A121 Analysis of a 100-Year-Old Alleged Opium Sample: Quality Assurance and Legal Issues

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After attending this presentation, attendees will better understand the importance of best laboratory practices and quality assurance in everyday work and how this can drastically affect legal implications in drug analysis from a criminal standpoint as well as a business perspective. A comparison of best laboratory practices and quality assurance measures from 1887 and today will also be addressed.

This presentation will impact the forensic science community by emphasizing and addressing proper documentation, quality assurance practices of accepted methodologies, bias, and the importance of reviewable data as they pertain to our current legal system. In today's world of accreditation and transparency, quality assurance is more important than ever. Analysts and managers struggle with a continued question, "What's more important, quality or quantity?" The answer to this question is simply both. Quantity and quality must be weighed together to ensure efficiency and functionality; however, picking one over the other may result in the lack of reviewable data or accepted practices that have no validation. It is critical for a reviewer to be able to reconstruct an analysis or be able to know how an analyst arrived from "point A" to "point B."

This presentation will demonstrate the incongruities associated with the analysis and legal status of imported opium in 1887 as three different "morphia" (or morphine) content results were reported for one sample. Handwritten reports detailing little to no information were supplied with no analytical data or description of tests performed to support the quantitative results. This practice indicates that the analyst/law officers were often taken "at their word" over 100 years ago.

In 1887, opium was legally imported into the U. S. from China as long as the morphine content was *above* 9% in an "unprocessed" or "crude" opium sample. This type of "smoking" opium had a peculiar flavor and was largely used in Hong Kong. However, Chinese immigrants living in the United States favored a different class of crude opium known as "Patua" which had a morphine content of less than 7% and, thus, was illegal in the United States.

Opium was often imported as crude or processed opium and subsequently appraised by the U.S. Customs House. Part of the appraisal processes involved the analysis of morphine content. Initial assays conducted in 1887 indicated that morphine was present at a level of 11.30%, rendering the shipment legal in the United States. Subsequent purchase of this opium at auction by sellers of Persian opium objected to the classification as crude "Patua" opium, since they argued that this class of opium rarely, if ever, contained more than 7% morphine. The importation of this "illegal" opium would be a detriment to their legitimate sales. They, therefore, submitted a formal complaint to the Customs House who, in turn, ordered a reanalysis. The sample was reanalyzed (2x) by Customs House analytical chemists later that year who reported the morphine content to be on average 4.1% (separate analyses of 4.05% and 4.25%). This new result caused the U.S. Customs House Department to launch an investigation. The larger value of 11.30% was subsequently dismissed upon conclusion of the investigation.

A U.S. Marshall conducting research in the 19th century records of the Bureau of Customs found a case file that included an envelope of alleged opium. This led to a request by the National Archives in 1993 requesting that DEA analyze the sample. Analysis of the sample utilizing gas chromatography/flame ionization detector (GC-FID), gas chromatography/mass spectroscopy (GC/MS), and infrared spectroscopy (IR) of the sample indicated that the alleged opium contained morphine (75%) and codeine (4.5%). Typically, the naturally occurring alkaloids of an opium poppy (morphine, codeine, thebaine, noscapine, and papaverine) are required to be present in a substance deemed to be opium. Yet, it is unclear if this was a requirement in 1887 due to the lack of reviewable data. Interestingly, the reported morphine content in 1887 was 4.1% (re-analysis), yet modern GC-FID analysis of the sample indicated that codeine was present at 4.5%. So the question arises, was codeine being erroneously identified and quantitated in the 1880s instead of morphine?

Assuming that morphine was the correct analyte being tested, why was there such a large disparity in quantitative values (11.30% vs. 4.1% vs. 75%)? Best laboratory practices and proper quality assurance practices such as: clear and concise documentation; reviewable data; analytical schemes; chain of custody; and, sampling protocols, which are critical in today's forensic science arena, could have alleviated much of this disparity. All of these issues are routinely depicted on popular television shows and by current real world events surrounding forensic laboratory closures in various states. Although a number of handwritten notes surfaced from the 1887 opium sample, no data relating to the chemical testing of the morphine could be located.

Morphine, Opium, Quality Assurance

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