Harm reduction advice based on the analysis of crack cocaine seizures from Swindon, UK

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Background

- Here we present the results of a collaboration between a drugs service, police and academics. We offer one way to expand harm reduction advice for crack cocaine users.
- Anecdotal reports from Drugs & Homeless Initiative (DHI) clients suggested that crack obtained in Swindon (UK) was of low quality.
- DHI workers felt this provided a harm reduction opportunity and approached the University of Bath for advice. It is hypothesised that providing information about the content and quality of local crack could influence *informed* choices made by users.
- The police felt additional forensic information, not routinely collected, could be helpful in expanding police intelligence.
- This study analysed crack samples provided by the police seized in the Swindon area. Major adulterants and cocaine content was determined. This was translated into key messages for users.

Method

- Crack cocaine samples were donated to the University by Wiltshire police once cases were closed.
- 2 x 100mg was from removed from each ‘rock’ for analysis.
- 100mg was shaken with 2ml dichloromethane and 2ml water and the two layers separated.
- If the water layer pH was basic (>pH7) this indicated the crack was made by the bicarbonate method. This was titrated with acid to determine residual carbonate.
- If the water layer pH was acidic (<pH7) this indicated the crack *could* have been made by the ammonia method.
- High Performance Liquid Chromatography (HPLC) was used to determine any salt form cocaine in the water layer.

Method

- The dichloromethane layer was assayed by HPLC to measure cocaine base content.
- Analysis methods were based on the British Pharmacopoeia assay for cocaine.
- Analysis was performed in duplicate and average results calculated.
- Nuclear Magnetic Resonance (NMR) was performed on a separate portion (~ 60mg) of the ‘rock’ to identify major contaminants.

Results

- 50 samples have been analysed so far.

Content

Not all contained crack cocaine.

40 (80%) samples contained cocaine.

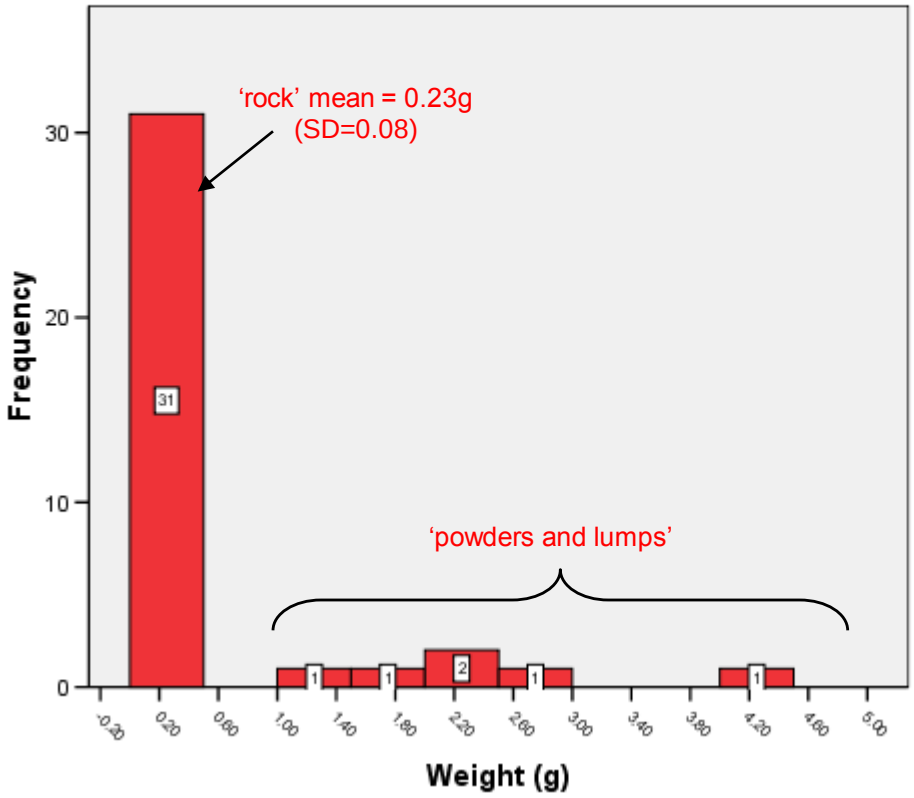
- 38 (76%) of the samples contained cocaine in base form, four of which *also* contained salt form; one (2%) contained 56.1% salt and 2.1% base
- 2 (4%) contained salt form cocaine only

