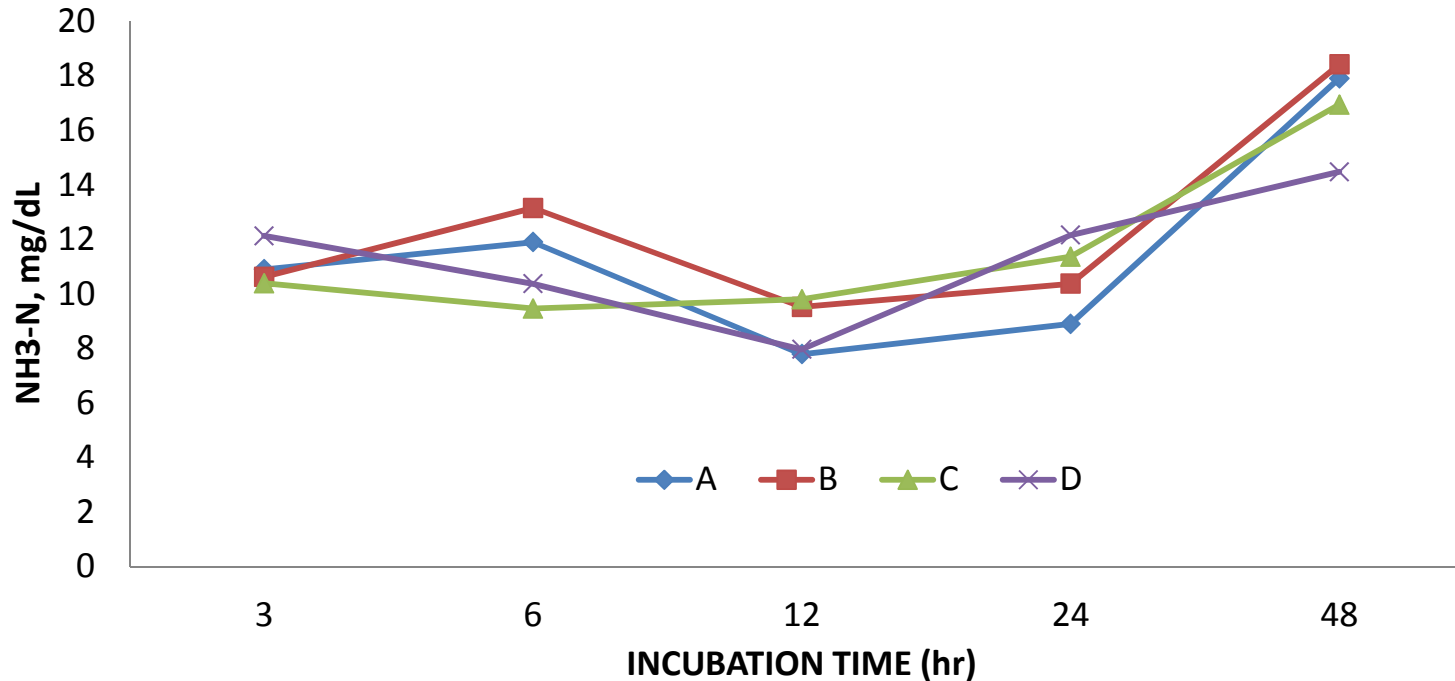
## Effect of GLR to Peptide-N in Rumen Fluid



A = 0%; B= 2.5%; C= 5.0%; D= 7.5% of GLR

- \* The protective effect of protein on GLR levels of 5.0% was also seen in the high levels of peptide-N in the rumen fluid
- \* The relationship between Peptide-N (independent variable) and GLR level (dependent variable) is  $y = 44.083x + 258.54$ ;  $R^2 = 0,536$

