Chemical Profiling of Illicit Heroin Samples

REFERENCE: Besacier F, Chaudron-Thozet H: Chemical profiling of illicit heroin samples; *Forensic Sci Rev* 11:105–119; 1999.

ABSTRACT: For many years, the forensic chemist has been asked to establish the degree of similarity between different seizures of illicit drugs. Such comparative analyses deal with the comprehensive examination of the chemical and physical characteristics of each drug exhibit. Therefore, they also deal with the development of analytical methods allowing for the collection of data on every drug sample in order to obtain a real fingerprint of it. This review describes various but complementary methods for the chemical profiling of illicit heroin samples. The first method is the identification and quantitation of major constituents of the drug exhibit, i.e., opium alkaloids and derivatives, adulterants and diluents. Second is the characterization of trace level impurities, e.g., neutral byproducts resulting from the action of acetic anhydride upon the opium alkaloids. The third and fourth methods are respective examination of residual solvents and inorganic compounds. Last is the multi-element stable isotope analysis of the sample, i.e., determination of the isotope ratios $^{13}C/^{12}C$, $^{15}N/^{14}N$, $^{2}H/^{1}H$, $^{18}O/^{16}O$ of its major components. For every method presented, analytical parameters are described and discussed. It is concluded that associating the first with the second and/or third method is the most reliable procedure for complete characterization of illicit heroin samples.

KEY WORDS: Chemical profiling, cutting products, heroin, impurities, inorganic compounds, residual solvents, stable isotopes.