10 (20%) samples were not found to contain any cocaine. Of these:

- 5 appeared to be heroin
- one probably citric acid
- 4 unknown

Weight of ‘crack’ seizures

Fig 1: weight distribution of crack seizures (g)



mean = 0.58g

(SD =0.91)

mode= 0.23g

min = 0.05g

max = 4.10g

(n=37, 3 missing)

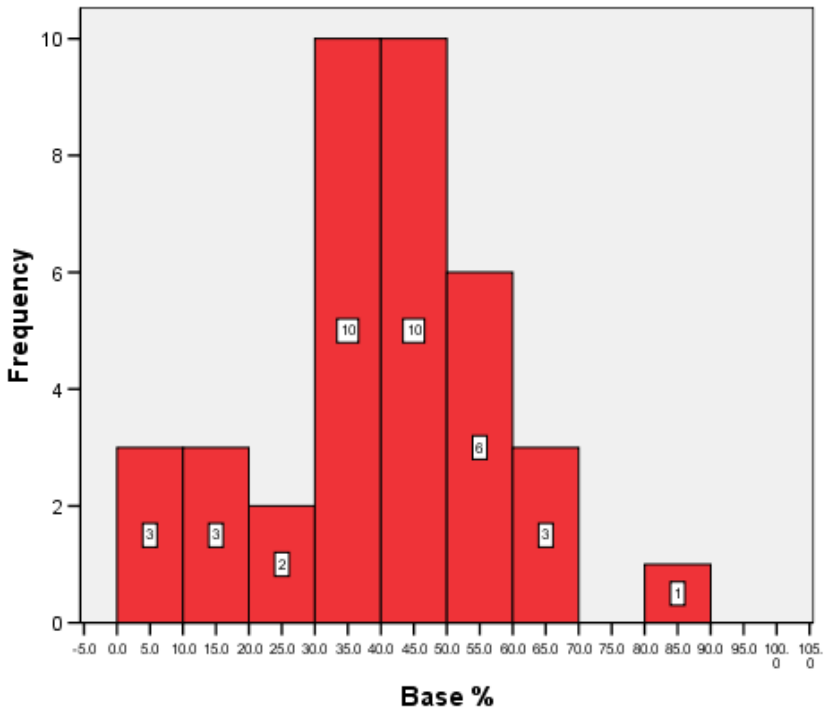
Probable crack manufacturing method

- 30 by Bicarbonate method
- 8 *possibly* by Ammonia method
- 2 pH not determined

Cocaine base content of rocks

- Cocaine base content ranged from 2.1 to 88.0%.

Fig 2: cocaine base content of crack rocks



mean = 39.4%

(SD =17.6)

