



Conversion of cocaine to benzoylecgonine in oral fluid proficiency samples over 18 months

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Objective

- The stability of cocaine and benzoylecgonine in oral fluid proficiency specimens received between January 2008 and May 2009 was investigated by comparison of the originally reported results with re-analyzed specimens using GC/MS.

Methods

- Neat oral fluid proficiency samples (3mL, pH 7.0) were received from RTI International, NC via overnight delivery using a Thermo Chill insulator package.
- The specimens were stored in glass amber bottles at 4 C until ready for analysis.
- ELISA screening and GC/MS analysis were initially performed upon receipt of the proficiency sets, and then the specimens were returned to refrigerated storage.
- A second analysis of all proficiency samples forming the basis of the cocaine (COC) to benzoylecgonine (BZE) conversion data comparison was performed in June 2009 using GC/MS analysis.
- Aliquots of the proficiency samples (1mL; N=10), calibrators (N=5) and controls (positive and negative in each batch) were diluted 1+3 with Quantisal™ buffer prior to analysis.
- Briefly, specimens, calibrators and controls were extracted using mixed mode solid phase columns and derivatized with trifluoroethanol and heptafluorobutyric anhydride in methylene chloride.

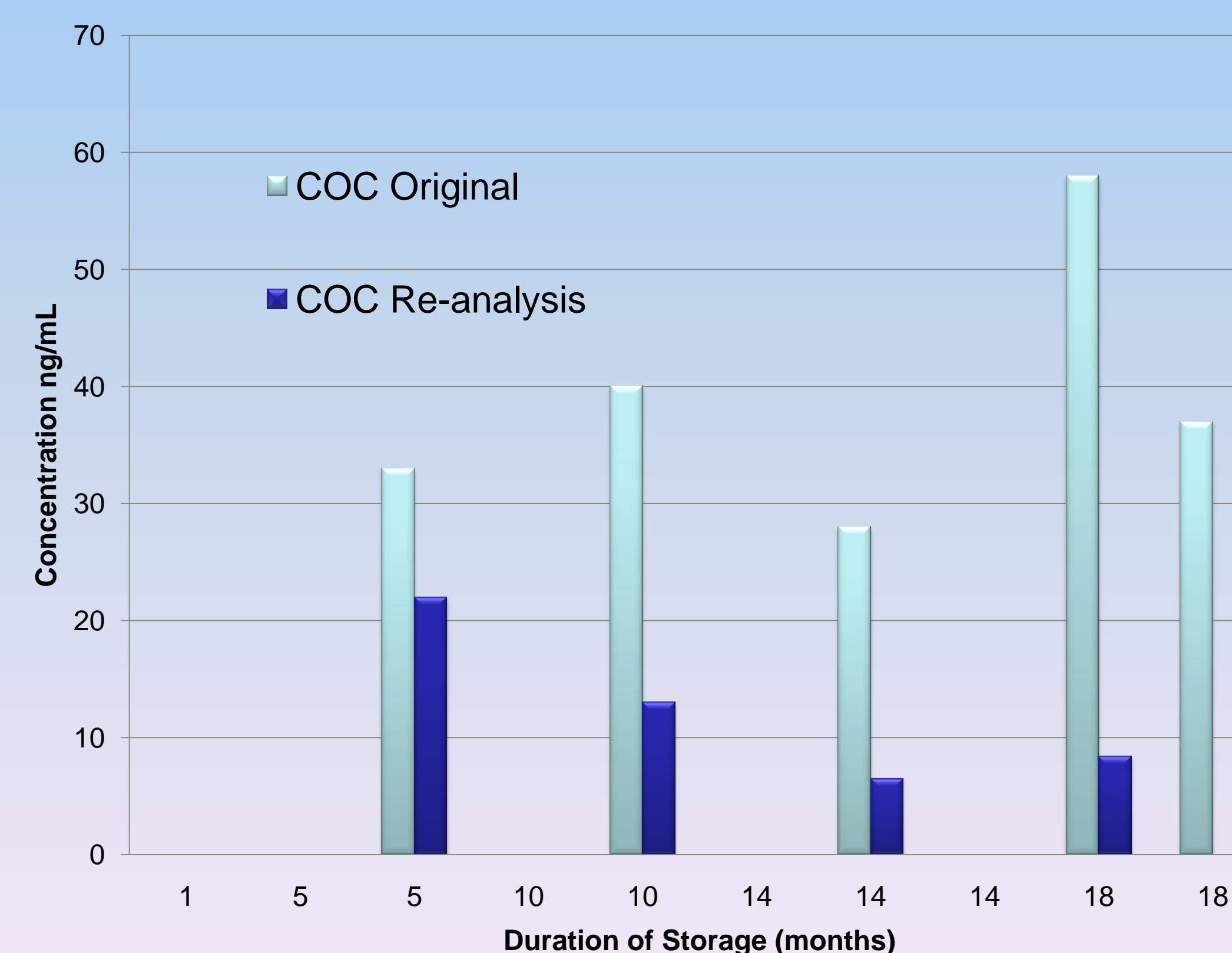
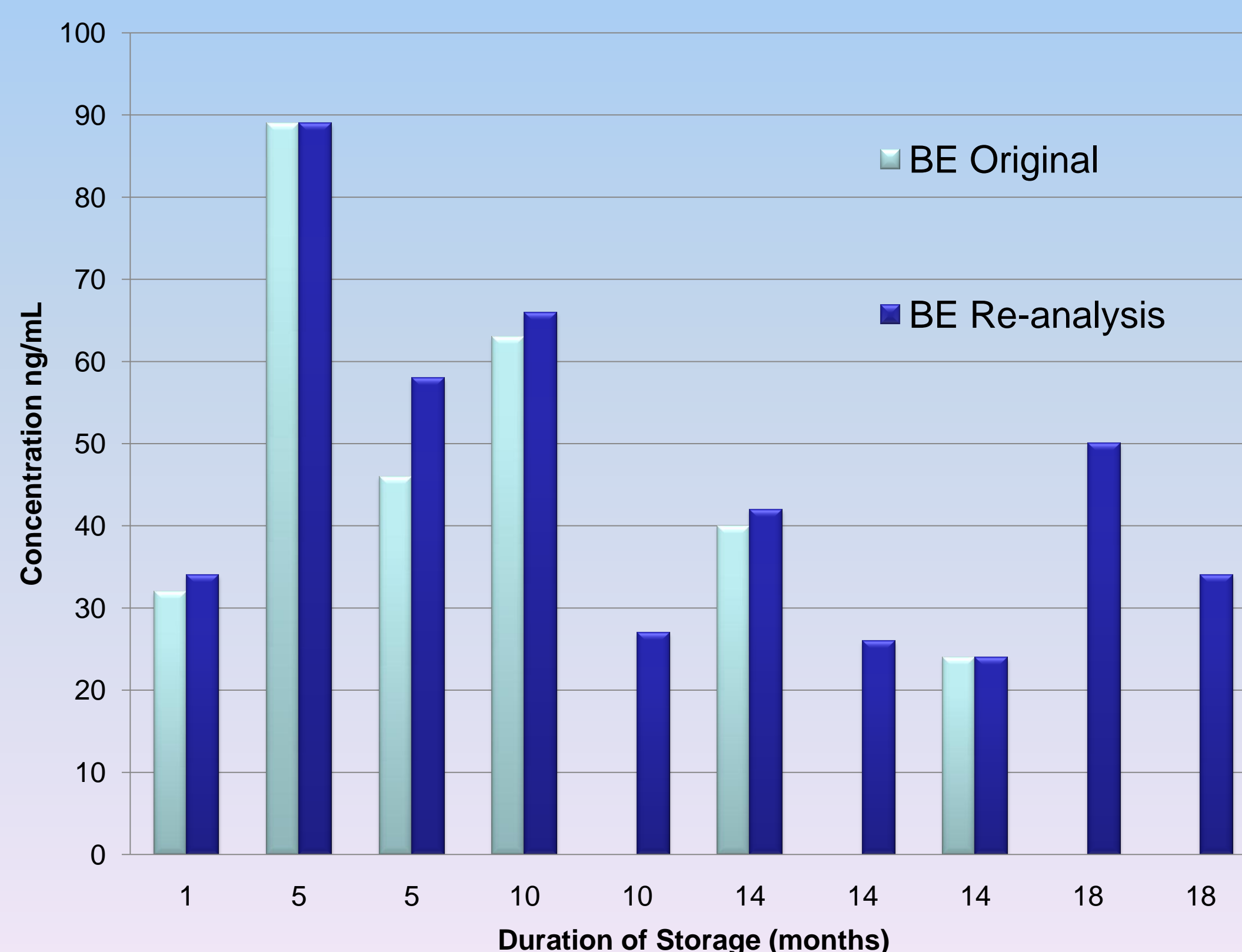
Results

