European Monitoring Centre
for Drugs and Drug Addiction

ISBN 92-9168-249-7

THEMATIC PAPERS

HALLUCINOGENIC MUSHROOMS:
AN EMERGING TREND CASE STUDY

Legal notice

Cataloguing data

European Monitoring Centre for Drugs and Drug Addiction, 2006
EMCDDA Thematic Papers — Hallucinogenic mushrooms: an emerging trend case study

Lisbon: European Monitoring Centre for Drugs and Drug Addiction
2006 — 33 pp. — 21 x 29.7 cm

ISBN number: 92-9168-249-7

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Acknowledgements

The EMCDDA would like to thank the following for their help in producing this case study: the national focal points and their EWS systems in Austria, Belgium, Cyprus, Czech Republic, Greece, Hungary, Lithuania, Poland, Portugal, Slovakia, Slovenia, Sweden and the United Kingdom; Jane Mounteney, Føre Var (Early Warning Project, Bergen, Norway); Luke Mitcheson (Mixmag); Paul Griffiths, Brendan Hughes, João Matias, Julian Vicente, Peter Thomas (all at the EMCDDA). We would also like to express our gratitude to Katharine Konaris, Forensic Science and Toxicology Laboratory, Cyprus, Renato Souza, Switzerland and the ESPAD experts: Marina Kuzman, Croatia; Marie Choquet, France; Salme Ahlstrome, Finland; Ludwig Kraus, Germany; Anastasios Fotiou, Greece; Zsuzsanna Elekes, Hungary; Sabrina Molinaro, Italy; Aleksandra Davidaviciene, Lithuania; Sharon Arpa, Malta; August de Loor, Karin Monshouwer, Raymond Niesink, Netherlands; Astrid Skretting, Norway; Alojz Nociar, Slovakia; Eva Stergar, Slovenia; Björn Hibell, Sweden; and Martin Plant, United Kingdom. Finally, we would like to acknowledge the authors of books, articles, reports and websites referenced at the end of this case study.

Key findings

Use of hallucinogenic mushrooms lay relatively dormant from the late 1950s until availability and prevalence of use increased during the late 1990s and early 2000s. The marketing of hallucinogenic mushrooms by smartshops, internet shops and market stalls caused the trend to spread.

Hallucinogenic mushrooms grow wild in much of Europe, yet it appears that most recreationally used mushrooms 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. Mushrooms are typically chopped and ingested or brewed in tea.

Overall prevalence estimates for use of hallucinogenic mushrooms in the EU are considerably lower than those for cannabis. However prevalence estimates for ever in lifetime use appear to equal those for ecstasy among school students aged 15 to 16 years in some countries.

Surveys in 12 EU Member States indicate that, among young people aged 15 to 24 years old, ever in lifetime use of hallucinogenic mushrooms ranges from less than 1% to 8%.

Six EU countries have tightened their legislation on hallucinogenic mushrooms since 2001 to coincide with recent increases in prevalence of use: Denmark (2001), the Netherlands (2002), Germany, Estonia, the UK (2005) and Ireland (2006). Reports in the UK suggest that legislation has had an impact on the availability of mushrooms and overall volume of internet sales.

Drug surveys conducted in club settings show that prevalence of illegal drug use is consistently higher than prevalence among the general or school populations and use of hallucinogenic mushrooms is more common among young people who have used other illegal drugs than among young people who have not.

User accounts suggest that hallucinogenic mushrooms may not be viewed in a sufficiently favourable light to repeat the experience or to promote the trend. Unpredictable potency and negative effects such as, nausea, panic attacks, and/or lack of sociable effects may all contribute to limiting recreational use of hallucinogenic mushrooms.

The recent legal responses to hallucinogenic mushrooms appear to have been followed by an emerging interest of retailers in selling alternative, legal, types of hallucinogenic mushroom such as *Amanita muscaria* (Fly agaric). Use of these may pose health risks which call for further legal and prevention responses.

This case study of hallucinogenic mushrooms highlights the importance of lifestyle trends and economic interests in the diffusion of and responses to an emerging drug trend. Future work in the field of emerging drug trends must consider the crucial part that contextual forces play in reinforcing or legitimating forms of regulation.

Contents

Introduction

Until recently in Europe, LSD was the substance that dominated the field of hallucinogenic drug use. Although information about the use of mushrooms for hallucinogenic psychoactive effects appeared in an article published in Life magazine in 1957 (Gordon Wasson, 1957), the emergence of hallucinogenic mushrooms as a potentially widespread drug trend laid relatively dormant in Europe until the late 1990s when they began to be marketed alongside other 'natural' products by smartshops ([1]) in the Netherlands. Interest in natural hallucinogens appears to be related to a 'return to nature' trend and has been facilitated by the rapid expansion of internet sales and information (Pepin and Duffort, 2004). In the UK, during the early 2000s, the number of shops selling hallucinogenic mushrooms also increased. These developments created a market for users and potential users of hallucinogenic mushrooms. This market sparked drug experts' and public interest in hallucinogenic mushrooms as an emerging drug trend. In 2000, hallucinogenic mushrooms were the subject of a risk assessment in the Netherlands (CAM, 2000). More recently a number of media reports in the UK have focused on legal responses to the use of mushrooms for recreational purposes (see References: Media reports).

About the E-POD project

The pilot project provides practical experience for the development of a European system to detect, track and understand emerging trends. It falls within the framework of the EU drugs action plan (2005–2008) designed to 'develop clear information on emerging trends and patterns of drug use and drug markets' (*) and provide a better understanding of the drugs phenomenon and the development of optimal responses to it

Main sources of information for the case study on hallucinogenic mushrooms.

EMCDDA reporting form (Detecting, tracking and understanding emerging trends, between July 2005 and October 2005) responses from Austria, Belgium, Cyprus, Czech Republic, Greece, Hungary, Lithuania, Poland, Portugal, Slovakia, Slovenia, Sweden, UK, Norway.

- Early Warning System reports
- National Reitox reports
- ESPAD School Survey Project
- Scientific articles published in peer reviewed journals
- Published literature
- Forensic science bulletins
- Grey literature
- Newspaper and magazine media articles
- Internet websites and discussion groups
- Personal communication with key informants

(*) EU Action Plan on Drugs (2005-2008)
http://www.emcdda.europa.eu

The identification and monitoring of emerging trends demands a different approach from the EMCDDA key indicators that are used for monitoring the main types of drug use. The EMCDDA is developing a pilot project (E-POD, European perspectives on drugs, see info box 'About the E-POD Project', right) to explore the capacity in EU Member States to detect, track and understand emerging drug trends using methods that depend on the triangulation of a wide range of different sources to assess the veracity of accumulated information. A case study for this project was to collect and analyse information on hallucinogenic mushrooms in the EU within a limited timeframe (between July and October 2005) taking into account the megatrends ([2]) among users and potential users as

([1]) A smartshop is a shop found in the Netherlands that specialises in psychoactive herbal substances that are legal in addition to a range of vitamins, mineral supplements and other health products. Most of them also sell new synthetic drugs which have not (yet) been placed under control.

([2]) A megatrend is a large social, economic, political, environmental or technological change that is slow to form. Once in place, megatrends are the underlying forces that drive trends in a wide range of activities and perceptions.

well as the economic interests of those involved in the marketing of hallucinogenic mushrooms. The importance of such cultural and economic factors was recently highlighted in a UK government paper on psychoactive substances (Berridge and Hickman, 2006).

Hallucinogenic mushrooms

The hallucinogens are a chemically diverse class of drugs, which are characterised by their ability to produce distortions in sensations and to markedly alter mood and thought processes. They include substances from a wide variety of natural and synthetic sources, and are structurally dissimilar (Jacob and Fehr, 1987). Naturally occurring hallucinogens can be found in mushrooms, plants (for example, cannabis, peyote cactus, ayahuasca, morning glory, iboga, *Salvia divinorum*, etc.) and even animals (for example, toads and fish) and are known to have been used for thousands of years in various parts of the world for religious, spiritual or healing purposes.

There are more than 100 known hallucinogenic mushrooms (Guzmán, Allen and Garrtz, 2000). The complexity of their mycological classification, together with their different chemical make up and the effects of various hallucinogenic mushrooms may lead to inconsistencies and confusion in their description. The subject of this thematic study is the psilocybin and psilocin containing fungi, belonging mainly to the *Strophariaceae* family (*Psilocybe genus*), *Bolbitiaceae* family (*Conocybe* genus), *Coprinaceae* family (*Copelandia* and *Panaeolus* genera) and *Cortinariaceae* family (*Inocybe* genus). The list of species and their geographical distribution is constantly critically revised by mycologists. However, the genus *Psilocybe* is predominant in terms of recreational use followed by genus *Panaeolus* (Courtecuisse and Deveaux, 2004). Of the former, the most

Hallucinogenic or psychedelic?

