

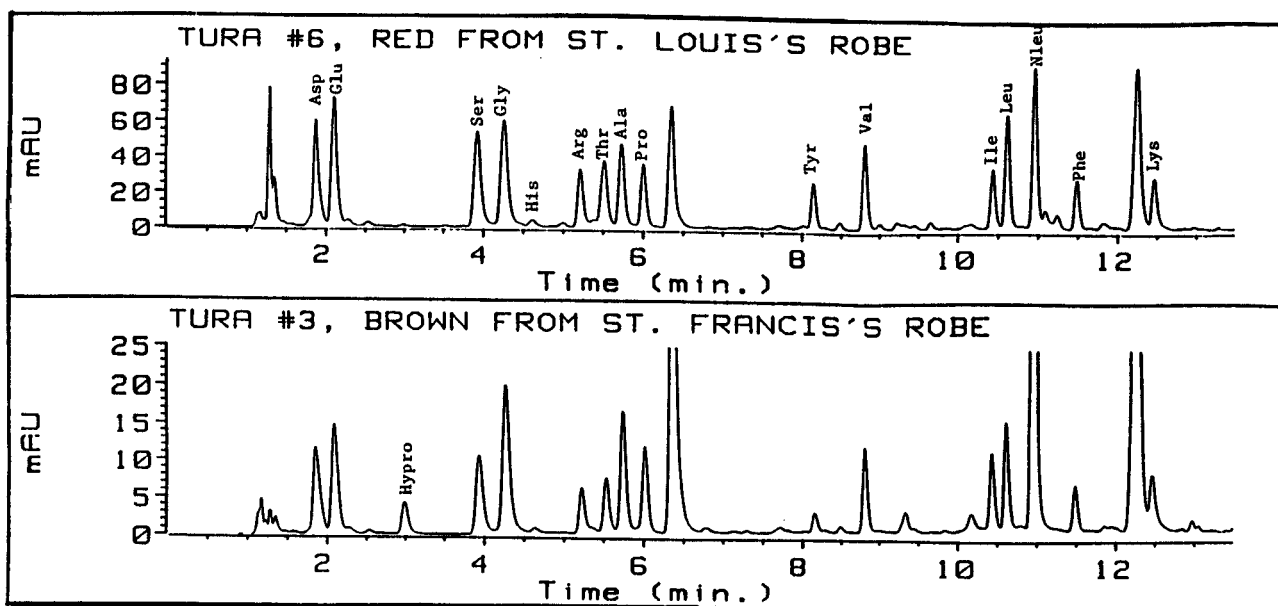
True "State-of-the-Art" Amino Acid Analysis with the Pico•Tag® Method

For many years Waters has provided researchers with the tools to study samples that can be exceedingly difficult to analyze. One extreme example was the space probes sent to Mars and Venus which used Waters™ GC packing materials^{1,2} to provide ultraclean columns for measurement of trace organics that would be evidence of life on the planets. Waters has also gone to sea where scientists used the Auto Tag™ OPA method to measure amino acids in seawater³.

With the introduction of the Pico•Tag method for amino acid analysis^{4,5} scientists were given a new powerful weapon in their arsenal of methods that enabled them to examine even smaller samples. This capability has proved invaluable to art historians studying rare artworks. For example, in a report at Waters Worldwide Technical Meeting⁶, Waters field technical support specialists showed results from a collaborative effort with the Smithsonian Institute that utilized Pico•Tag Amino Acid Analysis to determine the composition of artifacts such as feathers, leather and wool. Results with samples treated with preservatives designed to prevent the degradation of the materials were compared with untreated controls to ascertain the effect, if any, that the chemical treatment had on the composition of the materials. Fortunately, none was observed.

A recent report by Susana Halpine of the National Gallery of Art in Washington, D.C.⁷ gives a good illustration of how creative researchers have used the versatile Pico•Tag method for amino acid analysis to solve challenging analytical problems. Her task was to analyze pigment binders used in fifteenth century Renaissance paintings. Naturally, analyses had to be performed on minute samples that could be taken without visibly damaging the artworks. Ms. Halpine chose the Pico•Tag system for several important reasons: (1) The high sensitivity provided excellent results with a minimum of sample. (2) Baseline resolution of hydroxyproline (hypro) from other amino acids. (3) Ability to analyze other kinds of samples such as amino sugars or pigment dyes.

Hypro analysis was a key element in distinguishing glue-based binders and egg yolk binders, because hypro is present in animal skin used in the glue of the era, but not in eggs. A comparison of binders is shown in Figure 1, clearly demonstrating the ease with which the Pico•Tag method could solve the analytical problem at hand even with extremely limited samples. In fact, in one sample as little as 50ng of protein sufficed to identify the medium as animal skin glue.



References

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6. B. Baer, Waters Fourth Worldwide Technical Meeting, Life Science Poster No. 15, 1986. "Applications of the Pico•Tag System."
7. S.M. Halpine, Submitted to "Studies in Conservation", May 1990.

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Auto Tag, Waters

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