EUDA
EUROPEAN UNION DRUGS AGENCY

EU Drug Market: MDMA — In-depth analysis

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EU Drug Market: MDMA describes the European MDMA market from production to trafficking, distribution and use. It details the materials, processes and players involved at different stages and levels of the market. The module takes a threat assessment approach, identifying key issues and defining recommendations for action at EU and Member State level.

This resource is a module of EU Drug Markets: In-depth analysis, the fourth comprehensive overview of illicit drug markets in the European Union by the EUDA and Europol.

Last update: *March 2025*

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Introduction

MDMA (3,4-methylenedioxymethamphetamine) is an illicit drug of synthetic origin, which is typically present in the EU drug market as tablets or in powder or crystal form. When in tablet form, it is commonly referred to as ecstasy (X, XTC, molly, mandy, md), although several substances can be found in tablets sold as ecstasy. Initially developed by the pharmaceutical company Merck in 1912, the substance garnered interest throughout the 1970's in some therapeutic circles, and more widespread attention in the 1980s and 1990s due to its association with the dance and rave culture. The European MDMA market is largely supplied by illicit laboratories in the region, particularly in the Netherlands and Belgium, where production has frequently adapted to face market pressures, such as precursor shortages. Despite being smaller in overall value compared to other stimulants, the MDMA market remains profitable, with an estimated annual retail value of EUR 594 million in Europe.

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Key findings and threat assessment

The European MDMA market represents a significant and profitable market for criminal networks, with a minimum estimated annual retail value of at least EUR 594 million, corresponding to about 72.4 million ecstasy tablets used. Despite overall price stability, variations exist across Member States, particularly near the production hubs in the Netherlands and Belgium. Notably, while the MDMA content in ecstasy tablets remains high by historical standards, there are signals of a decrease from a peak in previous years. Nevertheless, significant health concerns remain due to the presence of high-strength ecstasy tablets on the market. MDMA production predominantly occurs in the Netherlands and Belgium, with Dutch criminal networks playing a significant role in the MDMA market both within and outside the European Union.

Europe's MDMA market has a global reach, supplying Oceania, Asia and also Latin America. Innovations in production and trafficking methods, alongside the exploitation of legal business structures, point to a sophisticated and adaptive criminal infrastructure. The environmental damage and health risks associated with MDMA production underscore the market's broader societal impacts. The trafficking of MDMA base oil and the potential for international market expansion pose new challenges. Innovations in precursor use and production techniques could, in future, further complicate efforts to control this market.

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Global context

An estimated 20 million people used MDMA worldwide in the past year, according to 2022 estimates. Globally, around 12 tonnes of MDMA was seized in 2022, a 15 % increase on the previous year, which suggests that the drop in seizures seen in 2021 associated with the COVID-19 pandemic was temporary. Europe accounted for over two fifths (43 %) of the global quantity of MDMA seized between 2018 and 2022, and typically accounts for approximately half of the world's dismantled illicit MDMA laboratories. However, MDMA is also produced in Oceania, Asia, North America and, more recently, Latin America. The largest consumer market is situated in East and South-East Asia, although Oceania has by far the highest prevalence rate of MDMA use globally.

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MDMA production

Countries in the European Union play a prominent role in the global supply of MDMA. Most EU-based MDMA production takes place in the Netherlands and Belgium but there are signs that production may be spreading to other countries. MDMA production currently occurs mostly via the 'high-pressure' method, a reductive amination reaction that uses PMK as the precursor. Some signals suggest that a shortage of high-pressure reactors attributed to the arrest of equipment manufacturers (critical facilitators) in the Netherlands may be driving a shift towards MDMA production by other methods, such as the 'cold method' and the purchase of equipment made in China. Analogous to the situation with BMK for amphetamine and methamphetamine production, PMK has also been supplanted by designer precursors, mostly sourced from China, which are then converted into PMK in Europe. Production facilities tend to be industrial operations, using sophisticated equipment operated by experienced 'cooks'. Between 2019 and 2021, fewer MDMA production facilities were dismantled than in the previous period, likely reflecting reduced demand for MDMA during the COVID-19 pandemic, as well as changes in law enforcement activities. However, this temporary market disruption appears to be over, with several large illicit production facilities being dismantled in 2022 and 2023. The same trend is reflected in seizures of MDMA precursors.

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MDMA trafficking and distribution

Demand for MDMA in Europe is met by large-scale producers in the European Union, mainly in the Netherlands and Belgium. Limited seizure data suggest that the impact of COVID-19 on the availability of MDMA at retail level may have been transitory, although the quantity of MDMA seized still remains lower than before the pandemic. From Europe, MDMA is trafficked to consumer markets globally. Based on available data, the Netherlands remains the main origin of ecstasy trafficking worldwide. However, Germany − and to a lesser extent Bulgaria and Belgium − appears to be emerging as a distribution hub for MDMA to both European and external markets.

Profitable markets in Oceania and Asia appear to be some of the main targets of European-origin MDMA, but there is evidence to suggest that Latin America may also be emerging as an increasingly important market. In some instances, there have been reports of barter deals, where MDMA has been traded for cocaine, between European and Latin American criminal networks.

MDMA is typically transported by land within the European Union and to Türkiye, and by cargo or passenger airplanes, and maritime shipping, for destinations outside Europe. Post and parcel delivery services are also key distribution channels for MDMA, particularly from vendors operating online. Shipments using post and parcel delivery mostly consist of smaller quantities, although larger quantities have also been reported.

MDMA is frequently traded online across a range of platforms, including darknet markets as well as surface web and social media platforms. Darknet markets offer retail and wholesale amounts of both ecstasy tablets and MDMA powders/crystals. Recently, social media platforms and instant messaging applications have become particularly dynamic channels through which MDMA is sold to consumers.

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MDMA retail market

Around 12.3 million adults in the European Union (aged 15-64) have used MDMA at least once in their lifetime. A demand-based estimate of the European MDMA retail market places its minimum annual value at EUR 594 million, corresponding to approximately 72.4 million MDMA tablets consumed in 2021. Around 90 % of this consumption can be attributed to frequent users. European consumers have access to a diverse set of MDMA products, mainly ecstasy tablets and MDMA powders/crystals. However, some novel consumer products are also becoming available on European markets, such as edibles and sweets containing MDMA. Although patterns of consumption have remained relatively stable, consumers of ecstasy tablets are expected to ingest more of the substance per use episode, given the increase in MDMA content per tablet between 2011 and 2019. Since 2019, however, MDMA tablet content has slightly decreased – in part, this may reflect a temporary reduction in MDMA demand during the COVID-19 pandemic and reduced availability of MDMA associated with legal controls placed on glycidic derivatives of PMK, some of its key (pre) precursors. Nevertheless, high-strength ecstasy tablets are still in circulation, as are mixtures of MDMA and ketamine sold as ‘tucibi’ or ‘pink cocaine’. Serious harms associated with exposure to MDMA are considered relatively rare, but MDMA acute toxicity is known, and the availability of high-strength products increases the risk of adverse health effects, including fatal outcomes, associated with the use of this substance.

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Actions to address current threats and increase preparedness

The large-scale production and distribution of MDMA within the European Union requires a strategic response framework to address the health and security challenges posed by this drug market. Key priorities include enhancing the intelligence picture on MDMA trafficking, both within Europe and to external markets, and reducing MDMA production and distribution. This will require improved monitoring, information sharing and enhanced control of the importation and flow of precursors and other chemicals used in MDMA production. Cross-border investigations also need strengthening to encompass the entire MDMA production chain, targeting the infrastructure supporting MDMA production, and utilising innovative technologies for detecting and dismantling production sites and distribution networks online and offline. To do so, enhanced collaboration between EU Member States, international partners and other key stakeholders is necessary, focusing on operational and strategic information exchange. Meanwhile, strengthened training and awareness among law enforcement and other key stakeholders will be important in order to enhance the intelligence picture of the MDMA market. In addition, enhancing available prevention, harm reduction, and treatment programmes will be necessary to reduce the harmful impacts of the MDMA market to public health.

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Methodology: Read more about the methodology used to collect data in this analysis.

References: Consult the list of references used in this module.

Abbreviations: Consult the list of acronyms and other abbreviations used in EU Drug Markets: In-depth analysis.

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EU Drug Market: MDMA — Introduction

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MDMA (3,4-methylenedioxymethamphetamine) is an illicit drug of synthetic origin commonly known as ecstasy (X, XTC, molly, mandy, md) although the latter term has now been generalised to cover a wide range of other substances (see section Retail markets — price and purity). It acts as a central nervous system stimulant and elicits euphoric and 'entactogenic' ([1]) effects more accurately described as increased sensory awareness.

