

IRD 3 Vapor Phase GC-IR

Limits of Detection

Introduction

To establish a limit of detection for the GC/IRD instrument, serial dilutions of five different drugs were prepared and analyzed using the method IRD.M. The five drugs chosen were Methamphetamine, Mescaline, Cocaine, Diazepam, and Cholesterol. These drugs were chosen primarily for two reasons. The first reason being that three of the drugs, Methamphetamine, Cocaine, and Diazepam, are very common drugs analyzed by the drug lab. The second reason being that these five drugs span a majority of the eleven-minute run time.

Drug	Elution Time
Methamphetamine	1.89 Minutes
Mescaline	3.57 Minutes
Cocaine	5.13 Minutes
Diazepam	5.81 Minutes
Cholesterol	8.41 Minutes

Parameters and Results

Concentrations of 1.0 mg/ml, 0.5 mg/ml, 0.25 mg/ml, 0.10 mg/ml, and 0.05 mg/ml were prepared. Additional concentrations of 0.025 mg/ml were prepared for Cocaine and Diazepam. These standards were analyzed ranging from September 9th to October 3rd, 2005. Sequences were set up analyzing these standards from higher to lower concentrations. Each of these sequences has been evaluated and a summary of the results listed below.

Methamphetamine	
Standard Concentration	Detectable by IRD
1.0 mg/ml	Yes
0.5 mg/ml	Yes
0.25 mg/ml	Yes
0.10 mg/ml	No
0.05 mg/ml	No

Mescaline	
Standard Concentration	Detectable by IRD
1.0 mg/ml	Yes
0.5 mg/ml	Yes
0.25 mg/ml	Yes
0.10 mg/ml	No
0.05 mg/ml	No

Cocaine	
Standard Concentration	Detectable by IRD
1.0 mg/ml	Yes
0.5 mg/ml	Yes
0.25 mg/ml	Yes
0.10 mg/ml	Yes
0.05 mg/ml	Yes
0.025 mg/ml	No

Diazepam	
Standard Concentration	Detectable by IRD
1.0 mg/ml	Yes
0.5 mg/ml	Yes
0.25 mg/ml	Yes
0.10 mg/ml	Yes
0.05 mg/ml	Yes
0.025 mg/ml	No

Cholesterol	
Standard Concentration	Detectable by IRD
1.0 mg/ml	Yes
0.5 mg/ml	Yes
0.25 mg/ml	Yes
0.10 mg/ml	No
0.05 mg/ml	No

Methamphetamine, Mescaline, and Cholesterol were not detectable at the 0.10 mg/ml level. Cocaine and Diazepam were no longer detectable at the 0.025 mg/ml level. IR scans for all five drugs below the 0.25 mg/ml level were very rough and there use for identifications questionable. Based on the data from these standards, the limit of detection for the instrument is set at 0.25 mg/ml.

Conclusion

The GC/IRD is used for qualitative analysis only. There are no methods in development for quantitative work. Concentrations for identification will have to be higher for quality scans for identification to be obtained. The limit of detection will vary slightly with each drug analyzed. This study is an effort to determine an average limit of detection for future reference.