

# Appendix 5: Overview of drug adulterants

Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
<b>Illicit drugs</b>	Sucrose Lactose Dextrose Mannitol	Sugars	To dilute/add bulk Legally and readily available	Inactive adulterants	Minimal risk of adverse health effects. Can cause nasal irritation
	Lead	Soft, malleable metal	<i>Heroin</i> Potentially a by-product of the use of lead pots in illicit drug manufacture  <i>Methamphetamine</i> Sometimes used in methamphetamine manufacture. Poor manufacturing can result in lead residue in drug product	In low dosages lead poisoning can have mild effects. Injecting of illicit drugs adulterated with lead causes severe adverse health effects	<ul style="list-style-type: none"> <li>• Abdominal pain and cramping</li> <li>• Headaches</li> <li>• Anaemia</li> <li>• Dizziness</li> <li>• Nausea/vomiting</li> <li>• Muscle weakness</li> <li>• Seizures</li> <li>• Coma</li> <li>• Renal injury</li> <li>• CNS damage</li> </ul>

Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
	Caffeine	Psychoactive stimulant drug	<p>Caffeine is legal, cheap and more readily available than illicit drugs</p> <p><i>Heroin</i> Vaporizes heroin at lower temperature when smoked – slightly increases efficiency</p> <p><i>Cocaine/ amphetamine/ methamphetamine/ ecstasy</i> Stimulant properties of caffeine can create similar, although usually milder, effects to the primary drug</p>	<p>In small doses there are few serious health repercussions</p> <p>Moderate to large doses can cause considerable harms</p>	<ul style="list-style-type: none"> <li>• Mood disturbances</li> <li>• Induces anxiety</li> <li>• Addictive</li> <li>• Sleep disturbance</li> <li>• Increases risk of a range of health problems</li> </ul>

Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
	Procaine	Local anaesthetic	<p><i>Heroin</i> Facilitates smoking of heroin and may relieve the pain of intravenous injection due to anaesthetic properties</p> <p><i>Cocaine</i> Similar anaesthetic and subjective effects as cocaine</p>	Risk of toxicity at high doses	<ul style="list-style-type: none"> <li>• CNS problems</li> <li>• Nausea</li> <li>• Vomiting</li> <li>• Dizziness</li> <li>• Tremors</li> <li>• Convulsions</li> <li>• Anxiety</li> </ul>

Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
	Paracetamol/acetaminophen	Over-the-counter pain-relief medication	<p>Easily available, relatively cheap</p> <p><i>Heroin</i>                      Analgesic effects and bitter taste of paracetamol may disguise poor-quality heroin                      May be used because it has similar melting point to heroin</p>	<p>Low dosages should have minimal impact</p> <p>Risk of toxicity at high doses</p>	<ul style="list-style-type: none"> <li>• Liver damage</li> <li>• Gastrointestinal effects</li> <li>• Adverse effects when mixed with alcohol</li> </ul>

Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
	Strychnine	Pesticide	<p>A fine motor stimulant. Low doses act as a muscle stimulant</p> <p><i>Heroin</i> Enhances retention of heroin when volatized. Has only been found at non-life threatening quantities</p> <p><i>Cocaine</i> Reason for inclusion unknown. May have been unintentional</p>	While it has only been reported in non-life threatening quantities, small increases could potentially be fatal	<ul style="list-style-type: none"> <li>• Muscle spasm</li> <li>• Opisthotonos (holding of body in awkward rigid position)</li> </ul>

Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
<b>Heroin</b>	Phenobarbital	Barbiturate	Psychoactive drug that facilitates smoking of heroin	Risk of overdose in intravenous drug users who are hypersensitive	<ul style="list-style-type: none"> <li>• Overdose</li> <li>• Death</li> </ul>
	Quinine	Antimalarial medication	<p>Bitter taste similar to heroin and may be used as a diluent</p> <p>Also mimics the respiratory 'rush' felt by injecting heroin users shortly after administration</p>	Can cause overdose and a host of other adverse health reactions	<ul style="list-style-type: none"> <li>• Acute renal failure</li> <li>• Cinchonism</li> <li>• Gastric disturbances</li> <li>• Thrombosis and hypotension (intravenous use)</li> <li>• CNS overstimulation</li> <li>• Visual disturbances (blindness)</li> <li>• Death</li> </ul>



Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
	Diazepam	A benzodiazepine derivative drug used to treat anxiety disorders, muscle spasms, and alcohol withdrawal	To enhance the euphoric effects of heroin by increasing its depressant effects on the CNS	<p>Can cause overdose – increased risk of coma, respiratory depression and death associated with use in combination with CNS depressants</p> <p>Risk of injury arising from sedative properties</p>	<ul style="list-style-type: none"> <li>• Low rates of mortality but implicated in a significant proportion of opioid overdose</li> <li>• Mood disturbances</li> <li>• Dependence syndrome and withdrawal symptoms (eg convulsions, dysphoria, anxiety, tremors, nausea and vomiting)</li> </ul>





Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
	Phenacetin	Analgesic substance	Pain-relieving properties and similar physical properties to cocaine	Phenacetin is banned in many countries due to links with renal failure and suspected carcinogenicity	<ul style="list-style-type: none"> <li>• Analgesic nephropathy</li> <li>• Haemolytic anaemia</li> <li>• Methaemoglobin-aemia</li> <li>• Kidney cancer</li> <li>• Bladder cancer</li> </ul>
	Levamisole	An anthelmintic medication (used for expelling parasitic worms)	Unknown; however, it is theorised that it gives a more intense 'high'	<p>Generally no longer used with humans, but still available as a veterinary medicine</p> <p>Highly toxic</p>	<ul style="list-style-type: none"> <li>• Fever</li> <li>• Agranulocytosis</li> </ul>

Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
<b>Methamphetamine</b>	Methylsulfonyl-methane (MSM)	Naturally occurring in some foods and also marketed as a dietary supplement	<p>MSM is readily available and is physically similar to methamphetamine (odourless, white, crystalline powder)</p> <p>Methamphetamine adulterated with MSM creates the impression of high-purity methamphetamine</p>	None identified	None identified



Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
	Paramethoxymethamphetamine (PMMA) and paramethoxyamphetamine (PMA)	Illegal psychoactive chemical	Purposefully added to ecstasy due to stimulant properties	Relatively unknown, but high dosages have caused death	
<b>Cannabis</b>	Lead	Soft, malleable metal	To increase weight	Lead poisoning	<ul style="list-style-type: none"> <li>• Abdominal cramps</li> <li>• Anaemia</li> <li>• Nausea</li> <li>• Fatigue</li> <li>• Polyneuropathy</li> <li>• Toxic effects</li> <li>• Seizures</li> <li>• Coma</li> <li>• Death</li> </ul>
	Aluminium	Soft, malleable metal	Unknown, but aluminium contamination may have resulted from impure water supply	Contribute to smoking-related diseases	Smoking-related adverse health effects

Drug	Adulterant(s)	Licit use	Potential reason for presence as adulterant	Public health risks	Health consequences
	Glass		Unknown, but potentially to improve apparent quality and increase weight	Inhalation of hot glass fumes	<ul style="list-style-type: none"> <li>• Sore mouth</li> <li>• Mouth ulcers</li> <li>• Chesty persistent cough</li> <li>• Tight chest</li> </ul>

Source: Cole C, Jones L, McVeigh J et al (2010) *CUT: a guide to adulterants, bulking agents and other contaminants found in illicit drugs*. Liverpool: Centre for Public Health, Liverpool John Moores University; and Jones L, Bates G, Bellis M et al (2011) *A summary of the health harms of drugs*. London: Department of Health.