MDMA was first patented by the German pharmaceutical company Merck in 1912 (Merck, 1914) and tested as a potential anti-clotting agent and as an alternative to epinephrine (adrenaline). The drug was never commercially produced or widely known until experimental use of MDMA as a psycho-pharmacological tool began in the 1970s (Shulgin and Shulgin, 1991). At that time, its supply was guaranteed by research chemists with an interest in exploring its properties and in supporting therapeutic circles. Use of the substance gradually spread outside those settings. By the 1980s MDMA had become a fixture of the house/rave and techno music scenes in the United States and, later, in Europe. Illicit laboratories were established in the United States to supply the growing dance scene, with some of that production making its way to Europe (Nuwer, 2023). Increasing demand led to the emergence of small-scale laboratories in the Netherlands, where amphetamine production was already established and 'research chemicals' were also being produced. Concerns over its safety triggered heated debate, which ultimately led to the decision to place it in Schedule I of the 1971 United Nations Convention on Psychotropic Substances in 1986 (Dunlap et al., 2018; United Nations, 1986).

By 2008, Europe had become an established worldwide exporter of MDMA, with most of its production based in the Netherlands (United Nations Office on Drugs and Crime [UNODC], 2008). Dutch prominence in the MDMA market may have been facilitated by the country's existing infrastructure for illicit synthetic drug production (including experience in building and handling illicit distillation equipment) and by well-established criminal partnerships (Soudijn and Vijlbrief, 2011).

At that time, MDMA was mostly sold as ecstasy: relatively plain, white or off-whitetablets pressed with a limited range of recognisable logos. Between 2009 and 2011, shortages in MDMA production associated with the lack of availability of safrole (one of its key precursors) resulted in the circulation of ecstasy tablets with little or no MDMA content, and a

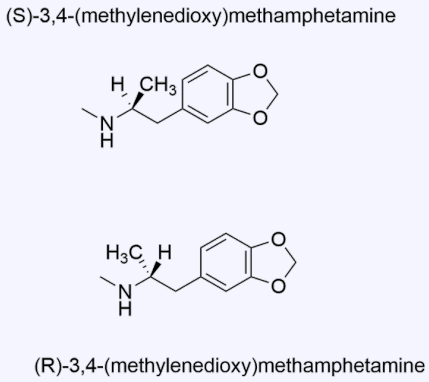
subsequent drop in consumer confidence (EMCDDA, 2016). To compensate for this, MDMA in crystal form was introduced in the market, and was both promoted by distributors and perceived by users as being purer and more reliable. MDMA shortages proved to be short-lived, however, as alternatives to safrole were soon found: first PMK, quickly followed by related 'designer precursors' (i.e., chemicals closely related with a controlled precursor but with limited or inexistent legitimate use). As such, from 2011 onwards, ecstasy tablets (mostly) containing MDMA were re-established in the market, sometimes in the form of brightly-coloured and distinctively shaped high-strength tablets with a vast range of logos, partly in a marketing effort to restore consumer confidence in the product (Mounteney et al., 2018). Since 2011, MDMA is commonly found on consumer markets as both ecstasy tablets and MDMA crystals (see Box 1.1. Forms of MDMA present on the European market).

In just over 50 years, MDMA has expanded from a small niche drug used in therapeutic circles in the United States to a globally known drug used by some 20 million people worldwide, according to 2021 estimates (UNODC, 2023). In large part, this market is supplied by European illicit drug producers; however, as this report explores, new markets are developing and there are signs that new players are becoming involved in production. From its production centres in the Netherlands and Belgium to its worldwide destinations, trans-European criminal cooperation is evident in every step of the supply chain. The MDMA market is large and profitable for the criminal networks involved in producing, trafficking and distributing the drug. Based on the most recent EUDA estimates, Europeans who use MDMA spend approximately EUR 594 million per year purchasing the drug. Although this is a relatively small amount compared to other drugs such as cocaine or cannabis, MDMA is also likely to generate considerable profits in external markets.

It is important to note that while most of the MDMA supply originates in illicit laboratories, recent changes to its legal status in some jurisdictions around the world may affect these dynamics (see Box 1.2. Developments in MDMA-assisted therapy for neuropsychiatric disorders).

Box 1.1. Forms of MDMA present on the European market

MDMA possesses structural similarities to amphetamine and methamphetamine as it contains a common phenethylamine core structure. Like amphetamine and methamphetamine, MDMA also possesses a stereogenic centre and therefore two enantiomers exist (R- and S-, non-superimposable mirror images of each other) ([a]).



Structural representation of the two enantiomers of MDMA

The available evidence shows that the MDMA present in the European illicit drug market is a racemic mixture of both enantiomers (Castrignanò et al., 2018; Losacker et al., 2022), unlike methamphetamine which is chemically treated to favour to the more potent and desirable *S*- form of the drug. Nonetheless, preclinical work and some human data suggest that there are differences in the pharmacology of the *R*- and *S*-enantiomers of MDMA, with the *S*-enantiomer generally accepted to be the more potent stimulant and the *R*-enantiomer thought to elicit more profound perceptual disturbances (Dunlap et al., 2018; Pitts et al., 2018). The exploration of these pharmacological differences may trigger interest in the development of strategies for the illicit production of enantiopure MDMA – with only one of the enantiomers present. This is a potential future development that should be closely monitored.

Like all amines, MDMA can occur as a free base (oil) or as a salt (solid). The base is a colourless oil that is insoluble in water and not suitable for human consumption, not even by vaporisation due to its high boiling point (Kalant, 2001). The salt, typically hydrochloride, can be easily produced from the base oil by treatment with an acid (e.g., hydrochloric acid), and occurs as white or off-white to brown crystals that are soluble in water. The crystals may be sold directly, or ground into a powder, although the latter is prone to adulteration. Finely ground MDMA hydrochloride powders are often compressed into tablets with appealing logos or colouring. These are known as ecstasy tablets.

The composition of ecstasy tablets may vary, not only with regard to the psychoactive substance present, if any, but also in the amounts present. The varying doses and compositions represent a serious risk to consumers' health. Drug-checking services across Europe have become a useful tool for limiting the harm associated with the consumption of ecstasy tablets and monitoring developments in the market (EMCDDA, 2023).

In tablet form, MDMA is almost always orally ingested. The powder/crystal form can also be orally ingested, typically by wrapping it in a cigarette paper which is then swallowed (known as bombing), insufflated (snorted), or less frequently administered sublingually or rectally.

(a) The *R*- and *S*-enantiomers of MDMA are sometimes referred to as the l- and d-enantiomers, respectively.

Box 1.2. Developments in MDMA-assisted therapy for neuropsychiatric disorders

Public and clinical interest in the potential therapeutic use of a number of psychedelic substances, including some novel and little-known substances, has been growing in recent years (EUDA, 2024). MDMA has commonly been classified as an "atypical" psychedelic in clinical research (EMA, 2023), as it shares some of the psychoactive effects of typical or

classical psychedelics while having a distinct pharmacological mechanism of action (See Frequently asked questions (FAQ): therapeutic use of psychedelic substances). In conjunction with a large increase in the number of clinical trials, a number of jurisdictions outside the EU have also begun regulating the use of psychedelics for medical and therapeutic purposes. In Australia for example, psychiatrists have been able to prescribe MDMA for PTSD since July 2023 (Therapeutic Goods Administration, n.d.). In parallel, significant commercial interest has also arisen, from both legitimate companies and players in the illicit or grey market. For example, so-called 'psychedelic retreats' appear to have spread across a large number of EU Member States – many of which are unlicensed or illegal practices that offer a range of psychedelics, including MDMA, for therapeutic purposes without proper supervision (EUDA, 2024; State Commission on MDMA, 2024).

To date, the most commonly trialled psychedelics for treatment-resistant mental health conditions have been (es)ketamine, psilocybin, MDMA, DMT (including 5-MeO-DMT) and LSD. When combined with therapy, some of these substances have shown promise in alleviating specific symptoms associated with certain neuropsychiatric disorders. Clinical trials conducted with MDMA have mainly focused on the treatment of post-traumatic stress disorder (PTSD), alcohol use disorder and symptoms of social anxiety in patients with autism spectrum disorder. While the level of evidence has appeared relatively consistent when treating post-traumatic stress disorder (PTSD) with MDMA-assisted therapy (see e.g. Mitchell et al., 2021; State Commission on MDMA, 2024), in August 2024 the US Food and Drug Administration (FDA) declined to approve the use of MDMA-assisted therapy as a treatment for PTSD (Readon, 2024). This followed the advice by an independent advisory committee to the FDA in June 2024, which cited several problems in effectively reviewing evidence of safety and efficacy, partly due to shortcomings in the clinical trial design (Wright, 2024).

The methodological issues raised by the FDA independent advisory committee have been common across a large number of trials involving psychedelic-assisted therapy (Butlen-Ducuing et al., 2023; EMA, 2023), including MDMA for various mental health indications. This includes challenges around blinding, a process designed to minimise bias by preventing participants and organisers, and sometimes those analysing the data, from knowing which treatment or intervention participants are receiving, which may compromise the interpretation of results.