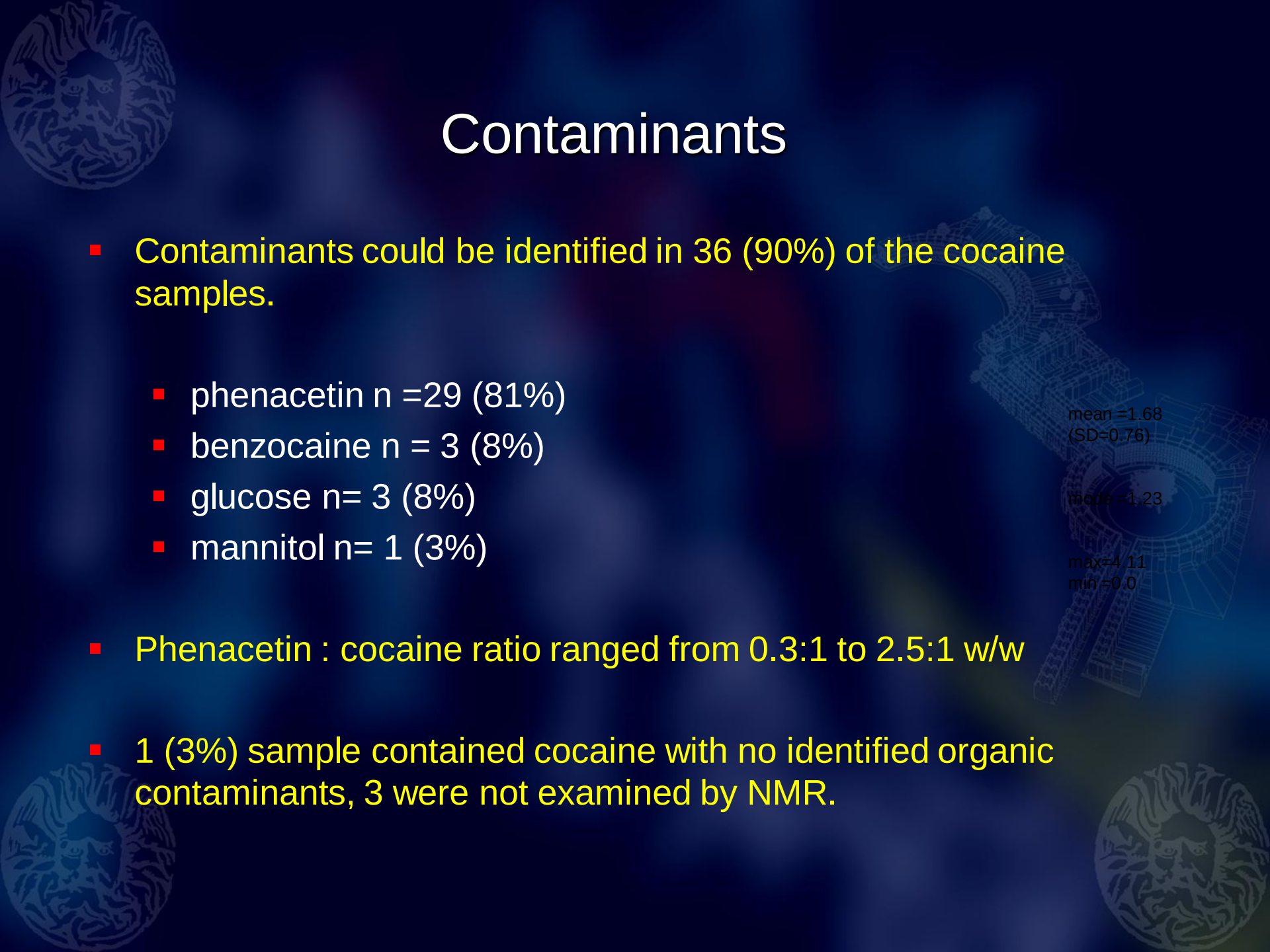
mode =39.6%

min =2.1%

max =88.0%

Contaminants

- Contaminants could be identified in 36 (90%) of the cocaine samples.
  - phenacetin n =29 (81%)
  - benzocaine n = 3 (8%)
  - glucose n= 3 (8%)
  - mannitol n= 1 (3%)
- Phenacetin : cocaine ratio ranged from 0.3:1 to 2.5:1 w/w
- 1 (3%) sample contained cocaine with no identified organic contaminants, 3 were not examined by NMR.



cocaine: phenacetin 2:1

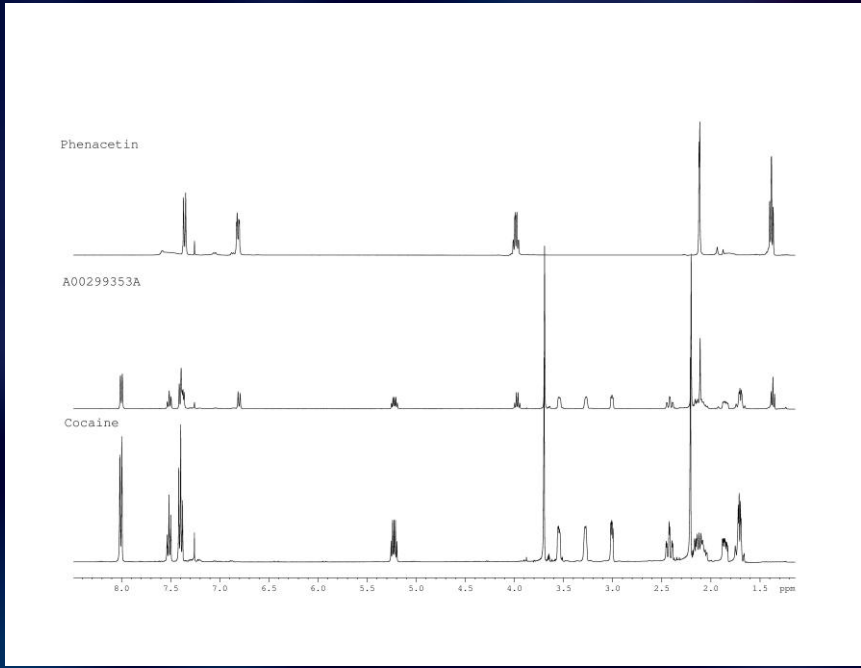


Fig 3. NMR spectra showing cocaine and phenacetin standards and a sample with a high cocaine: phenacetin ratio

