



Hallucinogenic mushrooms: the challenge of responding to naturally occurring substances in an electronic age

Over the past decade media interest in the use of hallucinogenic mushrooms appears to have been driven by open marketing of these mushrooms and by the legal changes made in some countries to prohibit this trade.

Standard epidemiological methods for monitoring drug use can be slow to identify emerging trends and it is recognised that they need to be complimented by more sensitive methods. The challenge is to identify new drug fashions, which tend to start within small subpopulations or in limited geographical areas, and assess their potential for more widespread diffusion. Information sources in this area can be diverse, including reports from internet

and other media, forensic analysis, practice and research. In this policy briefing, information on the use of hallucinogenic mushrooms is reviewed and policy lessons drawn. Factors are identified that served both to encourage and shape the trend in the use of hallucinogenic mushrooms during the late 1990s and early 2000s and also those that acted as barriers to more widespread diffusion.

The hallucinogens are a chemically diverse class of drugs that are characterised by their ability to produce distortions in sensations and to markedly alter mood and thought processes. Naturally occurring hallucinogens can be found in over 100 species of

mushrooms, most of which contain psilocybin and psilocin as the main active ingredients responsible for the hallucinogenic effect. Nearly all of the psilocybin-containing mushrooms are small brown or tan mushrooms that could be mistaken for a number of non-psychoactive, inedible, or poisonous mushrooms in the wild.

Psilocybin and psilocin (or psilocin) are controlled at the highest level internationally, but some countries experienced a lack of legal clarity with regard to mushrooms containing these substances. This confusion has been exploited by mushroom retailers and has presented obstacles to the development of mechanisms to control supply.

Definitions

Hallucinogenic mushrooms, commonly known as 'magic mushrooms': Species containing psilocybin and psilocin are the mushrooms most commonly used for their psychoactive properties, and are the main subject of this policy briefing. Other species of hallucinogenic mushrooms such as the fly agaric contain muscimol and ibotenic acid as the main active ingredients. The muscimol-containing species are themselves toxic and are closely related to highly toxic species.

Smart shops: Shops specialising in the sale of 'natural' psychoactive substances as well as related literature and paraphernalia.

Key issues at a glance

1. Use of hallucinogenic mushrooms is more common among young people who have used other illegal drugs than among young people who have not. As young people attending music festivals and electronic dance events report higher levels of drug use than the general or school populations, users of hallucinogenic mushrooms are likely to be found in these settings.
2. The sale of hallucinogenic mushrooms by smart shops and market stalls in the Netherlands and the United Kingdom appears to have played an important role in facilitating their use. These retailers have provided easy access to hallucinogenic mushrooms during the late 1990s and early 2000s.
3. In a recent internet search 39 online shops that sell hallucinogenic mushrooms products were identified. Many of these shops target an international customer base by offering different language versions and international shipping options. Considerable variation was noted in the extent and quality of information provided about the health risks of the products sold.
4. The number of fatal and non-fatal emergencies from hallucinogenic mushrooms reported is very low. Use of hallucinogenic mushrooms is more commonly linked to mental health risks and a significant proportion of those who use hallucinogenic mushrooms may experience a panic attack.
5. Inherent characteristics associated with the use of hallucinogenic mushrooms (e.g. nausea, panic attacks and unpredictable effects) and social constraints on young experimenters (e.g. need for a safe environment to reduce risks) may act as barriers to regular or frequent use.
6. Six EU countries have tightened their legislation on mushrooms since 2001 in response to concerns about the prevalence of use. The new legislation may have had an impact on the availability of mushrooms and overall volume of internet sales. However, there are also signs that online retailers have responded by switching to uncontrolled and possibly in some cases more toxic alternatives.

Who are the consumers?

In Europe, the use of hallucinogenic mushrooms for recreational purposes first emerged in the late 1950s but diffusion at that time was limited to small esoteric groups (such as beat poets). Diffusion among recreational drug users was gradual until sales by smart shops and market stalls provided a channel for more rapid diffusion during the late 1990s and early 2000s.

Compared with cannabis, the most commonly used illicit substance in the EU, far fewer people have used hallucinogenic mushrooms. Among young people aged 15 to 24 years old in 12 EU Member States, the proportion who have ever used hallucinogenic mushrooms ranges from less than 1% to 8%. Among school students aged 15 to 16 years, in some countries, experimentation with hallucinogenic mushrooms appears to equal that with ecstasy. Repeated or regular use of mushrooms is reportedly considerably lower than for stimulant drugs such as cocaine and amphetamine. As with the other main type of hallucinogenic drug, LSD, young people who experiment with mushrooms generally do not go on to become frequent or regular users.

Drug surveys conducted in music festivals and electronic dance music settings show that in these settings prevalence of illegal drug use is consistently higher than among the general or school populations, and use of hallucinogenic mushrooms is more common among young people who have used illegal drugs than among young people who have not. Comparability between these types of survey is poor, and conclusions about trends must be drawn with caution. Data from the Netherlands suggests a stable situation between 2000 and 2005, whereas data from the United Kingdom shows a strong increase between 2002 and 2004.