Another issue raised by the FDA relates to the psychotherapy administered alongside the MDMA. Across many studies in this area, a clear definition of the adjunct psychological intervention that is part of psychedelic-assisted therapy has been limited. As such, it may be difficult to distinguish the interaction between the substance itself and the associated therapy, and the degree to which each of these components influences results.

While it is unclear how the FDA's decision will affect future applications for psychedelic-assisted therapy in the US, there have also been developments in the EU that may influence developments in this area. In Czechia, for example, the Drug Action Plan 2023-2025 has earmarked funding for research with psychedelics in addiction treatment (Office of the

Government of the Czech Republic, 2023). At EU level, in early 2024, the Horizon Europe programme awarded EUR 6.5 million in funding for psychedelic therapy research for treatment-resistant mental disorders in palliative care (Eccles, 2024). In May 2024, the Dutch State Commission on MDMA released a report recommending the implementation of MDMA-assisted therapy for the treatment of PTSD 'as soon as possible' (State Commission on MDMA, 2024, p.11).

At the time of writing in September 2024, no psychedelics have been approved by any regulatory mechanisms at the Member State or EU level for the medical treatment of neuropsychiatric disorders (with the exception of esketamine, or Spravato, which has received marketing authorisation for adults with major treatment-resistant depression (EMA, 2024)). Overall, a number of methodological and practical challenges remain in this area, which will likely affect any future applications for psychedelic-assisted therapy using MDMA or other substances.

(1) The term 'entactogen' is composed of the Greek roots en and gen, which mean *within* and *to generate*, respectively, and the Latin tactus, *to touch*, to mean that which 'touches from within' (Nichols, 1986, 2022). The term was coined to substitute the term 'empathogen' previously attributed to MDMA, which highlighted subjective effects of 'strong propensity to induce empathy and feelings of connectedness' (Dunlap et al., 2018).

References

Consult the list of references used in this module.

EU Drug Market: MDMA — Key findings and threat assessment

MDMA: a large and profitable market for criminal networks

This resource is part of EU Drug Market: MDMA — In-depth analysis by the EUDA and Europol.

Last update: *September 2024*

- **The MDMA market is large and profitable for the criminal networks involved in producing, trafficking and distributing the drug.** The minimum estimated annual value of the retail market for MDMA in the European Union is at least EUR 594 million, with an estimated 72.4 million MDMA (ecstasy) tablets consumed in the European Union. This value does not include the considerable additional profits that are generated by the production, trafficking and distribution of MDMA produced in the European Union to external markets.
- **MDMA is generally low in price, although there are exceptions and relatively large variations between countries.** In general, it appears that prices for MDMA powders/crystals and ecstasy tablets are lower closer to the main centres of production, in the Netherlands and Belgium. Based on the data available, prices have remained relatively stable over the past decade.
- **While some high-strength ecstasy tablets still circulate**, the trend of increasing MDMA content observed between 2011 and 2019 appears to be reversing. The mean content of MDMA in ecstasy tablets was 144 milligrams in 2022, compared to 170 milligrams in 2019 and 84 milligrams in 2011. High-strength ecstasy tablets, containing more than 250 milligrams of MDMA, are still found on the EU market, which poses a high risk to users. As the prices of ecstasy tablets have generally remained stable since 2012 while their MDMA content has increased, accounting for inflation they have effectively become cheaper for consumers.
- **Organised crime groups based in the EU are global producers of MDMA.** Between 2018 and 2022, Europe accounted for over two fifths (43 %) of the global quantity of MDMA seized worldwide. The available data suggest that approximately half of the MDMA laboratories dismantled worldwide are located in Europe. Profitable markets in Oceania and Asia appear to be the main targets of MDMA shipments, but there is evidence to

suggest that Latin America may be emerging as an increasingly important market. In some instances, barter deals of MDMA for cocaine may be occurring between criminals based in the European Union and criminals based in Latin America.

- **MDMA production is concentrated in the Netherlands and Belgium, but there are some signs that production may be spreading beyond these countries.** Dutch criminal networks remain the leading large-scale producers of MDMA in the European Union, operating production facilities outside the Netherlands as well. They also control MDMA production in Belgium, through Belgian subsidiaries, and cooperate with networks of distributors to traffic MDMA to consumer markets in Europe and globally. While Dutch criminal networks play a central role in the MDMA trade, trans-European criminal cooperation is evident in every link of the supply chain. Although still modest, the number of countries reporting the dismantling of MDMA production facilities in Europe has been increasing since 2018.
- **Countries in the European Union are hubs for the trafficking of MDMA to non-EU countries.** The Netherlands remains the main source region of MDMA trafficking flows worldwide, although Germany, Bulgaria and Belgium appear to be emerging as distribution hubs for MDMA to both European and external markets. A significant part of the MDMA produced in the Netherlands may be intended for more profitable overseas markets. Air and maritime transport appear to be the main methods used to traffic MDMA from Europe to external markets.
- **Criminal networks are constantly adapting and improving methods for producing MDMA.** To a large extent, improvements in MDMA production efficiency are a result of increasingly sophisticated production equipment and the application of chemical engineering techniques, a trend that had previously been noted.
- **The main MDMA production method uses PMK**, mostly via the 'high-pressure' method, which is also used for the large-scale production of methamphetamine from BMK. This method therefore enables drug producers to switch easily between the two drugs, depending on the demand. Due to the international control of PMK, criminals rely on sourcing designer precursors, predominantly from Asia (mostly China), which are then converted into PMK in Europe.
- **A parallel criminal infrastructure delivers essential logistical support to EU-based MDMA producers.** Dedicated criminal networks are specialised in supplying precursors, designer precursors, chemicals and reagents, as well as equipment or expertise in setting up production facilities. They form part of an ecosystem in which crime is strongly interlinked with the legitimate business environment, for example, through the misuse of legal business structures and fraudulent practices. Companies in the EU are either established, procured or infiltrated by specialised criminal networks for these purposes.
- **The COVID-19 pandemic had a relatively significant impact on the MDMA market**, due to the closure of recreational settings where MDMA is commonly used (leading to reduced

demand). This was reflected in lower numbers of production facilities being dismantled in Europe, lower quantities of MDMA seized, and signals of a reduction in reported use of the drug. However, this trend now seems to be reversing, as MDMA production in the Netherlands appears to have returned to pre-pandemic levels, as have seizures of both 'traditional' MDMA precursors and designer precursor alternatives to PMK.

- **MDMA is trafficked within the European Union** by land, air and occasionally sea, using a range of methods, including parcel post. Some data suggest that most of the intra-EU MDMA trafficking occurs by land transport, which allows larger quantities to be transported compared with using mail or express couriers.
- **MDMA is frequently traded online across a range of platforms**, including darknet markets surface web and social media. Recently, social media platforms and instant messaging applications have become particularly dynamic channels through which MDMA is sold to consumers. Smaller quantities sold online are often dispatched in post and parcels from EU countries to consumer markets in Europe and globally.
- **There is significant environmental damage linked to MDMA production.** Depending on the method used, it is estimated that MDMA production in the European Union may have generated between 1 155 and 3 191 tonnes of chemical waste in 2021. Chemical waste products are typically dumped away from the production sites and often in neighbouring countries, resulting in health risks, environmental damage and high clean-up costs for contaminated sites. MDMA production is linked to a range of health and safety issues due to the risk of fires, explosions and exposure to toxic chemicals.
- **The supply of precursors and essential chemicals plays a key role in MDMA production.** A broad range of designer precursor alternatives to PMK are sourced by criminal networks for MDMA production in Europe, in an attempt to exploit potential loopholes in international control. Since 2013, seizures of designer precursors (predominantly glycidic derivatives of PMK) have surpassed those of PMK in Europe. Other chemicals needed for MDMA production such as catalysts and solvents are often sourced from EU Member States, including Germany and Poland.

Anticipating future threats

- **Shift towards in production methods.** Shortages of reaction vessels for the 'high-pressure' production method for MDMA associated with arrests of equipment makers (critical facilitators) in the Netherlands have triggered a shift towards other methods, such as the 'cold method' and the purchase of equipment from China. While this is an emerging phenomenon that is not yet well-documented, it can have serious consequences for the populations and the environment surrounding production areas. There is a considerable risk of explosions and accidents in production laboratories associated with the 'cold method' and the use of lower quality equipment.

- **The expansion of MDMA trafficking to countries in Latin America** requires enhanced monitoring. As Europe is a global supplier of MDMA, improvements in production capacity and efficiency may lead to larger quantities being trafficked internationally. There needs to be close monitoring of possible bartering of MDMA for cocaine by criminal networks in Europe and Latin America, particularly in the context of high availability of cocaine in Europe.
- **Continued innovation in the use of precursors and developments in production techniques** will remain a challenge for law enforcement, regulation and control. Over the past decade, several designer precursors have been introduced in the EU market, sometimes for only a limited amount of time. The use of designer precursors poses a key threat to authorities' efforts to control the market. It is also important to monitor the possible emergence of enantiomerically pure MDMA on the market, given the pharmacological differences between MDMA enantiomers.