Issues related to hallucinogenic drugs have aroused vehement discussions and often controversy among both concerned experts (psychiatrists, psychologists, psychopharmacologists etc.) and people using them. At different times, these drugs have been called 'psychedelic' (mind opening, mind expanding), 'psychotomimetic' (resembling psychosis), 'psychodysleptic' (mind disrupting), 'hallucinogenic', or the less familiar - 'phantastica', 'oneirogenic' etc. All these names depend on the purposes and starting premises of those using them and bring different positive or negative connotations (Gossop, 1993). The scientific community has largely adopted the term 'hallucinogens', however inaccurate it might be, whereas most of the users naturally prefer the term 'psychedelic'. In practice, the two terms are being used interchangeably.

The term 'hallucinogens' refers to the hallucinogen-producing properties of these drugs. However, the hallucinations are not the only effects caused by these drugs and often occur only at very high doses. The hallucinations are most often visual, but can affect any of the senses, as well as the individual's perception of time, the world, and the self (Jacob and Fehr, 1987).

The term hallucinogens. However, is misleading as these drugs do not generally cause true hallucinations (i.e. sensory perceptions in the absence of external stimuli). The effects could be more accurately described as perceptual distortions than hallucinations, though the effects also extend beyond perceptions. Changes of thought, mood, and personality integration (self-awareness) are all important effects (Gossop, 1993; Pechnick and Ungerleider, 2005).

Hallucinogens can be classified by chemical structure and the compound from which they are derived. Chemically related substances tend to exhibit similar effects. Many other agents can be classified as pseudo-hallucinogens because they produce psychotic and delirious effects without the classic visual disturbances of true hallucinogens. Grouping the hallucinogens based on their chemical structure includes, but is not limited to, three major groups: indolealkilamines (tryptamines) e.g. LSD, psilocin, psilocybin; phenylethylamines e.g. mescaline; and cannabinoids (Pechnick and Ungerleider, 2005).

common are *Psilocybe cubensis* (also known as *Stropharia cubensis*), *Psilocybe semilanceata* (liberty caps), *Psilocybe cyanescens* (wavy caps) etc. of which the most frequently marketed are the *cubensis* varieties (Mexican, Thai, Colombian, Amazonian, etc.). Some varieties such as *Psilocybe mexicana* and *Psilocybe tampanensis* form sclerotia and are known as the truffle or philosopher's stone ([3]).

Nearly all of the psilocybin containing mushrooms are small brown or tan mushrooms which could be mistaken for a number of non-psychoactive, inedible, or poisonous mushrooms in the wild. The primary distinguishable feature of most psilocybin containing mushrooms is that they bruise blue when handled (Erowid, 25.03.2006).

Hallucinogenic mushrooms: the chemistry

Beside psilocybin and psilocin, two further tryptamines — baeocystin and norbaeocystin — could also be present but are thought to be less active than the former two. Psilocybin and psilocin which could be chemically classified as indolealkylamnies (i.e. belonging to the same group as LSD) are structurally similar to the neurotransmitter serotonin (5-hydroxytryptamine or 5-HT). Psilocybin, 4-phosphoryloxy-N,N-dimethyltryptamine (4-PO-DMT) is the phosphate ester of psilocin, 4-hydroxy-N,N-dimethyltryptamine (4-HO-DMT); it is more stable in air and is water soluble. Psilocybin, however, is converted in the body into psilocin which is the pharmacologically active compound. Psilocin appears to act on the serotonin system as a 5-HT2A post-synaptic agonist or partial agonist.

A variety of psilocybin containing mushroom species are found in Europe, in particular throughout central and northern Europe. Habitats include wet grassy fields and uncultivated pastures. The most common wild European hallucinogenic mushroom is *Psilocybe semilanceata* (liberty caps). These mushrooms can be found for example in the UK, Norway and Germany. Other species of hallucinogenic mushrooms growing wild in Europe include *Psilocybe cyanescens* (wavy caps) as well as *Psilocybe bohemica* and *Psilocybe moravica*, particularly reported to grow in the Czech Republic (Supprian, Frey, Supprian, Roesler and Wanke, 2001; Stamets, 1996; Borovicka, 2003).

Other hallucinogenic mushrooms not explicitly dealt with in this case study are those of the Agaric family (Agaricaceae) — *Amanita muscaria* (fly agaric) being the best known representative. The active chemicals contained in this group — muscimol, ibotenic acid and muscarin — are totally different from mushrooms containing psilocybin, and are known to carry substantial toxicity risks. Furthermore, some closely related Amanita species are highly toxic and could cause fatal poisoning, which may partly explain the lower popularity of these species.

Prevalence and patterns of use

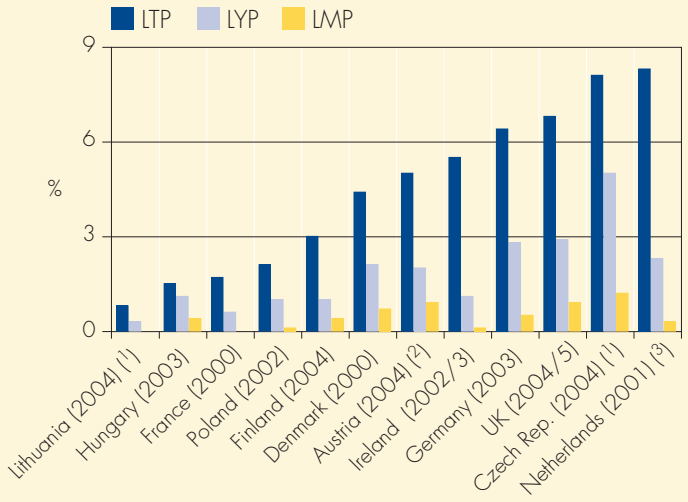
Historically, drug surveys conducted in the EU among national general and school populations have collected and reported data on LSD consumption or a general category of hallucinogenic drugs, rather than specific data on use of hallucinogenic mushrooms. Consequently there is a paucity of data on the use of hallucinogenic mushrooms. Now most school surveys and some general population surveys include questions about hallucinogenic mushrooms.

([3]) Sclerotia are hardened masses of mycelium which are more resistant to adverse environmental conditions than normal mycelium. This is a defence mechanism against dryness, cold, heat or excessive moisture.

National general population surveys

Recent general population survey data on lifetime prevalence of use of hallucinogenic mushrooms in 12 EU Member States (Figure 1) indicate that, among young people aged 15 to 24 years old, ever in lifetime use of hallucinogenic mushrooms ranges from less than 1% to 8%. The Netherlands, Czech Republic, UK, Germany and Ireland have the highest prevalence estimates and the lowest are reported in Lithuania, Hungary and France. It should be noted that the most recent adult population survey in France was conducted over five years ago (in 2000). A more recent survey (in 2003) of 17 to 18 year old French residents, reported higher prevalence estimates than those for young adults in the earlier French general population survey: 4.3% for lifetime prevalence for the use of hallucinogenic mushrooms, 2.9% for last year prevalence and 1% for last month prevalence (Beck, Legleye, Spilka, 2004). Prevalence of hallucinogenic mushrooms use is generally much lower than for cannabis, where lifetime prevalence in 11 of these EU Member States for persons aged 18 to 36 is reported at between 15% (Poland) and 45% (Denmark) (EMCDDA Statistical Bulletin, 2005). The proportion of current users ([4]) among those who have ever used is lower for the use of hallucinogenic mushrooms than it is for cannabis and ecstasy. It has been reported that the effects of hallucinogenic mushroom limit the appeal of regular use (CAM, 2000).

Figure 1: Comparison of different types of prevalence (%) of hallucinogenic mushroom use among 15–24 year olds (Source: EMCDDA EMQ 2000-2003).



Note:
LTP = life time prevalence
LYP = last year prevalence
LMP = last month prevalence

([1]) Czech and Lithuanian data are for the 15-34 year old age group, obtained from a special E-POD the EMCDDA Reporting Form 2005.

([2]) Austrian data include biogenic drugs such as jimson weed, mushrooms and cactuses.

([3]) Netherlands data include mescaline, psilocybine, 2cb, ayahuasca, ketamine and mushrooms.