Availability

Hallucinogenic mushrooms grow wild in many parts of Europe, but the information available suggests that most mushrooms used for their psychoactive properties are cultivated rather than picked wild. Mushrooms are sold both as fresh and dried products and for home cultivation using mushroom prints, spawnbags and growkits. The ESPAD school surveys conducted in 2003 report that the rates of 15 to 16 year old school students who perceive that hallucinogenic mushrooms are 'very' or 'fairly easy' to obtain range from 4% to 28%. Under 10% of students in Cyprus, Finland, Greece, Hungary, Latvia, Lithuania, Romania and Turkey report easy access to hallucinogenic mushrooms and over 20% of students in the Czech Republic, Ireland, Italy, Poland and the United Kingdom report easy access.

The sale of hallucinogenic mushrooms by smart shops and market stalls in the Netherlands and the United Kingdom appears to have played an important role in facilitating the use of mushrooms during the late 1990s. While exact figures on the revenue from sales of hallucinogenic mushrooms by retailers are not available, information mainly from these two countries provides an indication of the economic interest driving this product. For example, in 2000 it was estimated that magic mushrooms make up 50% of smart shops' turnover. In the United Kingdom, prior to July 2005 the Treasury collected sales tax on hallucinogenic mushrooms estimated to be worth up to 175,000 pounds sterling (EUR 255,421) a year on a turnover estimated of around 1 million pounds sterling (EUR 1.46 million) per annum.

In addition to retail outlets, there has also been an increase in the number of online smart shops. In 2006, the

Hallucinogenic mushrooms were among the first psychoactive substances consumed by man. Today they present us with a new dilemma – how do we effectively control the supply of a complex group of naturally occurring products being promoted and sold in what has become a global marketplace where regulatory actions may simply result in suppliers switching to alternative and possibly even more damaging products?

Wolfgang Götz, EMCDDA Director

EMCDDA identified a total number of 39 online shops that sell hallucinogenic mushroom products. Most of these online shops (31 or 82%) are based in the Netherlands. The remaining sites included four Austrian online shops, two German sites, a United Kingdom site linked to a Dutch online shop and a Polish site. Many sites are multilingual (mainly with English, French and German options) and the majority offer international shipping.

Information about health risks associated with hallucinogenic mushroom use varies between online shops. Most online mushroom shops warn against using hallucinogenic mushrooms when taking medication or in combination with alcohol or other drugs. However, one in three shops give no warning about the dangers of hallucinogen use to sufferers of depression or psychosis. Only half of the online shops provide information on dosage and safe use practices.

Health risks

The number of reports of fatal and non-fatal emergencies from hallucinogenic mushrooms is very low. In general, the physiological effects are short-lasting and not significant and may include dizziness, nausea, weakness, muscle aching, shivering, abdominal pain, dilation of pupils (mydriasis), mild-to-moderate increase in heart rate and

breathing (tachycardia, tachypnea) and elevation of blood pressure. However, pronounced physical symptoms such as severe stomach pain, persistent vomiting and diarrhoea have been recorded.

The acute toxicity of psilocybin is believed to be low, and this is supported by the fact that reports of fatal poisonings with hallucinogenic mushrooms are rare. Poisoning can occur when mushrooms picked in the wild are consumed, if toxic species are mistaken for hallucinogenic mushrooms.

Use of hallucinogenic mushrooms is more commonly linked to mental health risks. Although the proportion of users who experience a 'bad trip' is not known, it is these users who are most likely to contact emergency care systems. In such cases, the intoxicated individuals are usually extremely anxious, severely agitated, confused and disoriented, with impaired concentration and judgment. In serious cases, acute psychotic episodes may occur, including bizarre and frightening

images, severe paranoia and total loss of reality, which may lead to accidents, self-injury or suicide attempts. Although many prevention programmes include information on hallucinogenic drugs alongside information on other drugs in order to raise awareness, there appears to be a lack of specific information about health risks related to the use of hallucinogenic mushrooms provided to professionals working with young people. On the other hand, users and lobby groups have set up several internet sites providing information on hallucinogenic mushrooms.

Recent changes in legislation

Psilocybin and psilocin (or psilotsin) are controlled under 1971 UN Convention on Psychotropic Substances and listed in Schedule I, though how mushrooms containing them are classified is not always clear. Six EU Member States have tightened their legislation on hallucinogenic mushrooms since 2001, in response to concerns about

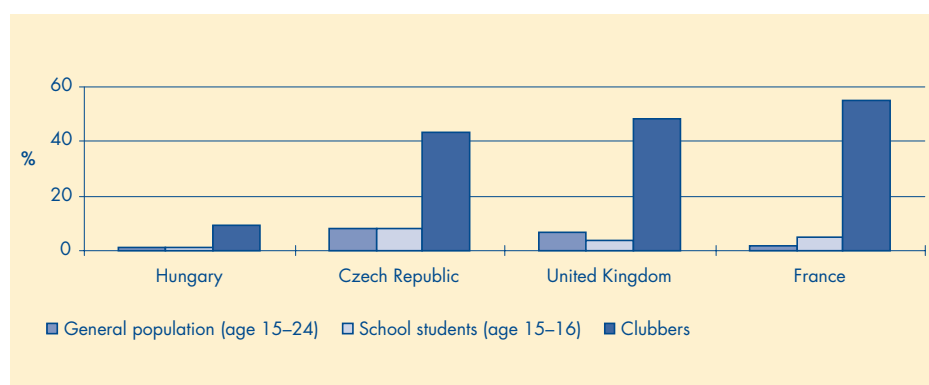
prevalence of use: Denmark (2001), the Netherlands (2002), Germany, Estonia, the United Kingdom (2005) and Ireland (2006).

