

Adapting extraction SPE and GC-MS analysis methods to search Promethazine in hair

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Introduction

Promethazine is a molecule from the antihistaminic family use as a sleeping drug. This medicine is a psychotropic, a substance which acts on the central nervous system, and can therefore make patient dependent or even cause death. This molecule can be searched in blood, urine but also hair. This type of analysis is made, in most cases, in the toxicology laboratory in hospitals. Technical analyses used are GC-MS or HPLC-MS after a solid phase extraction.

Experimental conditions

Analyses were realized with a Thermo GC-MS. The column used was HP-1 (100% dimethylsiloxane) of 30m; 0.25mm; 0.25 μ m. The carrier gas was Helium at 1.5 mL/min.

Firstly, promethazine was injected with the internal standard, caffeine at a high concentration (100mg/L) in the GC-MS to see the retention times and fragmentation ions. Then, compound calibrations were carried out between 5 at 100 mg/L.

Finally, hair was doped with known quantities of promethazine, and extracted by solid phase extraction with column Discovery C18 500mg/3mL. All the extraction yields were calculated and analyzed by GC-MS.

Results

Figure 1 shows the chromatogram of promethazine and caffeine at 25mg/L with a gradient of temperature to 100°C from 280°C with 20°C/min. The first peak is caffeine with a retention time of 6.23 minutes and the second is promethazine with a retention time of 9.33 minutes.

Figure 2 shows the mass spectrum of promethazine with the molecular ion $m/z=284$ and fragmentation ions. The most intense ion is $m/z=72$ corresponding to $(CH_3)_2NCHCH_3^+$.

The solid phase extraction yields were 90% in general between 10 at 50mg/L of promethazine. After extraction of hair and solid phase extraction, the results of extraction yields did not change.

Conclusion

Promethazine can be found in hair using either either GC-MS or HPLC-MS analytical techniques.

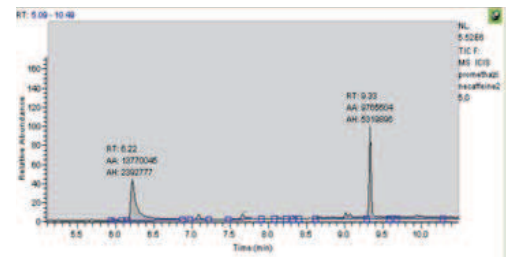


Figure 1: chromatogram of promethazine and caffeine in GC-MS analysis

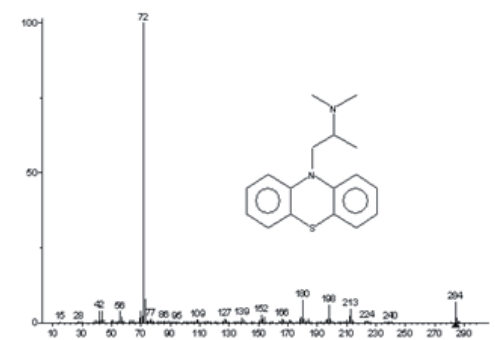


Figure 2: mass spectrum of promethazine