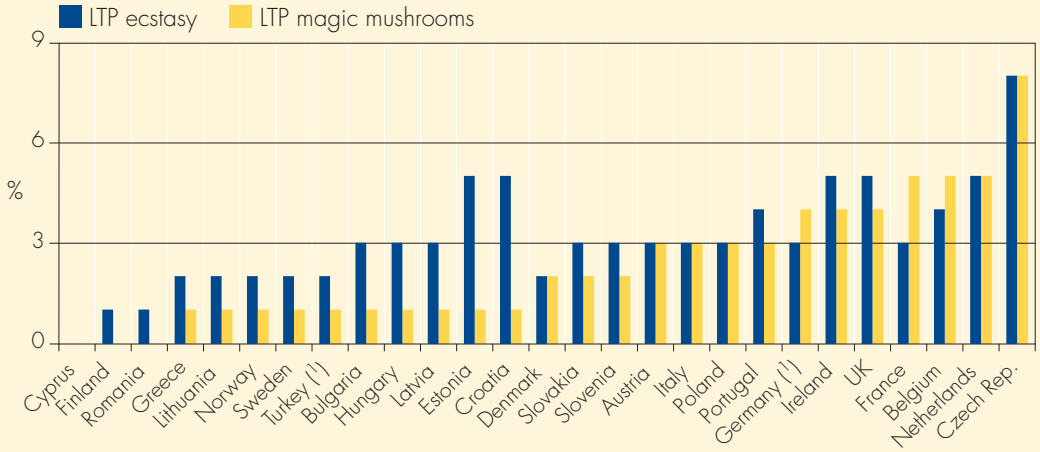
School surveys

Data is available (Figure 2) on prevalence of hallucinogenic mushroom use based on school surveys conducted in 2003 in 22 EU Member States, Norway and four EU candidate countries, Croatia, Bulgaria, Turkey and Romania (ESPAD European School Survey on Drugs and Alcohol, Hibell, Andersson, Bjarnasson et al, 2003). Results of these school based surveys indicate that, among

([4]) Current users are defined as those who have used during the last month.

young people aged 15 to 16 years old, ever in lifetime use of hallucinogenic mushrooms ranges from 0% to 8%. The Czech Republic, Netherlands, France and Belgium have the highest prevalence estimates and three out of the 27 countries reported zero lifetime prevalence — Cyprus, Finland and Romania. Ever in lifetime use of hallucinogenic mushrooms is equal to, or higher than, lifetime use of ecstasy in nine countries.

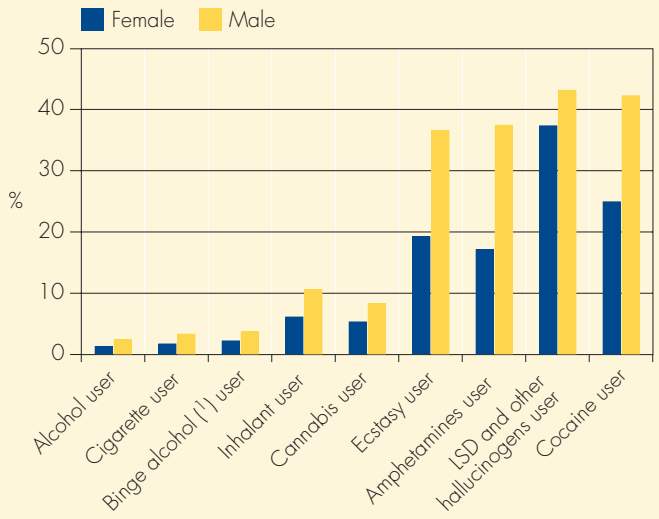
Figure 2: Comparision of lifetime prevalence (%) of hallucinogenic mushroom use and ecstasy use in 2003 among 15/16 year old students (Source: Hibell et al, 2003).



(1) German data are based on six regions only (Bavaria, Brandenburg, Berlin, Hesse, Mecklenburg-Western Pomerania and Thuringia). Turkish data are based on one major city in each of 6 different regions (Adana, Ankara, Diyarbakir, Istanbul, Izmir and Samsun).

Analysis of data from 11 EU Member States (Finland, Germany, Greece, Hungary, Italy, Lithuania, Malta, Slovakia, Slovenia, Sweden, United Kingdom) together with Norway and Croatia demonstrates that school students aged 15 to 16 years are much more likely to have used hallucinogenic mushrooms if they have only used LSD or other hallucinogens, ecstasy, amphetamines or cocaine than if they have used cannabis or legal substances (Figure 3). Following the common gender distributions for illegal drug use, male students, in general, have higher prevalence rates than females (ESPAD, Hibell et al, 2003).

Figure 3: Comparison of male and female lifetime prevalence (average %) of hallucinogenic mushroom use by different user groups in 13 European countries (Source: ESPAD experts, 2003).



Note: User groups are defined as those who have ever in lifetime experience of the substance.

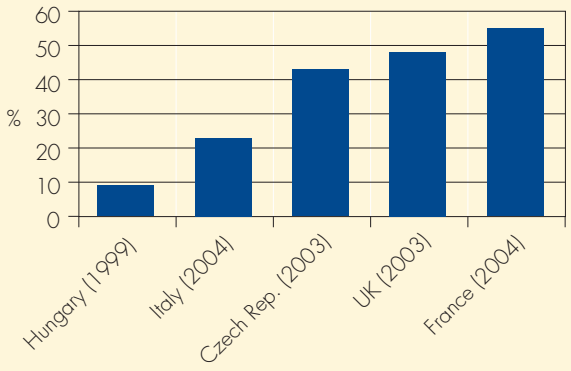
([1]) Binge alcohol is defined as 5 or more drinks in a row during the past 30 days.

Lifetime prevalences are based on an average for 13 countries (Finland, Germany, Greece, Hungary, Italy, Lithuania, Malta, Slovak Republic, Slovenia, Sweden, United Kingdom together with Norway Croatia, where ESPAD experts provided individual drug use data).

Clubbing surveys

A number of targeted (non-probability) surveys conducted in different dance music settings in Belgium, France, Hungary, Italy, the Netherlands and UK ([5]) record diverse estimates for prevalence of hallucinogenic mushroom use (Reitox national reports 2005, Belgium, Czech Republic, France, Hungary, Italy). Prevalence appears to depend on the country and city location, lifestyle aspects and ease of access to the mushrooms.

Figure 4: Lifetime prevalence (%) of hallucinogenic mushroom use in a variety of clubbing/music settings (Source: Reitox national reports 2005).



Hungary — Budapest, 1059 respondents in 33 party settings.

Italy — Bologna, 2015 respondents at rave parade.

UK — 805 respondents from readership of a club music magazine.

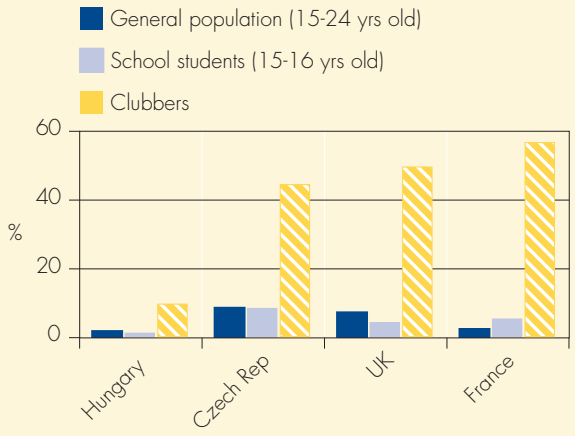
France — 5 urban centres (Bordeaux, Metz, Nice, Rennes, Toulouse), 1500 respondents in settings where electronic music is played.

Czech Republic (2003) — 1652 respondents in dance party settings.

([5]) Mixmag Survey 2005, personal communication from Dr Luke Mitcheson.

Figure 4 shows lifetime prevalence estimates for use of hallucinogenic mushrooms that range from 9% of clubbers in Budapest to 55% in France. Despite differences in the survey methods and settings the common factor emerging from all of the non-probability clubbing surveys is that substantially higher drug prevalence estimates are found in these surveys than those found in general or school population surveys (Figure 5).

Figure 5: Comparision of lifetime prevalence (%) of hallucinogenic mushroom use in three different groups in four countries 1999–2005 (Sources: see notes).



General population surveys conducted between 2000 and 2005

School survey data based on ESPAD 2003

Clubber surveys:

Hungary (1999) — Budapest, 1059 respondents in 33 party settings.

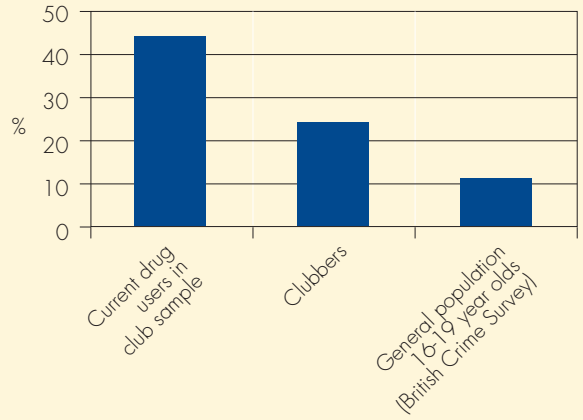
UK (2003) — 805 respondents from readership of a club music magazine.

