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A contemporary facet on rohypnol: a date rape drug

Abstract

Rohypnol is the common name for a drug called Flunitrazepam, the slang term used is *roofies*. Rohypnol is believed to be most commonly used drug in commission of drug assisted Sexual assaults in the United States, the United Kingdom, and throughout Europe, Asia and South America and very popular in clubs and rave parties. This drug being colourless, odourless and flavourless is simply slipped in a drink, or mixed in any food supplement without being suspected and is used to robe, rape or harm people therefore infamously called as Date rape drugs. It is a strong hypnotic, a sedative ; an anticonvulsant; an anxiolytic ; an amnestic ; and skeletal muscle relaxant. Present paper concisely states about the effects of such drugs, scenarios, attempts to explore various analytical methods available & challenges regarding its analysis posed before the toxicologist and law enforcing authorities. This communication has been sourced from scientific literature available in electronic databases and traditional literature available.

Keywords: rohypnol, hypnotic, sedative, central nervous system, toxicologist

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Introduction

Date Rape drugs usually applies to the drugs that renders us incapable of saying no, it causes sedation, impaired motor skills, unconsciousness and memory loss. Since the mid-1990s the media and researchers have revealed the use of date rape drugs such as Rohypnol, GHB and ketamine. The assault facilitated through such drugs without the consent or through unacceptable consent of a person is known as drug facilitated sexual assault. Moreover these drugs are colourless, odourless and tasteless and can be easily slipped in a drink, without being suspected.[1] Some of the other effects of these drugs are lost sense of time and identity, memory problems, numbness, loss of coordination, aggressive or violent behaviour, depression, high blood pressure, slurred speech, seizures, problems in breathing, loss of consciousness (black out) (Figure 1).

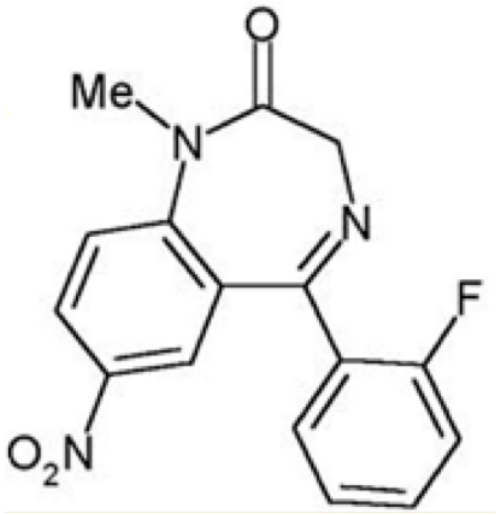

Figure 1 Rohypnol (5-(2-fluorophenyl)-1-methyl-7-nitro-1H-benzo[e][1,4] diazepin-2(3H)-one).

One of the infamous drug among Date rape drugs, a Benzodiazepine which is a central nervous system depressant. Roche (a healthcare and pharmaceutical company) started selling flunitrazepam (Rohypnol) in 1975. At first, hospitals used the drug when a patient needed a deep sleep. It was sold commercially in 1975 in Europe, and in the 1990s in the United States. The drug was given the brand name Rohypnol. It is similar to diazepam (such as Valium) but about 10 times more persuasive since it has much stronger affinity for the GABA receptor than diazepam. Flunitrazepam is readily (80–90%) absorbed through the GI tract and metabolized almost completely by the liver. Its metabolism includes reduction to 7-aminoflunitrazepam and then to the N-glucuronide, demethylation to the N-demethyl metabolite, hydrolysis to the 3-OH metabolite and then to the O-glucuronide. Approximately 90% of its metabolites are excreted through the urine and 10% in the faeces. Deaths involving flunitrazepam have been reported when this drug is abused along with other CNS depressants, such as ethanol, but also due to overdose of flunitrazepam alone. It is easily accessible with some pet names like "*roofies*," "rope," and "roaches.[2,3] It comes as a pill that dissolves in liquids; some of them are undersized, round, and white whereas newer pills are oval and green-gray in colour due to the presence of dye.

