Waters
Lab Highlights
An Internal Communication
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# DETERMINATION OF LYSINOALANINE IN PROCESSED FOODS USING THE PICO-TAG™ METHOD

Many complex reactions occur when food proteins are subjected to excessive heat. One of the most common reactions, particularly at alkaline pH, is the formation of lysinoalanine, an indigestible cross link between two protein chains. This reaction involves formation of a bond between the Lysine side chain amino group and dehydroalanine, formed by ß-elimination of water from a serine residue. Lysinoalanine (LAL) is not a true dipeptide, because the two amino acid residues are not linked by a peptide bond; thus the molecule is stable to hydrolysis (the structure of LAL is shown in Figure 1). Although once thought to be toxic to man, lysinoalanine is now regarded as an indicator of the "thermal abuse" e.g.; over-processing of protein containing foods.

The British Food Manufacturing Industries Research Association, Leatherhead, UK, has developed a simple and reliable procedure for determining lysinoalanine using the PICO-TAG™ Amino Acid Analysis System. The only modification required is to extend the run time slightly, as LAL elutes about one minute after lysine, well resolved from the amino acids and reagent peaks. Figure 2 shows a chromatogram of a hydrolyzate standard with lysinoalanine added; figure 3 shows a chromatogram of a processed food protein hydrolyzate showing the presence of LAL. This sample required overloading of the amino acids in order to detect at the level of approximately 1 mg of LAL per gram of protein.

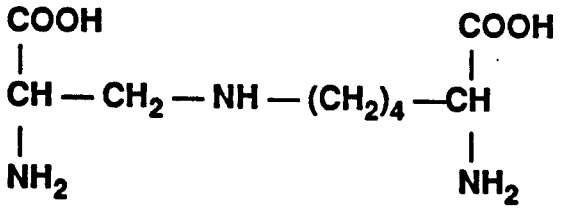


Figure 1. Structure of lysinoalanine

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**Figure 2**

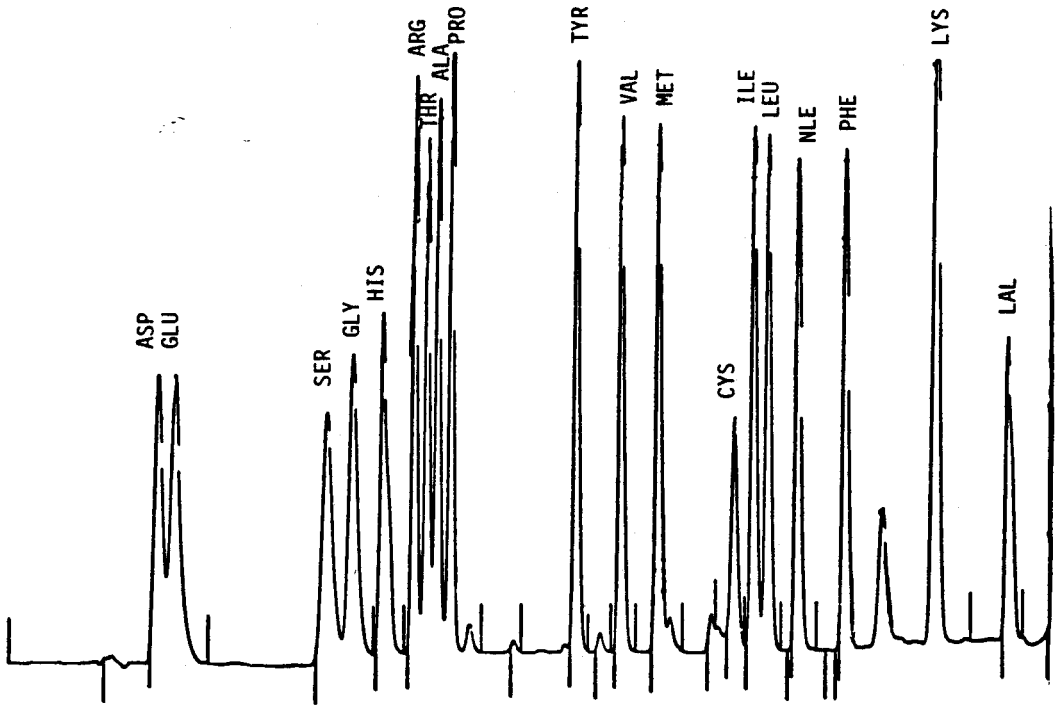


**Figure 3**