cocaine: phenacetin 1:2

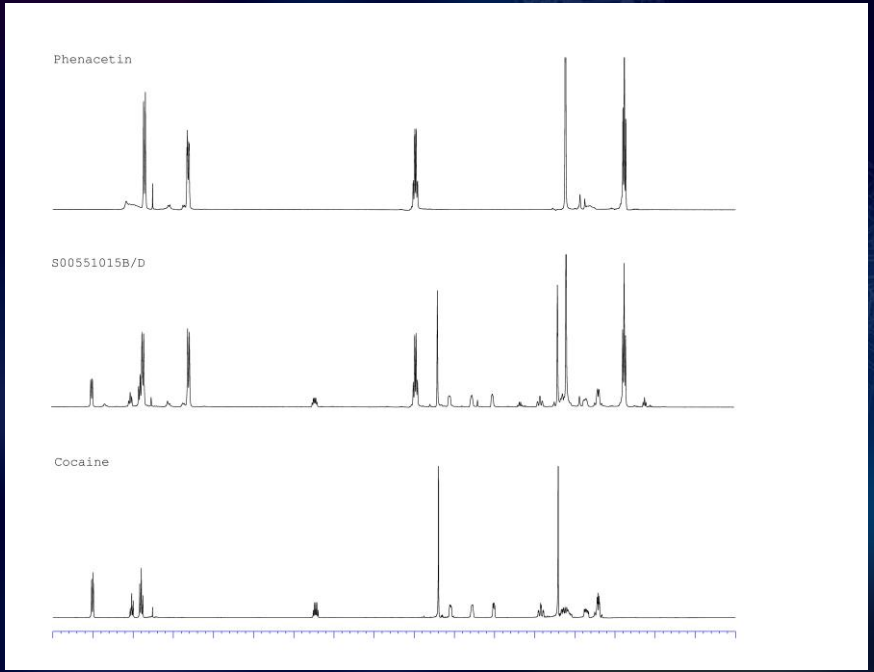
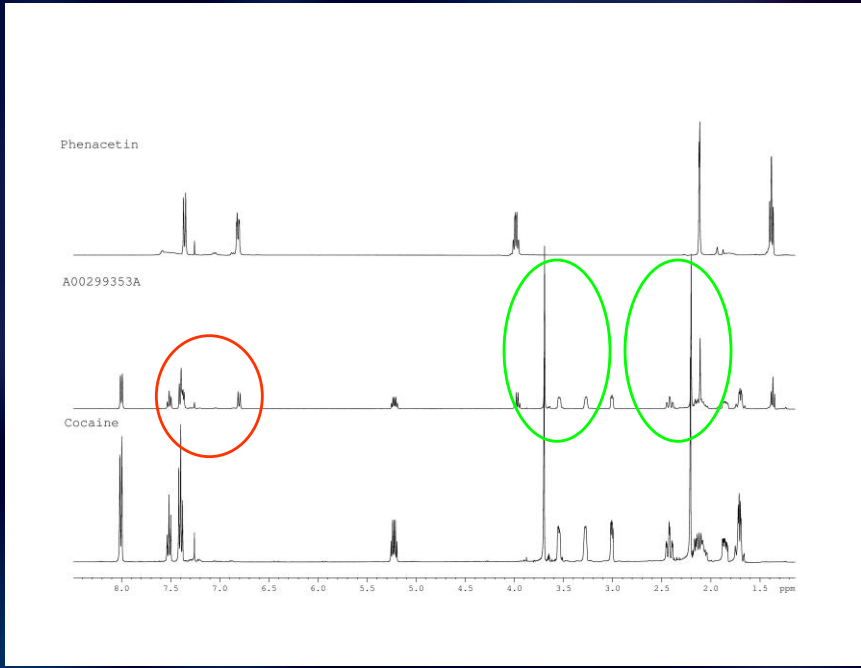


