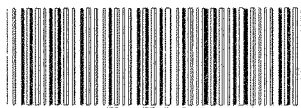


**A Comparison of Chromatographic Methods for
Estimation of the Opium Alkaloid Contents
of Illicit Heroin in Sri Lanka**

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by

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ABSTRACT

Heroin (Diacetylmorphine, DAM) is one of the most commonly encountered illicit drugs and hence must often be identified and quantified in samples involved in illegal drug proceedings. Such samples may contain a wide range of heroin concentrations, a number of related compounds such as morphine, codeine, acetylcodeine and monoacetylmorphine (MAM), other drugs, and a number of diluents. The current study was undertaken in view of the importance of accuracy in the determination of the heroin content consequent on the nature of the legislation as given in the third schedule of the "Poisons, opium and dangerous drugs Ordinance, Act 1984." The Act states that the possession of an amount of heroin greater than 2 g would attract the death penalty or life imprisonment. Therefore a suitable method of analysis must be able to distinguish heroin from other constituents and allow a simple quantification of the compounds of interest.

In this study the major opium alkaloids (diacetylmorphine, monoacetylmorphine, morphine and acetylcodeine) of fifty heroin samples (S_1 to S_{50}) received by the Government Analyst's Department were analysed by Marquis test, Thin Layer Chromatography (TLC) and Gas Chromatography coupled to Mass Spectrometry (GC/MS) and quantified by both Gas Chromatography (GC) and High performance Liquid Chromatography (HPLC). According to the results obtained by both GC and HPLC, diacetylmorphine (DAM), monoacetylmorphine (MAM), acetylcodeine and morphine were detected in 44, 43, 43 and 37 samples respectively. The highest level of DAM observed was 43% by GC and 38% by HPLC. Most of the samples contained DAM percentages less than 10%. Both methods indicated that the percentage of MAM and acetylcodeine ranged from 5–15%. The highest morphine content was 28%, but a majority of the samples contained less than 10%.

High levels of MAM in some sample indicate that the synthesis process has not been fully completed. It may also be due to the degradation of heroin. Acetylcodeine is a byproduct of the synthesis process. High levels of morphine in some samples may result in incomplete acetylation.

According to the present study the results obtained by GC and HPLC were different in some instances. The statistical analysis indicated that the DAM and acetylcodeine concentrations determined by GC and HPLC were significantly different while those of MAM and morphine were not. It is unclear as to why this is so, such the recovery studies conducted using both methods were satisfactory.