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i) What is breath analysis?

Breath = mixture of: Oxygen, Nitrogen, Carbon Dioxide (CO₂), water vapour and a small percentage of Volatile Organic Compounds (VOCs).

Non-invasive, repeatable method, applicable to all ages. Breath analysis can be used as a diagnostic tool for measuring VOCs that are present in exhaled breath.

Nowadays, this can be done in real-time with techniques that are capable of detecting VOCs in trace level.

ii) What are Drugs of Abuse?

According to The Sage Dictionary of Criminology, drugs of abuse are "drugs that are taken for nonmedicinal reasons, usually for mind altering reasons."¹

Categories:

Alcohol	MDMA (ecstasy)
Tobacco	Ketamine (Cat valium)
Cannabis (marijuana)	LSD
Opioids (heroin)	Steroids
Amphetamine (speed)	NPS ("legal highs")



Fig. 1: Drugs of abuse²

iii) Background/gaps

Not much research has been done regarding breath analysis and drugs of abuse. The only widely known drug of abuse that has been tested a lot is alcohol.³

Only in the recent years, with breath analysis gaining ground in medical applications, have people been trying to find a way to introduce breath analysis to forensic science.

Since breath sampling is relatively straightforward and easy, using breath for testing drugs could overcome many problems faced until now, such as difficulties in sampling.³



Fig. 2: Real-time breath analysis

iv) Research Aim

- Can we detect drugs of abuse in breath?
- What kind of compounds can we detect?
- Are there common compounds (biomarkers) for drugs of abuse?
- Can the metabolic pathway of drugs breakdown be detected in breath?
- Are there similarities between the metabolic pathway of illicit drugs? Are there similarities between the metabolic pathway of "legal highs"?

References:

- 1) E. McLaughlin, J. Muncie (2013) The Sage dictionary of criminology. SAGE. London, UK.
- 2) http://en.wikipedia.org/wiki/Psychoactive_drug
<https://www.flickr.com/photos/dcoetzee/8488782713/>
- 3) Beck et al, (2010) Amphetamines Detected in Exhaled Breath from Drug Addicts: A New Possible Method for Drugs-of-Abuse Testing. Journal of Analytical Toxicology, Vol. 34: 233-237

For more information about the program or the project please visit our websites or use the QR Code:

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