France (2004) — 5 urban centres (Bordeaux, Metz, Nice, Rennes, Toulouse), 1500 respondents in settings where electronic music is played.

Czech Republic (2003) — 1652 respondents in dance party settings.

Within club sample populations, polydrug use tends to cluster in the same individuals. For example, in a survey of 760 clubbers from 6 south east England nightclubs in 2000 overall lifetime prevalence for use of hallucinogenic mushrooms was 24%. However, among the current drug users in these nightclub samples (defined as those who had used cannabis or any other drug during the past month) prevalence for use of hallucinogenic mushrooms rose even higher, to 44%. In comparison, lifetime prevalence among 16-19 years olds in the general population in 2000 was much lower at 11% (Deehan, Saville, 2003; Ramsey, Baker, Goulden, Sharp, Sondhi, 2001).

Figure 6: Comparison of lifetime use of hallucinogenic mushrooms by current drug users, clubbers and 16–19 year olds, in 2000 (Source: UK Home Office).



Clubbers defined as 760 respondents at six mainstream commercial nightclubs in South East England.

Current drug users defined as those who has used drugs (not only, but could include cannabis or any other drug) in the previous three months and intended to use drug in the future (44% of sample).

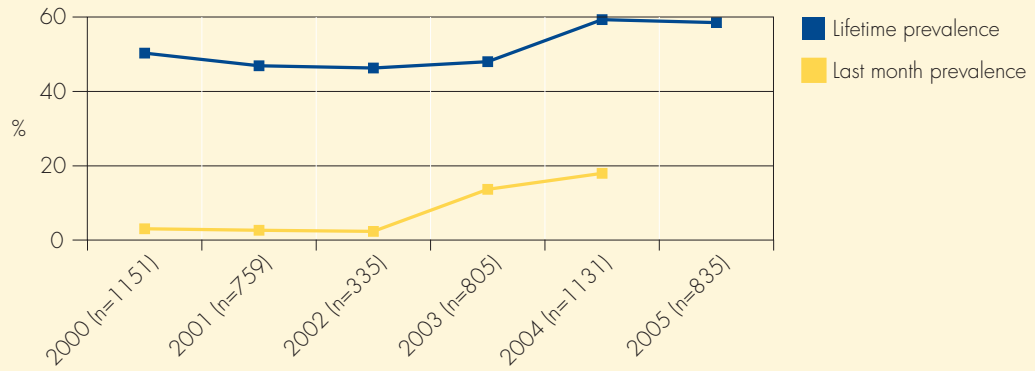
In addition to targeted (non-probability) surveys, other types of explorative research can uncover and investigate emerging drug trends. For example, Norway reported the existence of a music milieu which is characterised by a focus on organic lifestyles and woodland parties. This milieu is reportedly largely composed of economically disadvantaged people between 25 and 40 years old, many of whom use cannabis and hallucinogenic mushrooms. However, this milieu is reportedly considered peculiar and unattractive by the under 25 year old age groups and therefore the drug use associated with it is considered unlikely to diffuse widely (Norway Reitox national report, 2005).

The risk assessment report from the Netherlands conducted in 2000 points out that hallucinogenic mushrooms tend to be taken as an experimental drug and people generally discontinue use after a few times. Qualitative research in the Netherlands reports that users do not find the use of 'hallucinogenic mushrooms' a particularly pleasant experience as the experience lacks the positive mood altering (entactogenic) ([6]) effects that ecstasy provokes (CAM, 2000).

Trends

The only trend data available on the use of hallucinogenic mushrooms are based on six consecutive annual readership surveys conducted by a UK clubbing magazine (Mixmag, 2000–2005). Survey data (Figure 7) shows that lifetime prevalence estimates for use of hallucinogenic mushrooms increased between 2003 and 2004 and estimates for use during the past month increased significantly from 2.4 % in 2002 to 18 % in 2004 (Mixmag, 2000–2005). Caution is required interpreting these trend data and different characteristics of the (non-probability) samples and changes from year to year in the survey method may account for some of the sudden increase in prevalence.

Figure 7: Six year trends in lifetime and last month % use of hallucinogenic mushrooms (Source: Mixmag surveys 2000–2005).



The average age for first use of 'hallucinogenic mushrooms' was between 18 and 19 years old according to the 2004 Mixmag sample. Among the 305 individuals who had used hallucinogenic mushrooms, over half of them said they plan to take them again and the most commonly used mushrooms were the 'Mexican' variety.

([6]) A relatively new term derived from the Greek and describes a specific positive mood-altering effect that allows users to 'make contact' with their own feelings and those of others.

Telephone helplines

According to the most recently available FESAT reports based on information collected biannually from 26 drug telephone help lines in 16 European countries, there was no significant increase in calls to drug help lines regarding the use of hallucinogenic mushrooms during 2004 (FESAT, Hibell, 2004). In addition to the FESAT reports, Belgium reported that 1 % of all inquiries to Druglijn, Flanders in 2003 and in 2004 were related to hallucinogenic mushrooms (EMCDDA reporting form 2005, Belgian response). The number of telephone inquiries reported by the Swedish Poisons Information Centre appears to have peaked in 1998 with 96 calls. During the last five years the number has remained relatively low and stable at around 30 to 40 calls annually (EMCDDA reporting form 2005, Swedish response).

Markets and availability

Brand names and users' terms

In the case of hallucinogenic mushrooms there is an overlap between brand names of retailers and users' terms. The product name or users' terms sometimes reflect changing market strategies and new trends.

Hallucinogenic mushrooms are commonly known as 'magic mushrooms' but they are also widely known to the users as 'paddos' in the Netherlands, 'shrooms' in the UK, 'Zauberpilze' in Germany etc. Other names in English include: mush, mushies, boomers, psilocybes, cubes, liberty caps, caps, philosopher's stone, sacred mushrooms, teonanacatl ([7]), Mexican mushrooms, moon children etc. (CAM, 2000 and Erowid, 25.03.2006). Various other names in European languages are also in use ([8]). At the end of the 1990s when hallucinogenic mushrooms started to be commercialised by smartshops, new labels, names and users' terms appeared which reflect changes in the groups who sell and use these drugs. For example, the term 'philosopher's stone' is used to describe the sclerotia of certain hallucinogenic mushrooms, most notably that of *Psilocybe mexicana* which are sold by many smartshops. In addition, hallucinogenic mushrooms have been sold by many retailers under the general label of 'Herbal highs' following the trend in the late 1990s towards the preference for organic and herbal products. Numerous other products are included under the label 'Herbal highs' such as 'herbal xtc' ([9]) and *Salvia divinorum* ([10]).

([7]) Teonanacatl is the Aztec name meaning divine flesh (the flesh of god) which has also gained popularity with users.

([8]) Translations of 'hallucinogenic mushrooms' in European languages include: Bulgarian - 'магическите гъби'; Czech - 'magické houby'; 'Danish - 'psilocybinsvampe', 'magiske svampe'; Estonian - 'hallutsinogeense toimega seened'; Greek - 'μαγικά μανιτάρια'; French - 'champignons hallucinogènes' or 'champis'; German - 'Psychoaktive Pilze' or 'Zauberpilze'; Hungarian - 'varázsgombák', 'hallucinogén gombák', 'pszilocibingombák'; Italian - 'funghi magici'; Latvian - 'maiiskâs sçnes'; Lithuanian - 'haliucinogeniniai grybai', 'magiškieji grybai'; Norwegian - 'fleinsopp'; Polish 'magiczne grzybki', 'grzyby halucynogenne'; Portuguese - 'cogumelos mágicos', 'cogumelos psicadélicos'; Slovakian - 'magické huby'; Slovenian - 'čudeţne gobe'; Spanish - 'hongos alucinógenos', 'hongos lisérgicos', 'honguitos'; Romanian - 'ciuperci halucinogene'; Swedish - 'magiska svampar', 'psykedeliska svampar'.

([9]) Possible ingredients of 'herbal xtc' products are Ephedra alkaloids *Sida Cordifolia*, Guarana, Caffeine, Siberian Ginseng, Kola nut, Andorn. Most of them are supposed to have a stimulating, energizing effect.

([10]) *Salvia divinorum* is a sprawling perennial herb which grows wild only in the Sierra Mazatec region of Mexico. Its leaves contain the extremely potent salvinorin-A. It has a history of use as a divinatory psychedelic for oral use and has been widely available since the mid 1990s primarily as a smoked herb (Erowid, 25.03.2006).

Perceived availability

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. Levels of perceived availability mirror estimates for prevalence, albeit at higher levels. In the Netherlands, despite the lack of legal sanctions to control supply only 16% of school students in the Netherlands report easy access to hallucinogenic mushrooms.

