

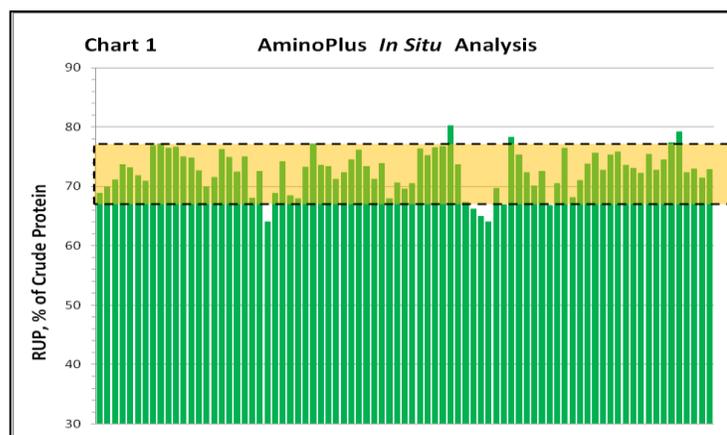


AminoPlus® Delivers High Quality Intestinally Digestible Rumen Bypass Protein

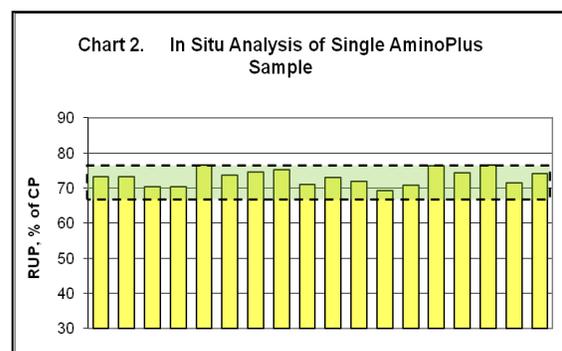
High quality, intestinally digestible rumen bypass protein is critical to maintaining the high level of milk production achieved in dairy herds today. Ag Processing Inc. (AGP) developed a manufacturing process and quality control program to assure AminoPlus provides high quality bypass protein that is digestible in the small intestine.

Measurement of RUP

- Procedures utilizing solutions and/or enzymes to simulate rumen protein degradation may not accurately predict RUP realized by the dairy cow.
- AminoPlus RUP content (**Chart 1**) is evaluated by measuring protein degradation in the rumen of a cow (*in situ* procedure).



- AminoPlus RUP is consistently within the recognized variability of this biological procedure (dashed line, $\pm 5\%$ of average value of 72.6% RUP).
- Replicated analysis is recommended for establishing ingredient nutrient values. Analysis of multiple samples, over a period of time, is particularly important for *in situ* procedures. Individual results utilizing a biological system, such as the rumen of a cow, can be influenced by differences in environment, ration ingredients, consumption patterns and normal day to day animal variability on the day of the test.
- Results of 18 separate analyses of a single AminoPlus sample, conducted over a period of 4 months, averaged 73.1% RUP (**Chart 2**), similar to the average of the data in **Chart 1**. Individual test results of this single sample ranged from 69.2 to 76.6% RUP indicating the use of single assay data can lead to misleading or erroneous conclusions.

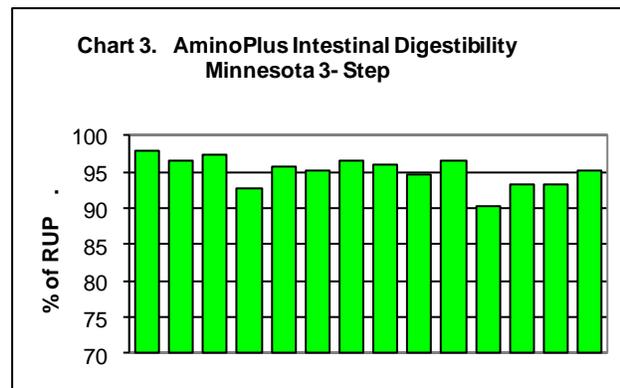


AminoPlus Digestibility

- AminoPlus replaced a portion or all of the soybean meal, lysine basis formulated to 92% of requirement, in a chick bioassay to evaluate protein and lysine digestibility. Average daily gain, feed/gain, gain/unit lysine and livability were equal for chicks fed AminoPlus diets compared to the soybean control (Table 1). The data indicates lysine availability in AminoPlus was equal to soybean meal and suggests the RUP fraction of AminoPlus is digestible in the small intestine of the ruminant.

SBM %	AminoPlus %	Gain gm/day	F/G	gm gain/gm/lysine	Livability %
100	0	28.2	1.90	50.3	94.9
67	33	28.8	1.87	51.1	100
33	67	30.4	1.78	53.6	95.6
0	100	28.9	1.85	51.8	95.5
67	33	29.0	1.86	51.5	96.7
33	67	29.2	1.84	52.4	96.8
0	100	28.6	1.90	50.2	98.3

- Intestinal digestibility of the AminoPlus RUP fraction was estimated by the Minnesota 3-Step procedure (Chart 3). Variation between samples is minimal considering the impact of procedural variation. Intestinal digestibility was greater than 90% for all 14 samples of AminoPlus, averaging 95.1 percent.



- Mobile Bag Technique (MBT) estimates intestinal digestion of protein by measuring disappearance from sample bags which have passed through the small intestine.
- European trials (De Schothorst, Danish Institute of Agricultural Sciences) reported intestinal digestibility of AminoPlus RUP at 99.0 and 91.8%, respectively (Table 2). A comparison of AminoPlus and expeller soybean meal samples indicate high intestinal digestibility for both protein sources averaging 96.3 and 94.3% for AminoPlus and expeller soybean meal, respectively.

European Trials	Independent AminoPlus	Laboratory Expeller
99.0	96.4	94.2
91.8	98.0	96.3
	94.4	92.5

The AminoPlus Quality Control Program helps assure you a consistent high quality, high intestinally digestibility bypass protein source –**AminoPlus®**