EU Drug Market: MDMA — Global context

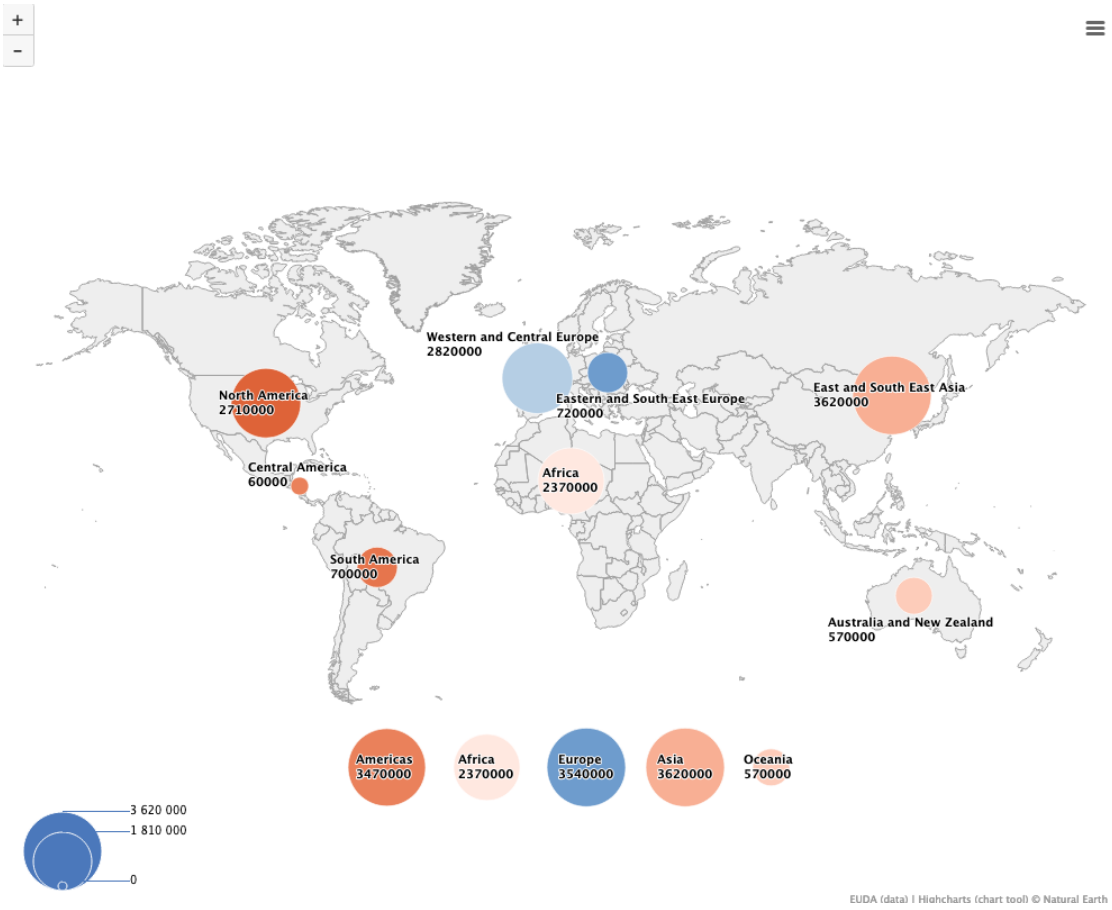
This resource is part of EU Drug Market: MDMA — In-depth analysis by the EUDA and Europol.

Last update: *March 2025*

Worldwide, approximately 20 million people used MDMA and ecstasy-type substances ([1]) according to 2022 estimates, which represents 0.4 % of the global population between 15 and 64 years of age (UNODC, 2024). The figure is comparable to 2022 estimates of the global number of users of cocaine, at 23.5 million people. According to wastewater-based analysis and rapid assessment studies performed in Europe and Oceania, use of MDMA appeared to decline temporarily during the early phases of the COVID-19 pandemic. However, 2023 data suggest an increase in the use and availability of MDMA in Australia and a return to pre-pandemic levels in New Zealand (UNODC, 2024). The temporary decrease of MDMA use during the COVID-19 pandemic followed the broader pattern of a decrease in the global demand for synthetic drugs used in recreational settings during periods of social distancing, which included the closure of clubs and venues and the cancellation of events such as music festivals (EMCDDA and Europol, 2019).

The largest consumer markets for MDMA are East and South-East Asia, Western and Central Europe (see Figure 3.1. Number of MDMA/ecstasy users, by region and selected sub-regions). The highest prevalence of use is reported in Australia and New Zealand.

Figure 3.1. Number of MDMA/'ecstasy' users, by region and selected sub-regions, 2022



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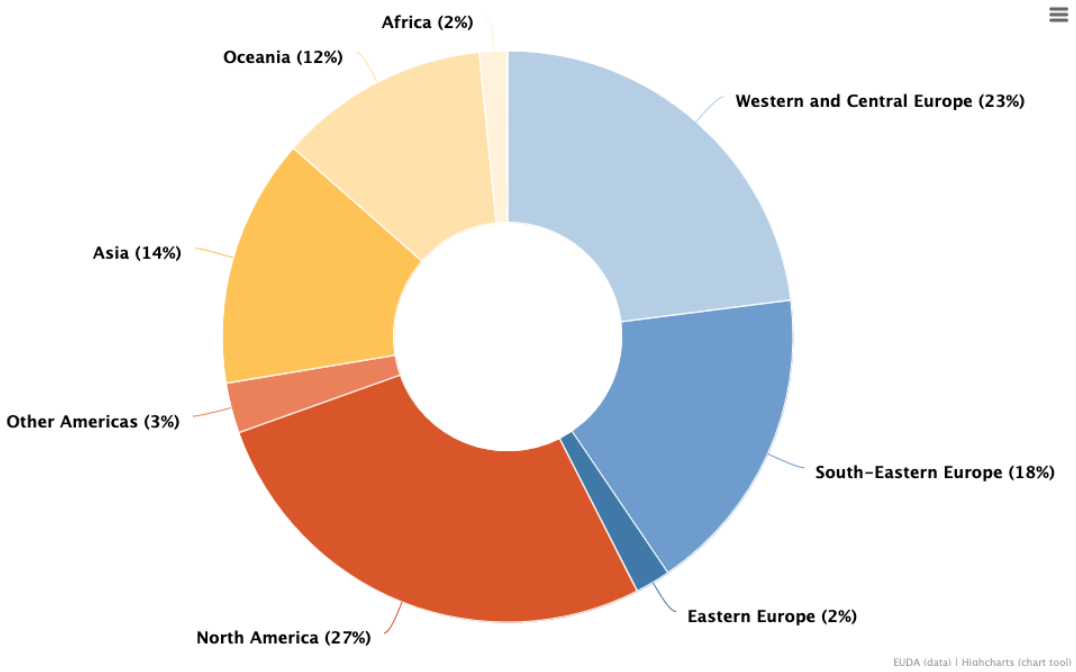
Source: UNODC, 2024.

The supply of MDMA to these markets is largely met by illicit production based in Europe, which typically accounts for approximately half of the world's reports of dismantled illicit MDMA laboratories, but also in Oceania, Asia and the Americas (UNODC, 2022). Canada, for example, has been known to produce large amounts of MDMA to supply its own market, as well as the United States (Drug Enforcement Administration, 2020). Very large seizures of MDMA precursors were made in Canada in 2023, in separate shipments that amounted to over 3.3 tonnes (Canada Border Services Agency, 2023). Emerging signals suggest that some local production may also be occurring in Latin America, particularly in Brazil but also in Chile, Argentina and Paraguay (UNODC, 2020). In recent years, production in these countries appears to have moved from cutting and tableting operations to also include the manufacture of MDMA (UNODC, 2021).

Between 2018 and 2022, Europe accounted for over two fifths (43 %) of the quantity of MDMA seized worldwide, underscoring the region's importance for MDMA production and trafficking. North America accounted for 27 % of all quantities seized, followed by Asia (14 %) and Oceania (12 %) (see Figure 3.2.Regional distribution of the quantity of MDMA seized worldwide in the period 2018-2022) (UNODC, 2024). In 2022, around 12 tonnes of MDMA was seized, a 15 % increase on the previous year, mostly due to increasing seizures in South America and North America (UNODC, 2024). This suggests that the drop in seizures seen in 2021 associated with the COVID-19 pandemic was temporary. Still, the quantity seized in 2022 has not reached the 22.4 tonnes of seized MDMA reported in 2020 (UNODC, 2023) ([2]).

Figure 3.2. Regional distribution of the quantity of MDMA seized worldwide in the period 2018-2022



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Source: UNODC, 2024.

(1) At international level, MDMA is monitored alongside ecstasy-type substances. These include structurally similar compounds such as MDA and MDEA, which are largely under-represented when compared to MDMA in statistics.