The UK Mixmag survey conducted in 2005, shortly after the imposition of stricter controls over the sale and use of hallucinogenic mushrooms, found 67 % of survey respondents reporting that mushrooms were less available than they had been previously ([11]).

Internet information

Since the late 1990s a number of extensive internet repositories of information on hallucinogenic mushrooms emerged which have contributed to the accessibility of information on description, use, effects and exchange of experiences among users. These include the US-based websites Erowid, Lycaeum, Mycotopia, Shroomery, MushroomJohn and The Entheogen Review. In addition, dedicated websites have focused purely on the use of hallucinogenic mushrooms in the domestic and regional context e.g. Copenhagen Mushroom Link (http://www.mushroom.dk — Denmark), Champis (http://www.champis.fr.tc — France), Daath (http://www.daath.hu — Hungary), Delysid (http://www.gratisweb.com/delysid — Spain), Enteogeneos (http://enteogeneos.com.sapo.pt — Portugal), Kouzelné houbičky (http://drogy.jinak.cz/houbicky — Czech Republic), Norshroom (http://www.norshroom.org — Norway), Planetahongo (http://planetahongo.tripod.com — Spain), Shroommap (http://www.shroommap.tk — UK), Svampinfo (http://knarkkorven.magiskamolekyler.org/svampinfo/index.html — Sweden) and Taikasieniforum (http://trippi.info/taikasieniforum — Finland). These sites are typically created by non profit organisations, mushroom users or lobby groups and usually display information on effects, dosages, chemistry, classification of mushrooms, laws as well as trip reports (e.g. http://www.magic-mushrooms.net). Some include photo galleries of various hallucinogenic drugs and advise on how to cultivate or collect fresh hallucinogenic mushrooms. Many include community items such as discussion forums and events listings to enable visitors to share personal information on use, events and supply channels.

Magic mushroom hunting

Evidence is sparse on the extent to which consumers in EU Member States collect naturally growing hallucinogenic mushrooms (known as magic mushroom hunting among users). There are magic mushroom websites which provide users with information on how to identify naturally growing mushrooms (e.g. http://www.shroommap.tk, 14.01.2006; http://www.shroomery.org, 10.01.2006) as well as sites where users share information on known magic mushroom locations. Qualitative reports from three EU Member States (Poland, Ireland, Czech Republic) report that users hunt for wild growing magic mushrooms. In Poland, residents in local communities and local shepherds in the south of Poland observed young persons aged 15–19 seeking magic mushrooms (*Psilocybe*

([11]) Mixmag Survey 2005, personal communication from Dr Luke Mitcheson.

semilanceata) (Szymański, not yet published). In Ireland, representatives of local communities in the region of Kilkenny reported that magic mushrooms were 'popular when in season' suggesting consumption of wild magic mushrooms (Finane, 1999). Consumption of locally grown hallucinogenic mushrooms is also reported in the Czech Republic (Kalina, 2003).

Retail outlets

The information concerning hallucinogenic mushroom markets and availability is dominated by the Netherlands and the UK. In both countries markets for legal smart drugs ([12]) emerged and expanded rapidly in the late 1990s and early 2000s.

Available information suggests that users purchase magic mushroom products from smartshops and on the internet. According to a study conducted in 2001 among a representative sample of young persons aged 12 and above in the Netherlands, 64% of young people aged 18 and older who used magic mushrooms in the last year purchased them in smartshops (Abraham, Manja, Hendrien, Kaal and Cohen, 2002).

In the Netherlands, it is estimated that there are about 120–150 smartshops, although the exact number is unknown ([13]). These shops are concentrated in Amsterdam and sell legal and predominately natural products, including magic mushrooms. They are also sold in a few coffee shops ([14]). In some areas 'paddo' cabs make home deliveries of hallucinogenic mushrooms (Riper and de Kort, 1999). 'Headshops' (shops which sell drug-paraphernalia, such as pipes) and 'grow shops' (shops for home growers of marihuana) also sometimes sell hallucinogenic mushrooms. According to the Dutch Risk Assessment Report, it is estimated that magic mushrooms make up 50% of smartshop turnover (CAM, 2000). The types of magic mushrooms most commonly sold by headshops or smartshops in the Netherlands are the *Psilocybe cubensis* varieties, most notably the *Psilocybe mexicana* none of which are reported to grow wild in Europe.

Most recreationally used mushrooms are cultivated rather than picked wild. The *cubensis* varieties are cultivated specifically (mostly in the Netherlands) in order to produce a marketable drug, mainly because they are easy to grow in terrariums and possess a low water content that allows them to stay fresh for 7–10 days (Levitt et al, 2006).

Picture 1: Market stall selling hallucinogenic mushrooms in Camden, London, December 2004 (Source: Zheileman, Creative Commons, http://www.flickr.com/photos/zheileman/3061819)

([12]) Smart drugs or Nootropics usually refer to chemicals which are claimed to have mild to moderate positive mental or physical effects such as improvements to memory, cognition, and clarity of thought or 'anti-aging' effects. In the context of this case study, smart drugs also include legal and predominately natural products which are marketed by smartshops.

([13]) Estimate provided by the Vereniging Landelijk Overleg Smartshops (Vlos) (2006), Dutch Association of Smart Shop Owners.

([14]) Coffee shops are shops were any adult can obtain and use small quantities of cannabis.

It is estimated that about 300 shops and market stalls across the UK sold hallucinogenic mushrooms (The Economist, 2004) until the change in legal status in July 2005 prohibited sales. Prior to July 2005 the UK Treasury collected sales tax on hallucinogenic mushrooms estimated to be worth up to £175,000 (€255,421) a year on a turnover estimated of around £1 million (€1.46 million) per annum (UK Home Office, Drugs Bill Regulatory Impact Assessment, 2004). According to data based on the annual readership survey conducted by a UK clubbing magazine (Mixmag 2004), 54.6% reported to have purchased their last batch of mushrooms in a club/shop/stall, 16% got them from a friend and 4.2% got them via the internet.

Following the current trend in many consumer markets, there is a rapid diffusion of new products and brands. For example, the recent prohibition of psilocybin and psilocin containing fungi in the UK appears to have provoked an emerging interest of retailers in legal, types of hallucinogenic mushroom such as *Amanita muscaria* (fly agaric) (Black Poppy, 2006).

Little is known about the sale of hallucinogenic mushrooms in other EU Member States. There are some examples of retailers using existing legal loopholes to circumvent national laws. In the Czech Republic, a newspaper reported that a shop in Prague was attempting to sell hallucinogenic mushrooms under the label of aromatic and decorative goods. They were sold with a leaflet that warned customers not to ingest them, thus evading national legislation (Garkisch, 2005).

Online internet shops

In recent years many retail outlets started to offer their products on the internet via online shops allowing easy access to their products for a wide range of customers, including customers living abroad. In order to obtain a snap shot of the number and type of online shops selling hallucinogenic mushrooms a search was conducted via the search engine Google™ (http://www.google.com) and AltaVista™ (http://www.altavista.com) in January 2006. The search used English language key words: 'magic mushrooms shop', 'buy magic mushrooms', 'psilocybe cubensis shop' ([15]), 'buy psilocybe cubensis'.

Table 1: Search summary of identified online shops that sell hallucinogenic mushroom products

Keywords	Online shops identified via Google	Altavista	Total number
Magic mushrooms shop	16 (837,000)	14 (674,000)	19
Buy Magic mushrooms	16 (686,000)	10 (733,000)	16
Psilocybe cubensis shop	24 (60,500)	5 (52,100)	24
Buy Psilocybe cubensis	17 (29,900)	7 (32,700)	18
Total number of online shops			39

Out of all the hits that were listed, the first 300 for each search engine and key word were analysed. Overall, the snapshot produced a total number of 39 online shops that sell hallucinogenic mushrooms products. An analysis of the given contact addresses for these online shops revealed that

([15]) *Psilocybe cubensis* was selected as it represents one of the most common hallucinogenic mushrooms sold by smartshops.

the vast majority (82%) are based in the Netherlands. The remaining 18% of sites included four Austrian online shops selling growkits and sporeprints (e.g. http://www.magicmushrooms.org, 15.02.2006), two German sites and a UK site linked to a Dutch online shop. A Polish site was also viewed that was selling mainly cannabis products but it referred to hallucinogenic mushrooms not being available at present (http://www.narkus.pl, 06.02.2006). No data are available on the number of customers or sales of hallucinogenic mushroom products via the internet. Website statistics for one Dutch online shop (http://www.webstats4u.com/s?tab=1&link=1&id=2984069, 14.02.2006) show that between May 2004 and February 2006 their site was accessed via servers based in the Netherlands (73%) followed by Belgium (14%), Germany (2%) and France (2%).