- Five specimens were originally positive in our laboratory for BZE alone by both ELISA and GC/MS. When re-analyzed, all of those samples were within +/- 10% of their original ELISA and GC/MS.
- Four samples were originally positive for cocaine only; upon re-analysis the cocaine concentration in all specimens had decreased, with those stored for 18 months showing the highest loss.
- BZE was present in all four of those specimens, showing conversion of parent cocaine to BZE over time.
- One sample, which was originally positive for COC (33ng/mL) and BZE (46ng/mL) showed a reduction in cocaine concentration to 22ng/mL and an increase in BZE concentration to 58ng/mL over a 5 month storage period.

Data Summary

Storage time (months)	Original concentration (ng/mL)		Re-analysis concentration (ng/mL)	
	Cocaine	BZE	Cocaine	BZE
1	0	32	0	34
5	33	46	22	58
5	0	89	0	89
10	0	63	0	66
10	40	0	13	27
14	0	24	0	24
14	0	40	0	42
14	28	0	6	26
18	58	0	8	50
18	37	0	0	34

Conversion of Cocaine to BZE



Conclusion

- Cocaine was converted to benzoylecgonine in neat oral fluid proficiency samples stored at 4°C, while benzoylecgonine in oral fluid remained stable.
- This has implications for the interpretation of oral fluid test results if specimens are re-tested after some time.
- Further studies will focus on storage of cocaine in transportation buffer supplied with oral fluid collection devices in an effort to improve the stability of cocaine.