(2) Overall, between 2010 and 2020, the quantity of MDMA seized worldwide (combined weight of tablets and crystals) almost quadrupled, from the equivalent of 6.4 tonnes in 2010 to 22.4 tonnes in 2020.

References

Consult the list of references used in this module.

The data used to generate the infographics and charts on this page may be found below (CSV format). Additional information, metadata and methodological notes may be found in the **EU Drug Market: MDMA source data entry in our data catalogue**.

Download all files (zip)

- Table EDMR2025-MDMA-1. Number of MDMA/'ecstasy' users, by region and selected sub-regions, 2022
- Table EDMR2025-MDMA-2. Regional distribution of the quantity of MDMA seized worldwide in the period 2018-2022

EU Drug Market: MDMA — Production. How and where MDMA is produced in Europe

This resource is part of EU Drug Market: MDMA — In-depth analysis by the EUDA and Europol.

Last update: *March 2025*

Overview of MDMA production in Europe

MDMA production capacity in Europe far exceeds what is needed to supply the domestic market. Large-scale production is concentrated mainly in the Netherlands and Belgium, where the whole process appears to take place, including the preparation of precursors from designer precursors, and the synthesis and conversion of MDMA oil to MDMA hydrochloride. While this conversion could feasibly take place in other countries, this appears to be limited to a few documented examples and is not a widespread phenomenon (see Section Trafficking and distribution — trafficking of European MDMA base oil: an emerging trend?).

As is often the case with other synthetic drugs, large-scale conversion and production laboratories in the Netherlands and Belgium are typically found in rural areas, whereas smaller operations tend to be found in residential areas or industrial parks (National Police of the Netherlands [NPNL], 2022). Crystallisation sites, for example, are common in residential apartments. This carries considerable risks of fire and explosions in populated areas.

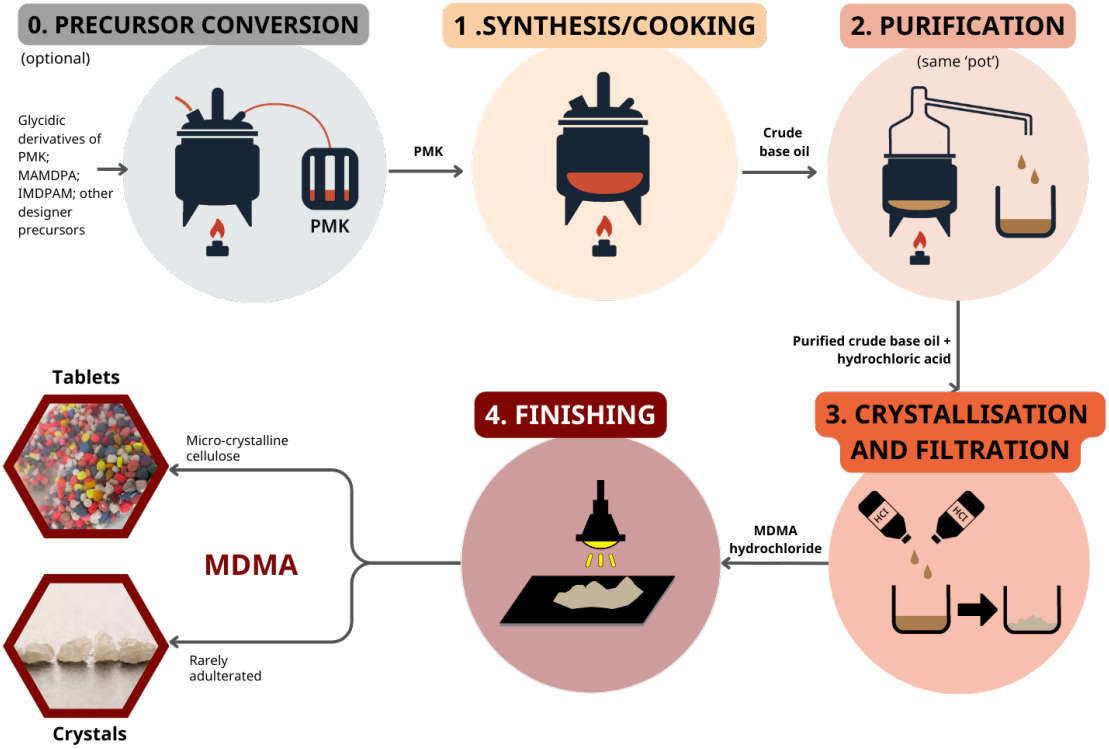
MDMA can be produced using several methods. In Europe, PMK methods are typically used. These involve the reductive amination of an intermediate formed between the precursor PMK ([1]) and methylamine. The most commonly found method is the high-pressure method, a technique that emerged in the Netherlands in 2017, which is also used for the large-scale production of methamphetamine from BMK (see EU Drug Market: Methamphetamine – In-depth analysis). As such, this method enables drug producers to easily switch between the two drugs, according to demand (NPNL, 2022).

In general, the process involves four main steps, with an additional (optional) first step being the conversion of PMK from designer precursors (see Figure 4.1. MDMA production steps):

1. the synthesis or ‘cooking’ step, where PMK is combined with other chemicals and the chemical reaction takes place, producing crude MDMA oil;
2. the crude MDMA oil is purified via steam distillation;
3. purified MDMA base oil is crystallised into solid MDMA hydrochloride, which is separated by filtration (typically using cloth filters);

4. the finishing step where the product is dried and packaged for sale as crystal MDMA, or pressed into ecstasy tablets.

Figure 4.1. MDMA production steps



Illicit MDMA production sites in the European Union: diversification of locations?

MDMA is produced on demand, and one useful indicator of the levels of production occurring in Europe is the number of illicit sites associated with its production, storage and chemical waste dumping dismantled by law enforcement. It should be noted however, that this figure does not reflect the size and production capacity of these sites, meaning that fewer sites do not necessarily mean less production, and therefore triangulation of information is essential to interpret these data.

Between 2019 and 2021, 92 illicit MDMA sites were found in Europe. This number includes 42 MDMA laboratories, at least 33 sites where tabletting occurred, 14 waste dump sites and three chemical or equipment storage facilities. In the previous reporting period (2015-2017) a higher number of MDMA sites were found (158 sites) (EMCDDA and Europol, 2019). In part,

the drop in the number of sites may be due to a drop in demand for MDMA during the COVID-19 pandemic. However, this seems to have been short-lived. Data for 2022 suggest that at least 50 MDMA sites were dismantled in the European Union (a 50 % increase compared to 2021). In addition, according to the Dutch Police, the number of MDMA sites dismantled in the Netherlands in 2023 appears to have surpassed pre-pandemic levels, with 32 sites being dismantled (NPNL, 2024).

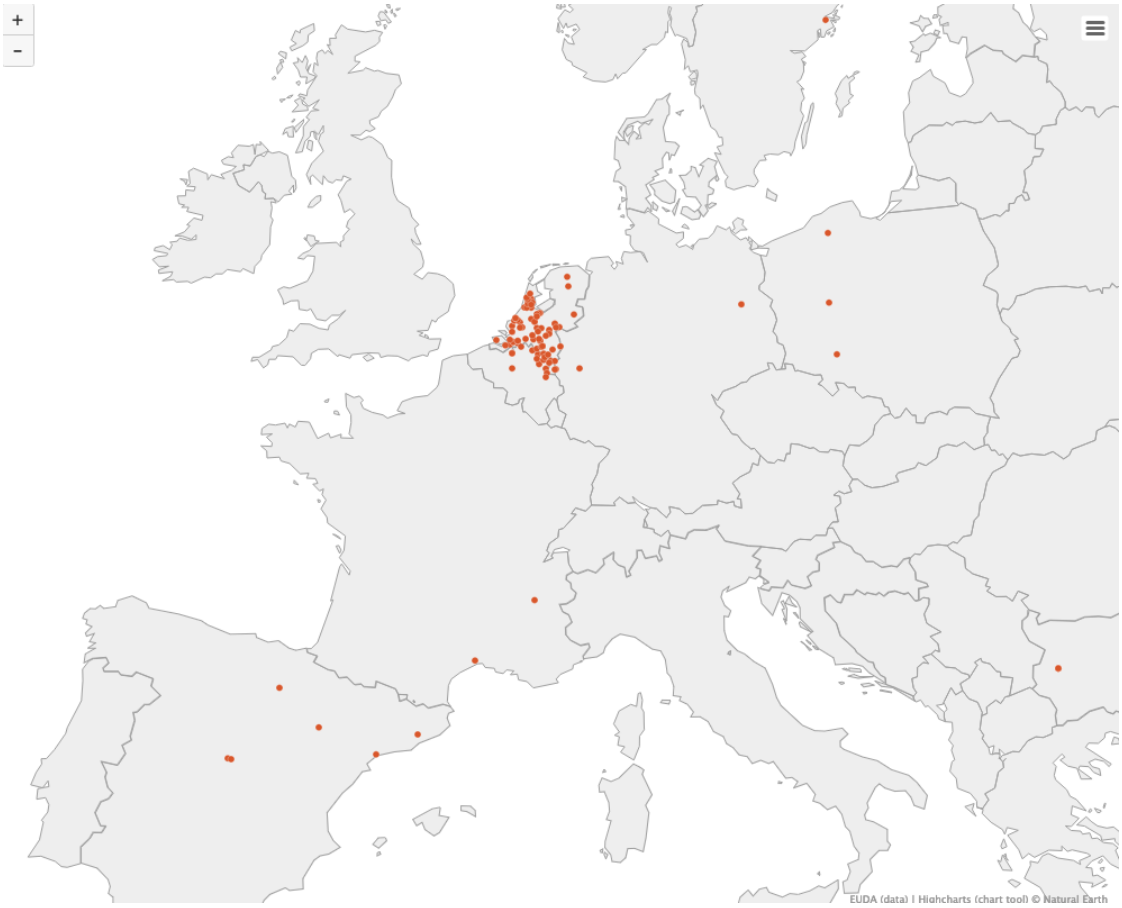
Of the 92 illicit MDMA sites dismantled between 2019 and 2021, the 89 that were associated with production were located in seven different Member States. Over two thirds were located in the Netherlands (57 sites), followed by Belgium (19), Bulgaria (4), Poland and Spain (3 each), Germany (2) and France (1) (see Figure 4.2. Location of sites related to MDMA production in the European Union, 2019-2022).