Online shops sell a variety of hallucinogenic mushroom products ranging from fresh mushrooms to mushroom prints ([16]), spawnbags ([17]) and growkits ([18]). The majority of online shops offer international shipping. However many sites do not ship to countries where sales are prohibited and or advise customers to verify the legal status of the product before ordering. Many sites have different language versions (mainly English, French and German) to attract foreign customers. The table below shows the price range for different hallucinogenic mushroom products sold.

Table 2: Price range of different hallucinogenic mushroom products sold by online shops, January 2006 (Source: national focal point, Cyprus)

Product	Quantity	Price range in €
Fresh *Psilocybe cubensis* (Mexican)	30 gr	8.5–45.28
Fresh *Copelandia cyanescens*	10gr	13–17.5
Psilocybe mexicana (Philosopher's stones/truffles)	15 gr	10–17.5
Spawnbag (*Psilocybe azurescens*)	1	24–25
Growkits	1	25–100 ([1])
Spore prints	1 print or syringe	9–28 ([1])

([1]) Prices vary according to the hallucinogenic mushrooms species for which growkits or spores are available.

Users can also obtain a variety of strains (e.g. *Psilocybe cubensis*, *Panaeolus cyanescens*) for a price of 1 EUR per print from a non profit making organisation, the 'Free Spore Ring Europe' (http://www.fsre.org, 25.01.2006). Instructions on how to grow hallucinogenic mushrooms using a spore print and a substrate can be easily found on the internet (e.g. http://www.magic-mushrooms.net/magic-mushroom-growing.html).

([16]) Spore prints are sold as spore prints, created by pressing the gills of a mature mushroom on to paper, or spore syringes, created by transferring spores from a print into a syringe under sterile conditions. The spores are used to grow mushrooms on a substrate of nutrients (free of bacteria and molds). Just as a common house plant is grown in a pot of soil, mushrooms can be grown on a cake of substrate material. Spore prints are available for a variety of magic mushrooms.

([17]) Spawn is the pure culture of mycelium which is already grown through the substrate. The substrate consists of woodchips. The mushroom spawn bags contain e.g. sterile hardwood chips with mushroom mycelium for the growth of mushrooms.

([18]) Growkits are available for various types of magic mushrooms (e.g. *Psilocybe cubensis*, *Psilocybe tampensis*). They usually contain a box with colonised substrate, a bag with an air filter and paperclips. A growkit can produce

In the UK, internet sites stopped selling hallucinogenic mushrooms in 2005. For example, in July 2005 one internet site in the UK (http://www.allsalvia.co.uk, 18.07.2005) claimed to be 'sold out' of their kits for growing hallucinogenic mushrooms. On the same page was a notice stating that fresh hallucinogenic mushrooms, truffles and growkits were about to become class 'A' controlled drugs. The Irish online headshop THC (http://www.thc.ie, 10.02.2006) placed a notice on their site that their hallucinogenic mushroom products are no longer available since they became illegal on 31 January 2006.

Retailers in the UK such as the online headshops EveryOneDoesIt.com and Allsalvia.co.uk have started to switch their sales to legal alternatives, e.g. Fly Agaric or the closely related *Amanita pantherina* (known as Panther mushroom for Panther cap). Another product that is being increasingly marketed in the UK as a legal alternative to hallucinogenic mushrooms are Purple Ohms capsules ([19]) which have similar effects to LSD.

Picture 2: Label of a growkit for Psilocybe cubensis. (Source: Forensic Science and Toxicology Laboratory, Cyprus).

Criminological evidence and seizures

In 2000, when a risk assessment was carried out in the Netherlands a number of smartshop owners were thought to have ties with the synthetic drugs market and they were not prepared to disclose the names of mushroom suppliers (CAM, 2000). The risk assessment report provides information on an investigation carried out by the National Criminal Intelligence Service (CRI) to assess the frequency of public nuisance related to hallucinogenic mushrooms. The CRI contacted various municipalities but found no evidence of public nuisance as a result of sale or use of these substances.

In 2004, police or customs seizures of hallucinogenic mushrooms were reported in Czech Republic, Estonia, Germany, Greece, Hungary, Lithuania, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Sweden (National reports, 2005, Estonia, Germany, Netherlands, Norway (reporting form 2005, Detecting, tracking and understanding emerging trends, Czech Republic, Greece, Hungary, Lithuania, Poland, Portugal, Slovakia, Sweden). Estonia reported the confiscation of 14 mail deliveries of psilocybin mushrooms or their spores or mycelium (EMCDDA, national report Estonia, 2005). Reported trends in seizures of hallucinogenic mushrooms were mixed. Data from customs in Sweden show an increase in 2004, while Norway reported a decrease. Germany also reported an increase (EMCDDA, national report Germany, 2005). The largest quantity seized was reported in Poland where police seized a total of 11.5 kg of hallucinogenic mushrooms in 2004. Since the reclassification of hallucinogenic mushroom as a Class A drug in the UK, seizures made by law enforcement authorities have also been recorded. One report involved hallucinogenic mushrooms worth £6,000 (€8,700) seized in Glasgow in 2005 (http://news.bbc.co.uk/1/hi/scotland/4699343.stm, 20.07.2005). In Cyprus, for the first time the

([19]) Purple Ohms capsules' main ingredient is Argryria nervosa (Hawaiian Baby Woodrose, a.k.a Elephant Creeper and Woolly Morning Glory) which contains Lysergic Acid Amide (LSA).

police seized hallucinogenic mushrooms in 2006 which apparently had been purchased through a Dutch retailer (national focal point, Cyprus).

Very few data are available as regards drug law offences. In the Czech Republic the Police National Drug Squad reported nine offences related to hallucinogenic mushrooms in 2003 and 2004. In Greece, a total of 37 and 20 offences ([20]) were reported in relation to hallucinogenic mushrooms in 2003 and 2004 respectively (reporting form, 2005, Detecting, tracking and understanding emerging trends, Czech Republic, Greece).

Dose and effects

Mushroom effects are dependent on dose and the individual reaction and sensitivity to psilocybin, previous experiences and the setting. The major effects are related to the central nervous system but there are also some sympathomimetic effects. The subjective effects, however, vary greatly between individuals and from one episode of use to the next within the same person (Jacob and Fehr, 1987; O'Brien, 1996; Pechnick and Ungerleider, 2005).

Potency and dose

Mushroom potency depends on the species or variety used, their origin, growing conditions and age. Overall, it is thought that the most potent species (e.g. *Psilocybe semilanceata*) could contain up to 1 % psilocybin, with some higher potency reported in specific species (e.g. *Psilocybe azurenscens*, *Psilocybe bohemica*). In other species (*Psilocybe cubensis*) psilocybin and psilocin could be present in up to 0.6% concentration. These values, however, are used for initial orientation only. Given that the psychoactive psilocybin doses are believed to be between 45 µg/kg body weight and 315 µg/kg body weight (Hasler et al, 2004), various speculative calculations could be performed in order to define the number and/or weight of mushrooms needed to obtain the desired recreational effects.

The dose 'recommended' for recreational use is reported to be between 1 and 3.5 to 5 grams of dried mushrooms. The dosage for fresh, wet mushrooms is believed to be approximately 10 times higher (10–50 grams) (Erowid, 25.03.2006). These dose ranges should be interpreted with caution, as it is difficult to transpose the maximum dose of the active or hallucinogenic substance e.g. of psilocybin into mushrooms (weight or number), as the concentration may vary. Furthermore, there is usually more than one active substance present. However, as short-term tolerance may develop rapidly to both physical and psychological effect dosages may increase as a result.

Route of administration, onset and duration of action

To achieve the desired effects the users ingest (chew up and hold in mouth or swallow) the mushrooms raw or dried or brewed/stewed into tea. Because generally hallucinogenic mushrooms do not taste good it is 'recommended' to chop them into smaller pieces. Eating them mixed or cooked into food may cause nausea and vomiting (Lifeline Publications, 2005). The mushrooms can

([20]) Unknown principals have been included in the total numbers.

also be dried for later use (Erowid, Shroomery). Users' reports on the internet suggest that dried mushrooms are also being smoked (Erowid, 25.03.2006; Shroomery, 05.04.2006) which is said to induce faster but milder effects. However, it is not clear whether smoking psilocybin and psilocin containing mushrooms can produce psychoactive effects. A report on the internet (Shroomery, 04.04.2006) refers to literature reports about extract of mushrooms being intravenously injected which results in more severe acute effects.

Users report that the onset of effects is between 10 to 60 minutes depending on the modality of ingestion, the physical condition, or food intake as well as the experience of the users. As with other hallucinogens, the experience is most often described as 'tripping'. The duration of a 'trip' is usually described to last between 2 and 6 hours with after effects (for example, difficulties to sleep) lasting additional 2–6 hours (Erowid, Shroomery).