Legislating against the use of hallucinogenic mushrooms presents lawmakers with several problems. Legislation should not unjustly criminalise people on whose land mushrooms grow wild. One solution was to state that mushrooms were illegal if 'treated or prepared' (Irish and United Kingdom legislation), which indicate the intent of use. Similarly, the Dutch Supreme Court ruled that mushrooms were under control when 'dried or processed'. With the increase in smart shops using this loophole to sell fresh mushrooms, the United Kingdom (for example) argued in 2004 that even packaging was a form of 'preparation', but finally the law in the United Kingdom was changed in 2005 to apply to hallucinogenic mushrooms, with no mention of their state.

Drugs laws in Greece, Italy, Cyprus and Lithuania have a catch-all term prohibiting cultivation of plants from which narcotic substances can be extracted. Yet, it is debatable if a mushroom is strictly a 'plant'; hence the recent amendment to the German law in 2005 adopting the term 'organic' substances, rather than the previously used 'plants and animals' in order to close any possible loophole for mushrooms.

Changes in legislation have had an impact on the availability of hallucinogenic mushrooms and overall volume of internet sales. An analysis of the different products promoted by online retailers revealed that those in the United Kingdom started to switch their sales to legal but more toxic alternatives, such as fly agaric, *Amanita muscaria*, or the closely related *Amanita pantherina* since the ban on hallucinogenic mushrooms.

Prevalence of ever in lifetime use of hallucinogenic mushrooms is higher among young people attending dance music events (clubbers) than among the general population



Notes: Estimates for recreational settings are based on non-probability samples using a variety of methods and sampling frames. Prevalence of drug use among the broader population of clubbers cannot be inferred from these samples. See EMCDDA (2006) for details.

Sources: Hibell et al. (2004), EMCDDA (2006).

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Policy considerations

1. Because of the relatively high levels of drug use among young people in music and dance settings, these venues offer cost-effective opportunities for prevention and other initiatives that aim to reduce the health risks associated with the use of hallucinogenic mushrooms.
2. The economic interests of the retailers that promote the sale of hallucinogenic mushrooms play an important part in supporting the diffusion of this product.
3. The internet allows increasing opportunities for promoting and selling hallucinogenic mushrooms but also, importantly, for providing information about health risks.
4. There appears to be a gap in the provision of mushroom specific information material for professionals working with young people and a similar lack of prevention or harm reduction material aimed at potential users.
5. The development of effective prevention and health promotion material is likely to be facilitated by understanding the perspectives of young people who are potential consumers of hallucinogenic mushrooms and tailored to their needs.
6. Although strengthening legal control measures may be an approach to limiting the use and availability of hallucinogenic mushrooms, the impact of any measures needs to be carefully monitored both to assess their effectiveness and to avoid the risk of unintended negative consequences.

Key sources

Berridge, V. and Hickman, T. (2006), *History and future of psychoactive substances*, Foresight Brain Science, Addiction and Drugs project. Office of Science and Technology, United Kingdom.

CAM (2000), *Risk assessment report relating to paddos (psilocin and psilocybin)*, Coordination Centre for the Assessment and Monitoring of New Drugs (CAM), Den Haag, Netherlands.

EMCDDA (2006), Hallucinogenic mushrooms: an emerging trend case study, *EMCDDA Thematic Papers*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.

Golub, A. and Johnson, B.D. (1996), 'The crack epidemic: empirical findings support an hypothesized diffusion of innovation process', *Socio-economic Planning Sciences*, 30 (3), pp. 221–231.

Guzmán, G., Allen, J.W. and Gartz, J. (2000), A worldwide geographical distribution of the neurotropic fungi, an analysis and discussion, *Annali dei Museo civico - Rovereto, Italia*. Vol. 14:1890280 (in English).

Hibell, B., Andersson, B., Bjarnasson, T. et al. (2004), *The ESPAD report 2003: alcohol and other drug use among students in 35 European countries*, The Swedish Council for Information on Alcohol and Other Drugs (CAN) and Council of Europe Pompidou Group.

Reynaud-Maurupt, C. (2006), *Usages contemporains de plantes et champignons hallucinogènes*, Observatoire français des drogues et des toxicomanies, Saint-Denis, 160 pp.

Web information

European Legal Database on Drugs ELDD <http://eldd.emcdda.europa.eu/>

OFDT information on hallucinogens <http://www.ofdt.fr/ofdtdev/live/produits/hallucin.html>

EMCDDA 2006 statistical bulletin tables on prevalence of drug use in the population
<http://stats06.emcdda.europa.eu/en/page053-en.html>



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