For 2022, data suggest that Belgium accounts for most of the production facilities reported by EU Member States (27 of the 48). This is a higher number of production sites in that country than the previous three years combined. An additional 13 production facilities were dismantled in the Netherlands, five in Spain and one in France, Poland and Sweden (each). Although preliminary, these data suggest that a potential diversification in production locations may be occurring. Consistent with this, in January 2024, a large MDMA production site operated by Spanish and Dutch nationals was dismantled in Spain (see Box 4.1. Spain's largest MDMA laboratory dismantled). In any case, production of MDMA in the Netherlands continues to be significant, with 32 production sites dismantled in 2023 (NPNL, 2024).

Although the large majority of the production sites are located in the Netherlands and Belgium, it is worth noting that from 2018 to 2022 between five and six Member States reported dismantled MDMA sites (whereas from 2013 to 2017 not more than three countries reported such findings each year). This may be a signal, albeit modest, of a diversification of MDMA production locations. It is notable that Dutch criminals are likely to control most of these.

Several of the sites dismantled in Europe were combination laboratories, where MDMA was produced alongside another drug. In the Netherlands, MDMA is increasingly being produced in the same facilities as methamphetamine since they share the same equipment and method, whereas in the past amphetamine/MDMA combination sites were more common (NPNL, 2022).

Figure 4.2. Location of sites related to MDMA production in the European Union, 2019-2022



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Box 4.1. Spain's largest MDMA laboratory dismantled

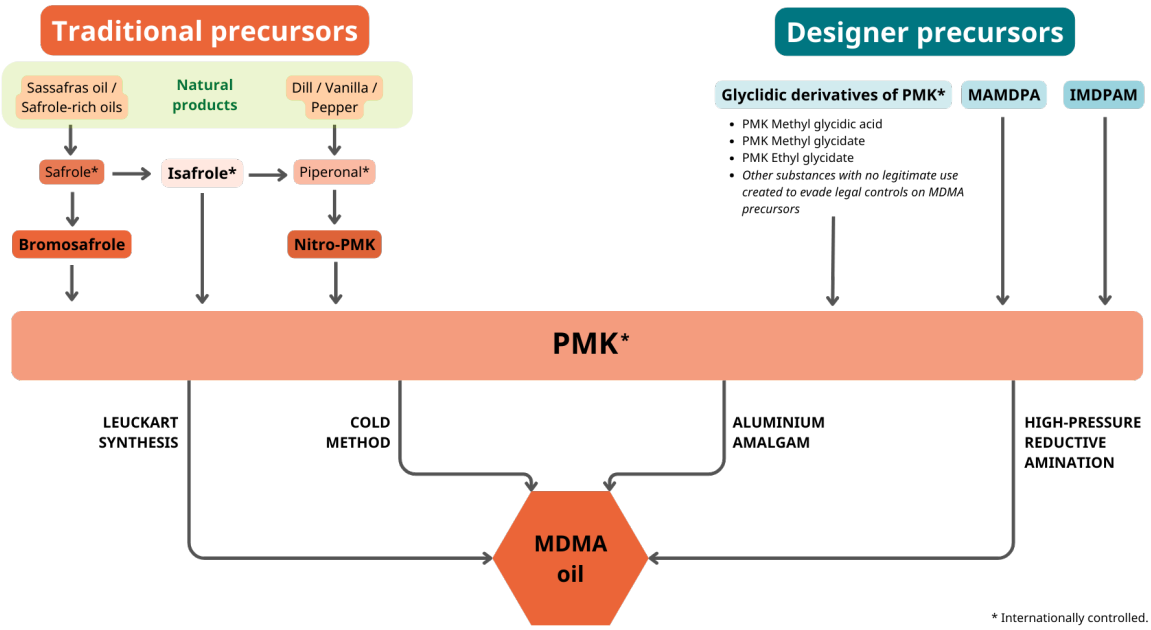
One of the largest MDMA production laboratories ever dismantled in Spain was raided in Valencia by the Spanish Policía Nacional in January 2024. At the site, located in a rented house in a remote woodland area, approximately 1 900 litres of MDMA, 1 000 litres of precursor chemicals and 1 000 litres of chemical waste were seized. The drugs were transported from the laboratory to storage sites, and then distributed to buyers. Untreated chemical waste was being dumped directly on the ground. Two Dutch nationals were arrested at the site, and are thought to be the 'cooks' – the producers of the drug.

MDMA laboratory seized in Valencia, January 2024. Source: Spanish Policía Nacional.

Main MDMA production methods

Some of the earliest published methods of synthesising MDMA start from safrole or piperonal, both of which can be extracted from natural plant sources (Biniecki and Krajewski, 1960; Merck, 1914). Synthetic pathways starting from safrole, its derivative isosafrole or piperonal proceed through the formation of PMK, which is then converted into MDMA (see Figure 4.3. Chemicals and chemical processes used in the synthesis of MDMA). PMK can also be directly acquired as an oil (illegally) and, as such, it is the most important precursor to MDMA. Most illicit MDMA production in the European Union depends on this chemical.

Figure 4.3. Chemicals and chemical processes used in the synthesis of MDMA



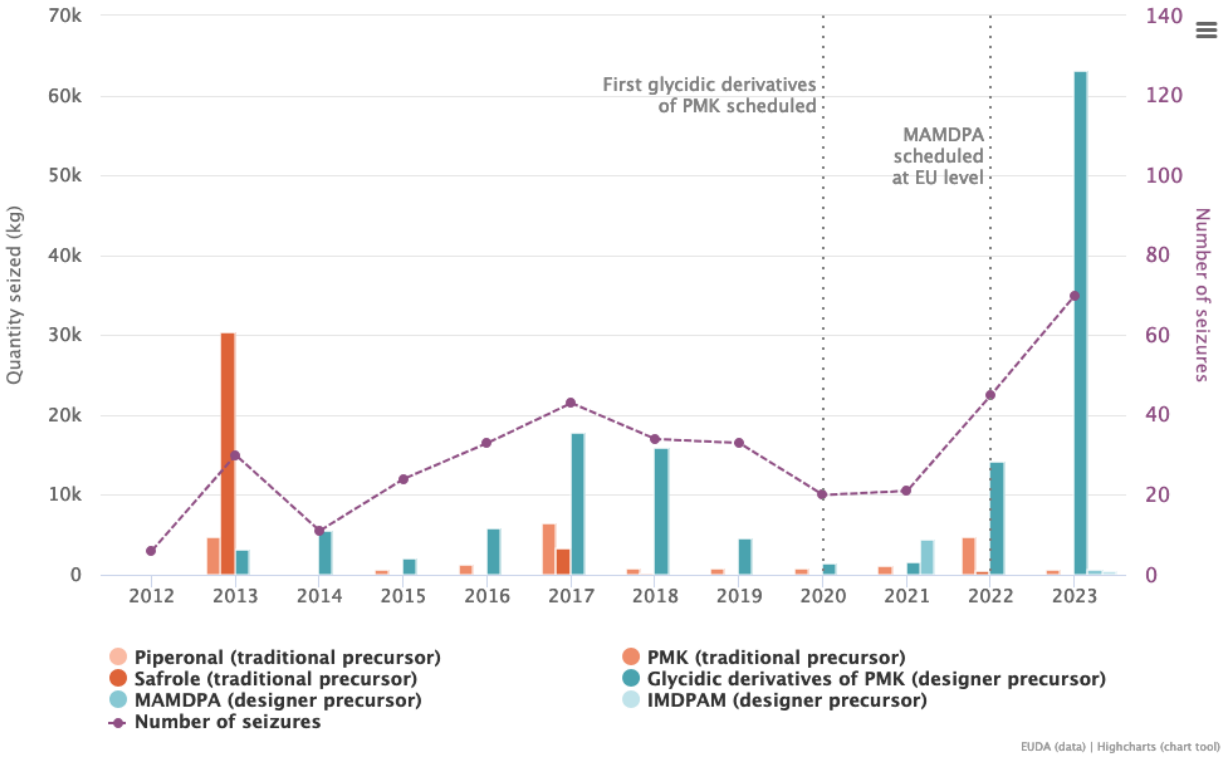
Designer precursors substitute scheduled MDMA starting materials