Acute psychological and physiological effects

Subjective effects described by users range from mild feelings of relaxation (comparable to those of cannabis), giddiness, uncontrollable laughter, energy, joy, euphoria, visual enhancement (seeing colours brighter), visual disturbances (moving surfaces, waves), to delusions, altered perception of real events, images and faces, or real hallucinations. The sensory distortions may be coupled with restlessness, in-coordination, feeling of anxiety, impaired judgement of time or distance, sense of unreality or even depersonalisation. These effects may be termed 'bad trips' by users and can also involve panic reactions and psychosis-like states.

The 'good trips' as described by users are usually associated with relaxation, mental stimulation, new insights (often about time) and perspectives, quickly changing emotions ('lots of fun and laughter') (Erowid, Shroomery). However, it has also been reported by users that the effects are not viewed as positively as the entactogenic effects of ecstasy, and the negative effects described in the next section may outweigh the positive effects in social situations. Nevertheless, there are users who enjoy the experience and choose to repeat it (CAM, 2000).

In general, the physiological effects are 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. Generally, body temperature remains normal. However, pronounced physical symptoms such as severe stomach pain, persistent vomiting, diarrhoea etc. have been recorded. A UK clubbing magazine survey conducted in 2005 found that over a quarter of those who had used hallucinogenic mushrooms in the last year had experienced nausea or vomiting (Mixmag, 2000–2005).

The tendency for a temporarily increased blood pressure may also be a risk factor for users with cardiovascular conditions, especially untreated hypertension (Hasler et al, 2004).

Consequences

Psychological and physical dependency does not occur with mushrooms and there are no withdrawal symptoms.

Somatic health risks

Acute toxicity of psilocybin is believed to be low so fatal intoxications related to consumptions of hallucinogenic mushrooms are rare. One, allegedly toxicologically confirmed, death case directly attributed to ingestion of a large amount of mushrooms in recent years is reported to have occurred in France (Erowid). The Czech Republic reported one death case, a suicide in 2004, in which the presence of 'hallucinogenic mushrooms' was detected and mentioned in the autopsy report.

The reported number of people seeking medical assistance because of intoxications from hallucinogenic mushrooms is very low. The Czech Republic, reported 4 and 10 cases, in 2003 and 2004 respectively, of people who sought assistance following the use of hallucinogenic mushrooms. In Poland, one toxicological centre reported psilocybin/psilocin intoxications — 2 cases in 2003 and 3 cases in 2004. Slovenia reported 2 intoxications in 2005. The number of cases reported by the Swedish Poisons Information Centre remained relatively low and stable in the last five years at around 30 to 40 calls annually. However, the coverage and capacity of the reporting systems and case definitions across the EU vary substantially which makes it difficult to interpret findings or draw firm conclusions (reporting form, 2005, Detecting, tracking and understanding emerging trends).

Intoxication with hallucinogenic mushrooms is not always easily diagnosed unless there is information about recent ingestion from the user or from friends or family. First aid usually aims at reassuring and preventing users from possibly harming themselves or others and assisting them to an appropriate medical unit. Benzodiazepines are reported to be the safest medication of choice, effective for most patients (WebMD).

There is no systematic research, but so far there is no evidence of chronic toxicity. Not enough data is available about mutagenicity and teratogenicity to draw any conclusion. There is no irreversible organ damage by psilocybin reported (CAM, 2000).

Mental health risks

Use of hallucinogenic mushrooms is more commonly linked to mental health risks. Although there is no evidence of what proportion of users experience a 'bad trip', 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 judgement. 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. A UK clubbing magazine survey conducted in 2005 found that nearly a quarter of those who had used hallucinogenic mushrooms in the last year had experienced a panic attack (Mixmag, 2000–2005).

A bad trip is usually followed by faintness, sadness and depression, paranoid interpretations etc.

which may persist for days, weeks or even months. Some of these symptoms are likely to be associated with the use of other controlled substances. Intermittent and chronic psychotic states resulting from hallucinogenic mushrooms are possible. In some individuals, use can bring to the surface underlying psychotic or personality disorders. Flashbacks can occur, although less frequently than with LSD. These episodes are generally perceptual alterations or pseudo-hallucinations. Some extreme cases have been reported, including a March 2004 case in Manchester, UK, where a 31 year old man died after leaping from a tower block window after consuming 'Hawaiian' psilocybin containing mushrooms in combination with alcohol (Manchester Evening News, 28.05.2005); a coroner's inquest confirmed the contributory role of the mushrooms together with alcohol. A full inquest into a 2005 case in Dun Laoghaire, Ireland, where a 33 year old man died after falling from the fourth floor of a building after consuming hallucinogenic mushrooms is scheduled for June 2006 (Irish Independent, 02.03.2006).

Responses

Legal status

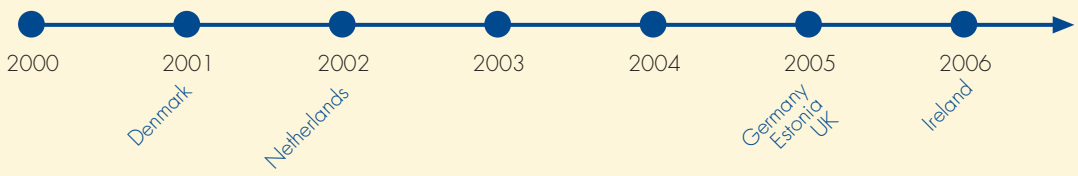
Which mushrooms are controlled?

Legal controls do not always apply to the same mushrooms. It can be seen that Denmark controls 'Psilocybe semilanceata, Psilocybe cubensis or other fungi/spores containing psilocin or psilocybin', whereas Italy lists 'Fungi of the genus Strofaria, Conocybe and Psilocybe'. Other countries' laws simply list 'Fungi containing psilocin or an ester of psilocin' (e.g. UK) (EMCDDA, ELDD).

Recent changes in legislation

Psilocin and psilocybin are controlled under the 1971 UN Convention on Psychotropic Substances and listed in Schedule I under the name psilocybine and psilocine (or psilotsin) respectively. All EU Member States control them accordingly. Although, many plant-based drugs have been self-administered for thousands of years the imposition of criminal sanctions is mostly a product of the twentieth century (King, 2003). In the case of hallucinogenic mushrooms, six EU countries have tightened their legislation on mushrooms since 2001, to coincide with recent increases in

Figure 8: Timeline for recent legislation on hallucinogenic mushrooms in EU countries (2001-2006). See info box, page 23.



prevalence.

How to control wild fungi?

Some countries have had legal difficulties, not wanting to unjustly criminalise people who may own land where mushrooms grow wild. A first solution was to state that mushrooms were illegal if 'treated or prepared' (Irish/UK 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 smartshops using this loophole to sell raw mushrooms, the UK (for example) argued in 2004 that even packaging was a form of 'preparation', but finally the law in the UK was changed in 2005 to apply to psilocin mushrooms of any kind, with no mention of their state.

Is it a plant?

The Italian, Greek, Cypriot, and Lithuanian laws have a catch-all term prohibiting cultivation of plants from which narcotic substances can be extracted. Yet if a mushroom is a fungus and not 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 the loophole for mushrooms.

Information for risk reduction

The extent and quality of information on hallucinogenic mushrooms disseminated via prevention activities, leaflets etc. in EU Member States is not known. Many prevention programmes today include information on hallucinogenic drugs alongside information about other drugs in order to raise awareness. Examples with a specific focus on mushrooms are: a flyer about the effects of psilocybin and of mushroom consumption (Trimbos.nl, 10.02.2006) published by the Trimbos Institute of the Dutch Ministry of Health; an information brochure on hallucinogenic mushrooms by the Berlin Drug Working Group (Landesarbeitsgemeinschaft Drogen Berlin); the publication by the UK organisation Lifeline

Recent changes to legislation

Date: July 2001

Country: Denmark

Law: Added 'Mushrooms or spores of Psilocybe semilanceata, Psilocybe cubensis or other fungi/spores containing psilocin or psilocybin, including grown, dried or processed in any other manner' as a controlled substance.

Date: Nov 2002

Country: Netherlands

Law: The Opium Act specifically prohibits psilocin, psilocybin, and also 'preparations' containing one or more of the prohibited substances. The Supreme Court clarified that the Opium Act therefore applies to hallucinogenic mushrooms containing these substances that have been 'prepared' by being dried, mashed, or processed in food (or processed into any other form) - but not to fresh mushrooms.

Date: Mar 2005

Country: Germany

Law: Changed definition of controlled substance from 'plant' to 'organism', to clarify that mushrooms are included.

Date: May 2005

Country: Estonia

Law: Clarified that cultivation of hallucinogenic mushrooms is an offence.

