



Differences in How Crude Protein is Fractionated Between Models

As models have evolved, the Crude Protein (CP) of an ingredient has been recognized as having different fractions with each fraction having a specific degradation rate (Kd). The relationship of the pool size of each fraction with its specific Kd linked to the rate of passage (Kp) defines the percentage of CP that is degraded in the rumen and the percentage that flows to the small intestine. Tables 1 and 2 give an example of how the CP of solvent soybean meal is partitioned into different pool sizes by the NRC, CPM and the CNCPS v.6.

Table 1: N Fraction (pool size), % of Crude Protein

NRC	CPM V.3	CNCPS v.6
Soybean meal, solvent 48%	Soybean meal, 47.5%	Soybean meal, 47.5%
A=15	A=10.76	A=2.4
	B1=9.24	B1=17.6
B=84.4	B2=76.9	B2=76.9
	B3=1.1	B=1.1
C=0.6	C=2.0	C=2.0

Table 2: Degradation Rate (Kd), %/h

NRC	CPM V.3	CNCPS v.6
Soybean meal, solvent 48%	Soybean meal, 47.5%	Soybean meal, 47.5%
A=Complete degradation	A=10,000	A=200
	B1=230	B1=23
B=7.5	B2=11	B2=11
	B3=0.2	B=0.2
C=Not degraded	C=0	C=0

The impact of how the pool fractions are estimated as well as the different Kds and Kps assigned to each fraction for each model on the estimated RUP (%CP) is of consequence. Using the example of soybean meal*, the estimated RUP is 43.5, 37.4 and 42.1% for NRC, CPM V.3 and CNCPS v.6 respectively. The differences illustrated for soybean meal are generally true for other ingredients such that the same ration evaluated through CPM will have a lower predicted RUP proportion of MP which is offset by a higher microbial protein contribution compared to both NRC

and CNCPS.

Currently, in the United States, there are several models using the NRC, the CPM V.3 and the CNCPS v.6 biology. The NRC biology is incorporated in [Formulate 2](#) as well as in other software programs. Several companies use [CPM V.3](#) and there are two commercial versions of the CNCPS v.6 biology: [AMTS](#) and [NDS](#).

In the next Technical Series email, I will discuss the impact of these differences on the percentage of metabolizable lysine and methionine and how to interpret the results to maximize their utilization.

* Intake - 55 lbs of TMR per day

Have Questions?

Please [contact me](#) if you have any questions or would like more information. I will personally respond to all emails.



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