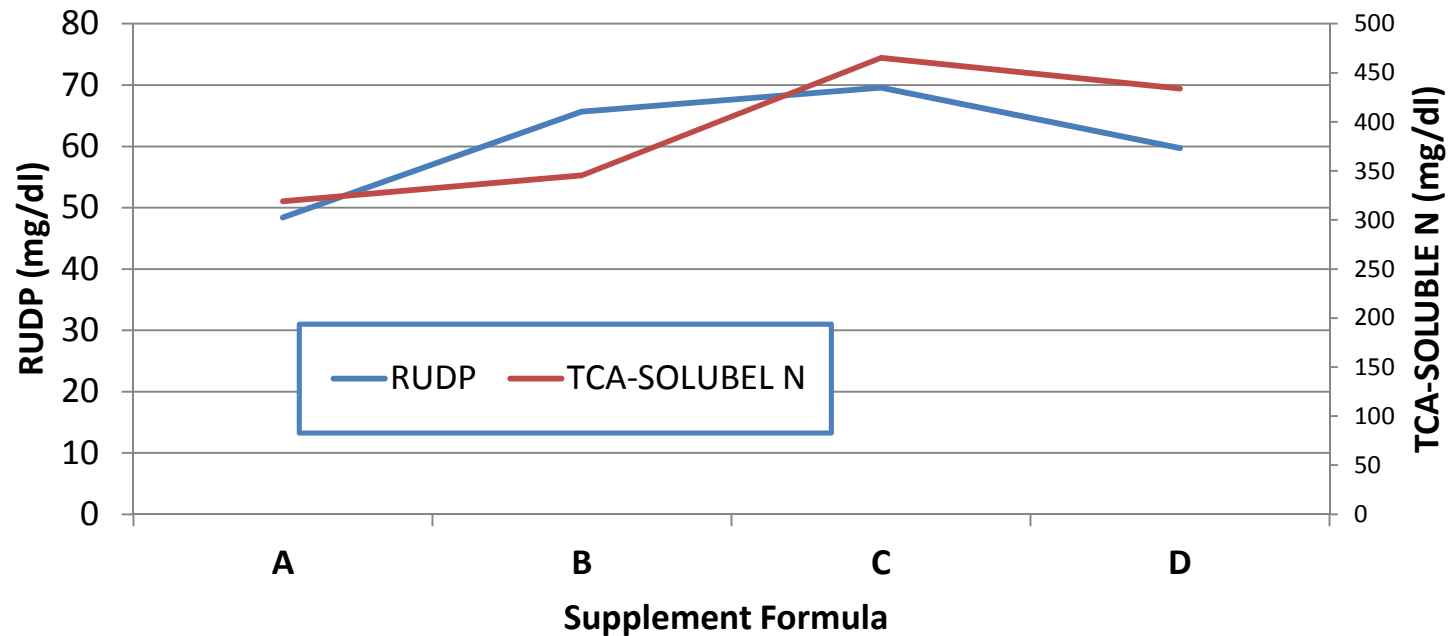
## Effect of GLR to Ammonia in Rumen Fluid



NH3-N = ammonia; A = 0%; B= 2.5%; C= 5.0%; D= 7.5% of GLR

- \* Ammonia at a GLR level of 0-2.5% was significantly higher at 6 h incubation as a result of the highest rate of this level at 3 h incubation.
- \* There was no significant effect on GLR levels other than at 6 hours incubation

## Effect of GLR to RUDP and TCA-soluble protein



RUDP = rumen undegraded dietary protein; TCA = Trichloro acetic acids;  
A = 0%; B= 2.5%; C= 5.0%; D= 7.5%

- \* RUDP and microbial protein detectable in TCA-soluble N, it is the end products of protein fermentation in rumen and available to ruminants for produce daily gain, milk, and pregnancy.
- \* A 5% GLR level performs best on RUDP and TCA-soluble N.

## CONCLUSION

- GLR contains condensed tannins which are able to protect feed protein from degradation in the rumen of ruminants
- The GLR level 5% obtained the highest of end product of rumen fermentation of protein in the rumen
- The best GLR level in supplement feed is 5%