

## The Pico-Tag® Method: "...a Viable Alternative to AAA at Approximately One-Half the Price..."

Dietary control of the growth and health of livestock animals is critical to productivity in the agricultural industry, and has resulted in major investments in process and test equipment in the feed industry. Two important parameters which must be controlled in feedstuffs are available nitrogen, and essential amino acids. Amino acid analysis is a useful tool for monitoring both factors.

We presented our initial work on the analysis of feeds at the 10th AOAC Annual Spring Training Workshop (this work was subsequently published<sup>1</sup>). At that time, we talked at length with Dr. Robert Elkin (Purdue University), one of the leading researchers in the field of animal nutrition. He has recently published a paper<sup>2</sup> comparing the performance of the Waters Pico-Tag System with conventional cation exchange amino acid analysis for feedstuffs.

Corn, peanut meal, a complete mixed feed, and two sorghum feeds (a high and a low tannin variety) were hydrolyzed in 6N HCl. Duplicate samples were subjected to performic acid oxidation prior to hydrolysis; cysteine and methionine were determined as cysteic acid and methionine sulfone, respectively. Derivatization was carried out using a Pico-Tag Workstation, and the analysis was performed on a 710/720/730 system configured for the Pico-Tag method.

Figure 1 shows the chromatogram of the PTC amino acids from oxidized and hydrolyzed mixed feed. Table 1 shows the results of the comparative analysis, expressed as percent of crude protein.

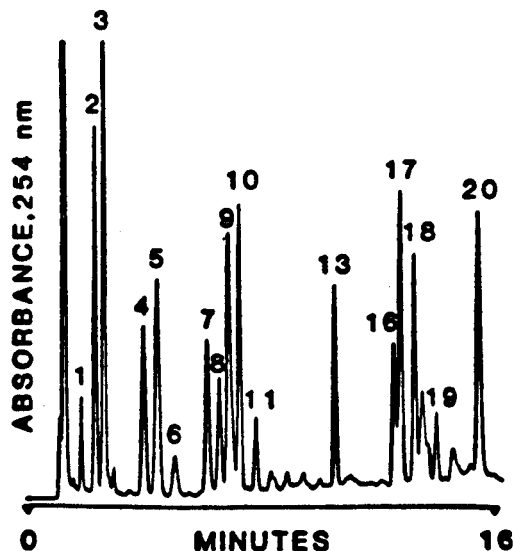


Fig. 1. Chromatogram of a complete mixed feed hydrolyzate subjected to oxidative pretreatment. Peaks: 1 = Cya; 2 = Asp; 3 = Glu; 4 = Ser; 5 = Gly; 6 = His; 7 = Arg; 8 = Thr; 9 = Ala; 10 = Pro; 11 = Met-O<sub>2</sub>; 12 = Tyr; 13 = Val; 14 = Met; 15 = Cys; 16 = Ile; 17 = Leu; 18 = Aminohexanoic acid; 19 = Phe; 20 = Lys.

**Table 1**

	PICO-TAG	IEX
ASP	2.106	2.170
GLU	3.574	3.921
SER	0.996	1.077
GLY	1.004	1.078
HIS	0.497	0.607
ARG	1.399	1.515
THR	0.782	0.840
ALA	1.089	1.145
PRO	1.250	1.298
TYR	0.795	0.786
VAL	1.003	1.060
MET	0.445	0.456
CYS	0.303	0.340
ILE	0.925	0.911
LEU	1.783	1.835
PHE	0.963	1.004
LYS	1.009	1.115

The authors concluded that "... the two methodologies employed in the present study agreed with each other as well as one might expect conventional CXC [*cation-exchange chromatography - ed.*] amino acid analyses from different laboratories to concur.", and that "Furthermore, on a practical basis, absolute differences between methods ... were generally small and would be anticipated to be of minor significance with regard to diet formulation." In summary, the Pico-Tag System "... provides a viable alternative to AAA at approximately one-half the cost, is generally easy to operate and maintain, and is readily adaptable to the analysis of compounds other than amino acids."

1. B. A. Bidlingmeyer, *et al.*, J.A.O.A.C., 70, No. 2, 1987, 241-247.
2. R. G. Elkin and A. M. Wasynczuk, *Cereal Chemistry*, 64, No. 4, 1987, 226-229.

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