

Analysis of Amphetamines in Nail Clippings Collected from Female Prisoners

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Learning Objective: To evaluate the usefulness of fingernail as an analytical specimen for confirming amphetamines use and to study relative contents of amphetamines in nail and hair.

With respect to the use of fingernail as an analytical specimen, fewer studies have been directed to amphetamines than other commonly abused drugs, such as opiates or cocaine. In this study, paired fingernail and hair specimens were collected from 43 consenting female prisoners who have admitted the use of amphetamines and/or opiates. These specimens were quantitatively analyzed for amphetamine, methamphetamine, methylenedioxyamphetamine, and methylenedioxymethamphetamine. Methamphetamine and amphetamine concentration ranges, and methamphetamine/amphetamine ratios found in the 21 amphetamines-containing specimens were 0.46-58.17 ng/mg, <0.20-5.42 ng/mg, and 4.06-14.01, respectively. Six paired hair specimens from these 21 sets were selected and cut into 1.5-cm sections. The first 5 sections (from the root) were analyzed. Analytical data are shown in Table 1.

Table 1. Amphetamines in fingernail and hair

Sample No.	Fingernail (ng/mg)				Hair (ng/mg)		
	Methamph.	Amph.	Methamph./Amph.		Methamph.	Amph.	Methamph./Amph.
3 (A-008)	13.96	2.73	5.11	S-1 ^a	16.78	4.32	3.88
				S-5 ^a	58.78	12.83	4.58
5 (A-013)	12.43	1.70	7.31	S-1	18.95	2.27	8.35
				S-5	38.29	3.59	10.67
8 (A-024)	58.17	5.42	10.73	S-1	134.1	24.37	5.50
				S-5	80.55	10.42	7.73
11 (A-027)	3.94	0.97	4.06	S-1	7.03	1.76	3.99
				S-5	30.23	5.89	5.13
13 (A-030)	43.63	3.38	12.91	S-1	71.81	11.59	6.20
				S-5	9.24	1.73	5.34
19 (A-041)	11.70	1.42	8.24	S-1	20.95	3.84	5.46
				S-5	45.25	6.44	7.03

^a S-1, S-5: The first and the 5th sections of the 5 sections analyzed.

It is interesting to note that results obtained from hair sectional analysis follow definite trends. Specifically, the concentrations of methamphetamine and amphetamine in samples 3, 5, 11, and 19 increase continuously, while the same analytes' concentrations in samples 8 and 13 decrease continuously. Nail clippings will be continuously collected on biweekly intervals. Whether the analytes' concentrations in nail specimens will follow the same trends observed for hair will be investigated.