Some MDMA precursors (e.g. safrole, isosafrole, piperonal and PMK) have been under international control since the early 1990s. In the early to mid-2000s, international shortages of these chemicals led to reduced availability of MDMA in Europe and, subsequently, to the appearance of alternative unscheduled precursors, also called designer precursors (EMCDDA, 2019a; Mounteney et al., 2018). Clandestine chemists explored synthetic routes that begin with readily available chemicals such as vanillin, catechol, eugenol and piperine (Chambers et al., 2018; Cormick et al., 2021; Nair et al., 2021). However, another adaptation emerged that involved the use of non-scheduled chemicals that could be converted into PMK by relatively simple procedures, effectively adding a precursor conversion step to the synthesis of MDMA, rather than significantly altering the method.

The first wave of designer precursors for PMK to emerge in the European Union were glycidic derivatives of PMK ([2]). The sodium salt of PMK glycidic acid was detected as early as 2013. Soon after, a number of variations followed, including PMK glycidate and numerous other salts, esters and ethers of PMK. Other alternative chemicals included 3,4-methylenedioxyphenylacetonitrile ([3]) (first detected in Europe in 2014), methylenedioxyphenyl-2 nitropropene ([4]) (detected in 2015), MAMDPA ([5]) (detected in 2021) and, more recently, IMDPAM ([6]) (detected in 2023). It is important to note that, while none of these substances were under international or EU-level control at the time of their appearance, they were automatically included in the INCB's limited international special surveillance list of non-scheduled substances (ISSL), under the extended definitions as specific derivatives of already controlled precursors.

Between 2019 and 2021, combined seizures of traditional MDMA precursors (safrole, isosafrole, piperonal and PMK) reached almost 2.7 tonnes in the European Union. An additional 13 tonnes was intercepted before reaching its destination (stopped shipments). In contrast, in that same period, seizures of designer precursor alternatives to PMK (glycidic derivatives of PMK and MAMDPA) amounted to 12.1 tonnes (see Figure 4.4. Quantity of traditional and designer precursors used in the synthesis of MDMA seized in Europe, 2012-2023). This suggests a continued trend of using designer precursors for MDMA production rather than the more traditional precursors, as noted in the past (EMCDDA, 2019a; Mounteney et al., 2018).

Figure 4.4. Quantity of traditional and designer precursors used in the synthesis of MDMA seized in Europe, 2012-2023



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Source: European Union's drug precursors database.

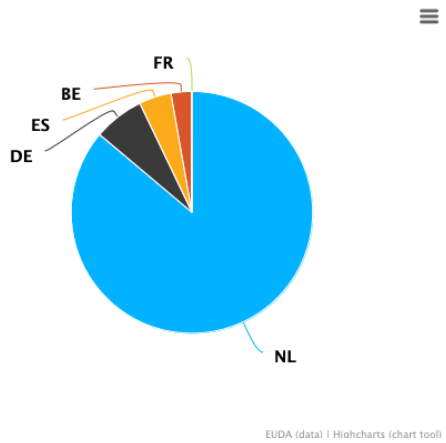
Data for 2022 and 2023 indicate that seizures of traditional MDMA precursors in the European Union reached 5.7 tonnes, while seizures of designer precursors reached 78.4 tonnes (almost exclusively glycidic derivatives of PMK). Two additional stopped shipments of glycidic derivatives of PMK amounting to 1.1 tonnes were also reported in 2022 – one of which was a large shipment of 1.1 tonnes stopped in Luxembourg.

Together, these data show that in 2023 alone, both the seizures of traditional MDMA precursors and designer precursor alternatives to PMK are larger than those reported in the 5-year period that preceded it (2018 to 2022). While precursor seizure data reflects a number of complex dynamics (including their legal status and and law enforcement priorities) this

indicates that MDMA production is reverting or maybe surpassing pre-pandemic levels.

Figure 4.5. Proportion of the total quantity of MDMA precursors seized in Europe, by seizing country, 2019-2021 and 2022-2023

Total quantity of MDMA precursors seized in Europe, by seizing country, 2019-2021



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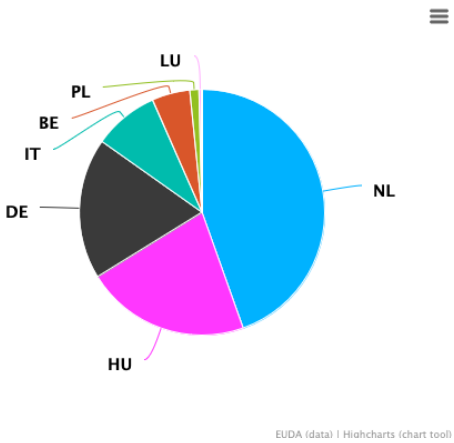
Total quantity of MDMA precursors seized in Europe, by seizing country, 2022-2023



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Source: European Union's drug precursors database.

The Netherlands accounted for the large majority (86 %) of the quantity of MDMA precursors reported seized in the European Union between 2019 and 2021, followed by Germany, Spain and Belgium (see Figure 4.5. Proportion of the total quantity of MDMA precursors seized in Europe, by seizing country, 2019-2021 and 2022-2023). In 2022 and 2023, the Netherlands accounted for 44 % of the quantity of MDMA precursors reported in the European Union, with the remainder reported by Hungary (22%), Germany and Italy.

Known shipments of PMK or its designer precursor alternatives originate in Asia, mostly China. They are often mislabelled as other chemical products (e.g. 'polyvinyl chloride', 'pigment') or electronics (e.g. 'flashlight', 'USB cable', 'keyboard pc'). Mislabelling of shipments is carried out at the source by the suppliers, who also provide all the necessary paperwork for customs export and import. The packages containing the chemicals may sometimes be included in much larger shipments with legitimate goods to mislead authorities. For example, the large shipment of 1.1 tonnes of PMK ethyl glycidate stopped in Luxembourg in 2022 originated in China and was misdeclared as 'mobile phone accessories; earphone and lithium-ion batteries'. In 2022, three controlled deliveries of shipments from China were made in Italy, amounting to 4.2 tonnes of PMK, all of which were declared as polyester powder coating. At least one of the shipments was destined to the Netherlands.

Stopped shipment of PMK ethyl glycidate in Luxembourg in 2022
Source: Luxembourg Customs and Excise Agency.

Small differences in labelling or box size among the large shipments can sometimes assist in detecting illicit consignments. The chemicals are shipped to various EU countries and imported by companies specifically established to provide these goods to drug manufacturers (National Police of the Netherlands [NPNL], 2022). They are then transported by road across Europe to MDMA producers, often using legitimate courier companies without their knowledge.

The high-pressure method: the most common MDMA production method in Europe

Once the PMK is obtained – either by direct import of the oil or by conversion from any of its designer precursor alternatives – the synthesis of MDMA can proceed. When PMK is added to methylamine, an imine intermediate is formed. The methods to produce MDMA from this imine vary according to the reducing agent that is chosen. Three main methods are encountered.

- The **high-pressure method** uses hydrogen in the presence of a metal catalyst (such as platinum oxide) as the reducing agent. This is the same technique used for large-scale production of methamphetamine in Europe, the only difference being the starting material (BMK for methamphetamine and PMK for MDMA).
- The **cold method** uses a hydride (such as sodium borohydride) as the reducing agent. The reaction occurs at low temperatures and can be performed in simple plastic containers placed inside large freezers. The main disadvantage of this method is that it is labour intensive and carries high risks, including fire and explosion.
- The **aluminium amalgam method** uses aluminium foil treated with mercury chloride as the reducing agent. Although this process has been reported in European MDMA

laboratories, it is mostly used for the production of methamphetamine in specific countries or regions (e.g. Mexico). The process is extremely dangerous due to the risk of fire or explosion and the risk of exposure to toxic fumes and hazardous waste.

In Europe, the high-pressure method is the one most commonly encountered. The reaction is initiated by adding methylamine to PMK, and occurs in the presence of platinum oxide (as the catalyst) and hydrogen gas. As the imine derivative is formed, there are changes to the temperature and pressure of the reaction vessel, which requires external control. The resulting MDMA base oil is then separated from the reaction mixture by vacuum distillation, and is converted into its salt (typically the hydrochloride salt) by treatment with the corresponding acid (see Box 4.2. Theft of hydrogen gas in Europe). A racemic mixture of *R*- and *S*- is produced, but the enantiomers are rarely, if ever, separated, despite pharmacological differences between the two (see Box 1.1. Forms of MDMA present on the European market in the Introduction section).