Fig 4: NMR spectra showing cocaine and phenacetin standards and a sample with a low cocaine: phenacetin ratio

cocaine: phenacetin 2:1



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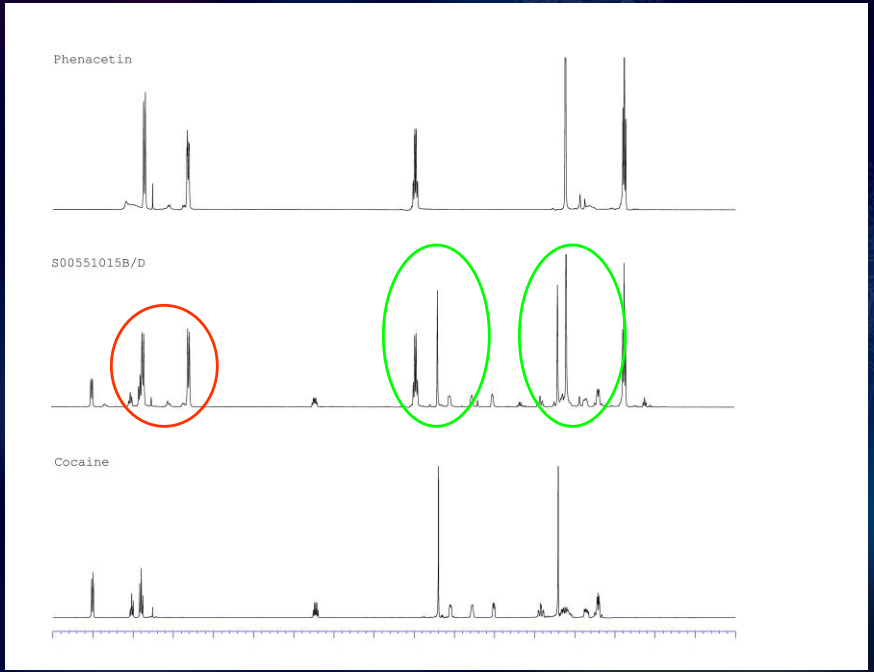


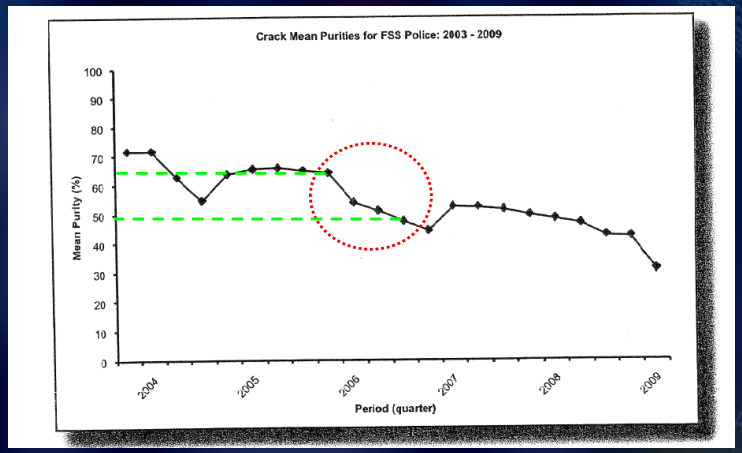
Fig 4: NMR spectra showing cocaine and phenacetin standards and a sample with a low cocaine: phenacetin ratio

Harm reduction messages

- 90% of ‘crack’ samples analysed had contaminants in them
- The most common, phenacetin, is potentially harmful to kidneys
- There was huge variation in cocaine ‘purity’ with the most common being ~ 40%; so 3/5th of a Swindon ‘crack rock’ isn’t cocaine.
- *Maybe we could use NMR spectra for visual illustration to users?*

Summary

- The analysis concurred with the user reports that Swindon crack was of low quality; 20% of cases contained no cocaine.
- The average content was 39%, UK average content (2006-08) is reported to be higher (69%) [Schifano & Corkery, 2008]. Although….



- Most samples were contaminated with phenacetin, present in the ratio 0.3:1 to 2.5:1 with respect to cocaine. Phenacetin is not licensed as a medicine in the EU and associated with kidney damage in crack users [Brunt et al, 2009].

Conclusions

- Although the data is not novel in the analytical sense – the contaminants are previously reported in the literature and purity data is available, the *local* context of the analysis is novel and provides users with data from their own streets.
- Local harm reduction messages can inform users that analysed crack was of low cocaine content and may present a risk to kidney health.
- The main limit of this work is the time delay necessary between seizure and analysis. Seizures were made 2-3 years before analysis. The data is therefore retrospective, samples were collected over a one year period.

Acknowledgements

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- Drugs and Homeless Initiative, Swindon, especially Mick Webb

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