Legal status of rohypnol

Rohypnol is commonly prescribed as a sedative; there are over 50 countries around the globe which authorize its production, distribution and use. (Rohypnol Use in Different Cultures) The drug is most prominent in European countries, Columbia and Mexico. Other countries prescribe Rohypnol to aid sleep problems like insomnia and for general anesthesia. Rohypnol is also used to treat withdrawal symptoms of other drugs, such as crack or cocaine (Table 1).

Various analytical procedures reported for the determination of Rohypnol in different matrixes

Rohypnol will remain in the bloodstream for up to 60hours in the average person after ingestion. Some preferable samples for such drug is blood and urine but studies over the last few years have investigated

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the use of oral fluid as an alternative matrix to blood and urine, especially when non-intrusive and quick sampling procedures are important most recently hair are considered best sample for long term abuse of such drugs. The cups, bottles, drinking glasses and liquids left at scene of crime should also be collected and submitted for analysis. Some common methods for drug analysis include. Various studies have been reported which are claiming to produce a nail polish that will reveal the presence of "date rape drugs" such as Rohypnol and GHB by changing color in their presence.[4–18] (Students Develop Nail Polish That Can Detect Date Rape Drugs) (Table 2).

Table 1 International legal scenario

United States	Not been approved by the Food and Drug Administration and is therefore illegal in the United States. The U.S. government passed a law in 1996 known as the Drug Induced Rape Prevention and Punishment Act because of the high number of sexual assault and rape cases related to Rohypnol use.
Australia	Flunitrazepam is a Schedule 8 drug meaning that it is illegal to possess without a valid prescription or license.
Canada	Added to Schedule I in 2012
Germany	Flunitrazepam is available by prescription in Germany. Sold under the brand name "Rohypnol", produced by Roche, it comes in 10 or 20 tablet packages at 1 mg per tablet
Norway	It is a controlled substance and is a prescription-only drug
Sweden	Flunitrazepam is a Class 2 drug in Sweden, with most other benzodiazepines in Class 4. Flunitrazepam is available as a prescription drug under the brand names Flunitrazepam and Fluscand. Comes in 20, 50,100, and 250 tablet packages with each tablet at 0.5 or 1.0mg.
France	Since 2016 Flunitrazepam is not marketed
United Kingdom	Flunitrazepam is not licensed for medical use and is a controlled drug under Schedule 3 and Class C
Japan	Marketed by Japanese pharmaceutical company Chugai and is used for the treatment of insomnia as well as used for preanesthetic medication(Flunitrazepam)

Table 2 Various analytical procedures reported for the determination of rohypnol in different matrixes

Analytical method	Matrix	Detection limit	Citation
Screen Printed Graphene Electrodes (SPGrE)	Buffer, Beverage	6ng/mL	Enriqueta Garcia-Gutierrez[5]
SPGE	Buffer, Beverage	0.47µg/mL	Lledo-Fernandez et al.[11]
LCMS-MS	Human Serum	0.2ng/mL	Moore et al.[12]
Fluorescence spectroscopy	Beverage	1ng/mL	Leesakul et al.[10]
Desorption Electrospray	Beverages	15ng/mL	D'Aloise[3]
GC-MS	Oral Saliva	0.1pg/mL	Samyn et al.[14]

Challenges

Drug-facilitated sexual assault victims often do not report the incident in a timely manner because of amnesia and doubt about what may have happened and possibly other psychological reasons (including embarrassment, fear, rejection, denial, and mistrust in authorities). If reported does not lead to positive results due to length of time elapsed in collection of urine and blood samples.

Conclusion

Rohypnol is the most popular drug used for perpetrating sexual offences due to their favourable physical properties like colourless, odourless and tasteless. This drug is usually taken in addition to alcohol and marijuana, are the most common in cases of substance-related sexual assaults today. This drug is legal when lawfully used under medical prescription. But that doesn't mean they are safe as these drugs can lead to dependency and can impair if abused, therefore should only be used under a doctor's care and order. It has been observed that in most of crimes facilitated by this drug is being lanced by persons of acquaintance and even men fall prey to date rape drug gangs. Police or investigators should pay importance in collecting samples immediately after reporting of incident (i.e. Blood and Urine).

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Conflict of interest

The author declares no conflict of interest.

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