Date: July 2005

Country: UK

Law: Added 'Fungus (of any kind) which contains psilocin or an ester of psilocin' as a controlled substance - no longer controlled only "if treated or prepared".

Date: Feb 2006

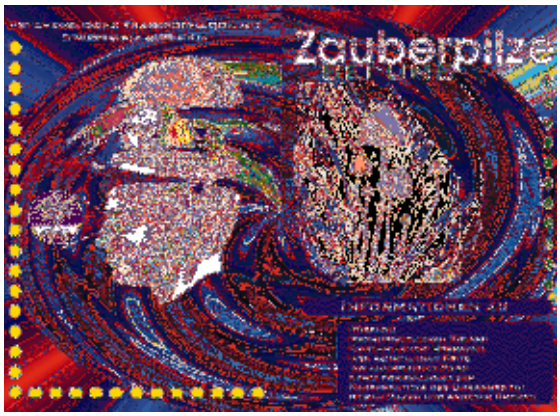
Country: Ireland ([1])

Law: Criminalised possession or sale of 'fungus of any kind or description, which contains psilocin or an ester of psilocin' (exempt if growing uncultivated); no longer controlled only 'if treated or prepared'.

([1]) In Ireland the recent change in law was, according to the Deputy Prime Minister, initiated around a time when the sale of magic mushrooms was increasingly commonplace and after a young man died after having consumed psychoactive mushrooms.
http://www.dohc.ie/press/releases/2006/20060131.html

'Magic mushrooms - frequently asked questions'.

Many retailers from the smartshop industry in the Netherlands provide warnings. Picture 4 shows an example of a label found on a fresh pack of *Psilocybe cubensis* purchased in a Dutch smartshop in February 2006. It warns, in the English language, that persons under the age of 18 should not use the product as well as when pregnant, using medication, suffering from mental illness, when driving or operating machines. It also warns not to use the product in combination with alcohol. In addition, the number of a UK Drug Helpline is displayed on the label. This suggests that UK customers are being targeted.



Picture 3: Risk reduction leaflet published by the Berlin Drug Working Group
(Landesarbeitsgemeinschaft Drogen Berlin, http://www.gruene-berlin.de/drogen/IAG-Drogen/zauberpilze.html)

The quality and amount of information provided by those selling the product varies (CAM, 2000). As a rule, information leaflets provide no information about the maximum shelf life, the nature of possible side-effects and the proportion of active substances (psilocybin and psilocin).

In a snapshot of 21 online shops viewed in January 2006, the majority warn not to use hallucinogenic mushrooms when taking medication and/or in combination with alcohol or other drugs such as stimulants. Only two thirds do not recommend the use of hallucinogenic mushrooms when the user suffers from depression or psychosis. About half of the sites provided information on dosage and included information on safe use practices (e.g. consume with empty stomach, drink liquids during the trip and consume in quiet safe environment). Most sites provide information on sought-after effects, yet few provide information on how to enhance sought-after effects. The vast majority excludes information on possible negative side effects. Only a minority of sites explicitly mentioned nausea and sickness which may occur during consumption. Although this snapshot does not represent all online shops, it shows that the information from these retailers is biased towards the positive effects and that extent of information varies considerably.

Another source of more detailed information that users can increasingly access are the internet websites mentioned earlier in this case study, both those dedicated to hallucinogenic mushrooms and to wider drug use. As with the information provided by retailers, the extent and quality of information on these websites is variable.

Picture 4: Label on a package of fresh Psilocybe cubensis mushrooms purchased in a smartshop in Amsterdam. Note that the label includes the National Drugs Helpline in the UK, suggesting that the product is targeted at UK users.
(Source: EMCDDA, 2006)

Conclusions

Overall prevalence estimates for use of hallucinogenic mushrooms in the EU are considerably lower than those for cannabis. However, prevalence estimates for ever in lifetime use appears to equal those for ecstasy among young people in some countries. The highest prevalence estimates among young adults (aged 15 to 24 years old) are found in the Czech Republic, Germany, Ireland, the Netherlands and the UK. The highest prevalence estimates among school students appear to be in the Czech Republic, the Netherlands and the UK. Only a few special developments in prevention materials relating to the use hallucinogenic mushrooms have been reported, although many drug prevention programmes include information on hallucinogenic drugs alongside other information. The relatively low levels of reported harm together with indications that patterns of frequent or intensive use are rare probably account for the lack of developments in specialised prevention.

The conclusions of this paper focus on factors in the EU that may have contributed to the emerging trend in use of hallucinogenic mushrooms and also on factors that may have provided barriers to diffusion of this trend.

Contributing factors

A number of conditions existed during the last decade which might have contributed to the emergence of a trend in the use of hallucinogenic mushrooms.

Mega consumer trends

Firstly, according to consumer market analysts there is a megatrend for people to actively seek out more intense experiences and be more prepared to experiment with new products than in the past (Datamonitor, 2004). Increasing interest among young people in experimenting with hallucinogenic substances for recreational purposes may be driven by this megatrend. Also, increasing interest in natural and organic products may have enhanced the appeal of hallucinogenic mushrooms over synthetic hallucinogens.

Recreational drug settings

During the last decade synthetic drugs such as ecstasy and other ecstasy-type stimulants emerged as a common feature of the music and dance scene in many parts of Europe. The accompanying increases in prevalence of recreational drug use during this period may have helped to establish a platform of acceptability for the use of other psychoactive drugs, particularly those which are perceived as carrying low risk. Survey data show that individuals who frequent dance music settings, especially those who use other illegal substances, are much more likely to use hallucinogenic mushrooms than those who do not.

Ease of access

With regard to issues of supply and access to hallucinogenic mushrooms, the main suppliers are smartshops and online internet retailers. The sale of hallucinogenic mushrooms by smartshops in the Netherlands appears to have played an important role in kick-starting the trend in the late 1990s. Diffusion of this trend was probably facilitated further by the rapid expansion of the internet which enabled pro-mushroom lobby groups to spread information to promote the trend in use. The internet also provides retailers with opportunities to develop international markets for hallucinogenic mushrooms. The quality and amount of information about associated risks of use provided by

retailers on the internet varies and, not surprisingly, tends to emphasise positive rather than negative aspects of use. The amount of overlap between pro-mushroom lobby groups and commercial retailers is unclear.

Legal loopholes

The fact that hallucinogenic mushrooms containing an internationally controlled substance grow in the wild has created confusion with regard to legal controls and, in countries where legal controls are exercised, they are not always applied to the same mushrooms. This confusion has provided loopholes in the law for mushroom retailers to use and presented obstacles to the development of mechanisms to control supply.

Barriers to diffusion

With regard to the conditions and events in the EU that may have helped to prevent diffusion of this emerging trend, the influence of the following factors might be considered.

Legal control

Since 2001, six EU Member States have tightened their legislation on hallucinogenic mushrooms to coincide with concerns about increasing prevalence in these countries. New legislation appears to have had an immediate impact on both the availability of hallucinogenic mushrooms in the UK and on the general volume of internet sales.

Cost/benefits of use

User accounts suggest that hallucinogenic mushrooms may not be viewed in a sufficiently favourable light to repeat the experience or to promote the trend. Unpredictable potency and negative effects such as, nausea, panic attacks, and/or lack of sociable effects may all contribute to limiting recreational use of hallucinogenic mushrooms. Diffusion of an emerging drug trend usually requires opportunities for the potential user to witness others using the substance in order to make a cost benefit assessment (Golub and Johnson, 1996). Unlike ecstasy, which is purchased and taken in a convenient and familiar tablet form, mushrooms are usually chewed or brewed in hot water. Comparing the ease with which an ecstasy tablet can be swallowed in a party or dance setting, this cumbersome route of administration, combined with unfamiliar and unpleasant taste, is likely to serve as a barrier to widespread or frequent use of mushrooms. Opportunities for young people to witness others using mushrooms are therefore limited and consequently the potential for diffusion is lower than was the case for ecstasy.

Responding to the trend

With regard to issues of access, the health risks associated with picking mushrooms in the wild due to the fact that hallucinogenic mushrooms are easily mistakable for any number of non-psychoactive, inedible, or poisonous mushrooms may limit the number of people willing to risk consuming mushrooms obtained directly from their natural habitats.

The recent prohibition of psilocybin and psilocin containing fungi appears to have provoked an emerging interest of retailers in alternative, legal, types of hallucinogenic mushroom such as

Amanita muscaria (fly agaric). The active chemicals in these are known to carry substantial toxicity risks and some closely related Amanita species are highly toxic and could cause fatal poisoning.

This case study of hallucinogenic mushrooms highlights the importance of lifestyle trends and economic interests in the diffusion of and responses to an emerging drug trend. Future work in the field of emerging drug trends must consider the crucial part that contextual forces play in reinforcing or legitimating forms of regulation.

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