The reaction takes between 4 and 6 hours and can be engineered so that it proceeds in a single reaction vessel ('one-pot' reaction). However, it carries significant risks, requires the use of chemicals that can be expensive and hard to obtain (hydrogen gas and platinum oxide) and requires investment in robust high-pressure reaction vessels (NPNL, 2022). While the individual steps can be easily taught, this method requires experienced cooks or at least the supervision of someone who is highly experienced (Soudijn and Vijlbrief, 2011).

Depending on the quantities sought, MDMA can be synthesised in small benchtop set-ups or large industrial reactors. Laboratories located in the Netherlands and Belgium commonly have industrial dimensions, and use customised or custom-made high-pressure reaction vessels, which may hold up to 200 litres, producing up to 25-35 litres of MDMA oil per batch (Europol, 2019), or in some cases up to 750 litres (Mounteney et al., 2018). Each of these custom-made vessels can cost up to EUR 65 000. The whole cooking process can occur inside these vessels, including the mixing, heating, pressure control and distillation. To a large extent, improvements in MDMA production efficiency are a result of increasingly sophisticated production equipment and the application of chemical engineering techniques, a trend that had previously been noted (EMCDDA and Europol, 2019) and appears to be continuing. Innovations include the optimisation of temperature, mixing and pressure controls, inlets for the addition and removal of gas, and importantly, the use of combination vessels of larger capacity (i.e. vessels which combine equipment for several steps).

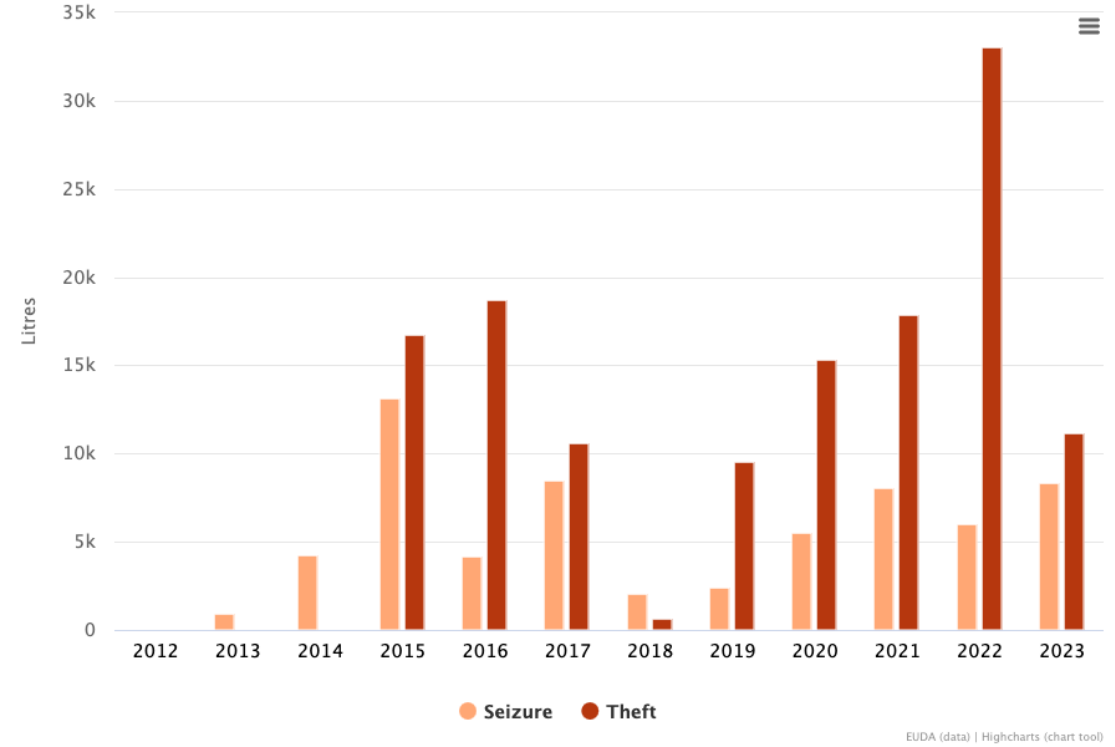
According to Dutch investigators, a relatively small number of specialised engineers and welders make or customise these reactors. The few individuals involved in this activity are in high demand and may be responsible for setting up several production units, sometimes via a facilitator. As a result of investigations targeting these individuals in the Netherlands (NOS, 2021), there are signals that high-pressure reaction vessels may be in short supply at present. It has been suggested that Dutch drug producers may be turning to other methods which do not require these vessels to overcome this shortage, or sourcing equipment elsewhere – namely in China. Poorly constructed reaction vessels can lead to serious accidents, given the high pressures involved in this process. These developments require careful monitoring.

Box 4.2. Theft of hydrogen gas in Europe

Hydrogen gas is essential for the production of MDMA via the high-pressure reductive amination method, although this chemical is difficult for criminal networks to obtain. While it may also be used for methamphetamine production, hydrogen cylinders found in illicit drug production sites are generally indicative of MDMA manufacture. Between 2019 and 2021, close to 16 000 litres of hydrogen gas was seized in the European Union, and an additional 17 850 litres was reported as stolen. Most of the seizures were reported by the Netherlands and to a much smaller extent Belgium, while all of the reported thefts occurred in Germany (see Figure 4.6. Quantity of hydrogen gas seized and stolen in Europe, 2012-2023). Data for 2022 show a significant increase in the amount of hydrogen stolen, with 33 050 litres reported stolen in the EU − almost double the amount reported in the previous year. This appeared to be a peak, as in 2023 values were under 11 150 litres.

The thefts appear to be carried out by professional thieves, who steal the cylinders directly from the premises of commercial gas trading companies. Police investigations have shown that criminals go to Germany specifically for this purpose (NPNL, 2022). In some cases, the cylinders are later recovered in the Netherlands or Belgium during the dismantling of illicit drug production facilities.

Figure 4.6. Quantity of hydrogen gas seized and stolen in Europe, 2012-2023



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Source: European Union's drug precursors database.

Other methods

Both the cold and the aluminium amalgam methods are only sporadically encountered in MDMA production sites in the European Union. Neither method requires expensive catalysts, equipment or hydrogen gas, but they both have other drawbacks. A shortage of high-pressure reaction vessels may motivate drug producers to use these methods rather than the more common high-pressure method.

In the cold method, PMK is mixed with methylamine in a container, typically a jerrycan. Sodium borohydride is used to reduce the imine intermediate, which generates hydrogen and heat. This leads to significant safety risks, as hydrogen gas can be easily ignited. To control the temperature, the reaction is normally carried out in a freezer and may take close to 30 hours. From 2019 to 2021, a total of 407 kilograms of sodium borohydride, likely intended for MDMA production using the cold method, was seized in Europe, all in the Netherlands. In 2022 and 2023, 210 kilograms were reported, which may mean an increase in

interest in the use of the cold method in laboratories based in the EU. Where known, the chemicals originated in Poland and, to a lesser extent, Spain (NPNL, 2022).

To date, MDMA laboratories using the aluminium amalgam method have been rarely encountered in Europe. The method can be easily identified by the large amounts of toxic grey mercury sludge generated from the addition of mercury (II) chloride to aluminium foil. Just under 1.3 tonnes of mercury (II) chloride was seized in the European Union from 2019 to 2021 and a further 170 kilograms in 2022 and 2023. Some or all of the mercury (II) chloride seized may have been intended for use in the synthesis of amphetamine via the nitrostyrene method (see EU Drug Market: Amphetamine – In-depth analysis).

Finally, in rare cases, some precursor-free methods have also been reported. No such cases were reported in the period between 2019 and 2021. These methods use masked MDMA, a derivative of MDMA which can be easily converted back to the drug (EMCDDA, 2019b). These substances comprise the complete MDMA molecule with an additional chemical protecting group attached, which is easily removed. The protecting group changes the drug molecule enough to take it outside the scope of international drug control conventions. Seizures of masked MDMA in the form of *N*-t-BOC-MDMA were made in the Netherlands in 2016 and 2017. Since then, no further reports of such seizures have been documented, suggesting that the method may not have gained much traction in EU drug production. Nevertheless, future developments in both well-known and innovative synthetic chemistry techniques may lead to the emergence of novel precursor-free methods for MDMA production in future.

Auxiliary chemicals

Some criminal networks specialise in the supply of chemicals for illicit drug production. While PMK and designer precursors are mainly sourced from Asia, other chemicals (such as catalysts and solvents) are often sourced from EU Member States such as Germany and Poland. Chemical companies in the European Union are either established, procured or infiltrated by specialised criminal networks in order to obtain the chemicals for MDMA production from legitimate EU and non-EU-based suppliers. Some Polish companies, for example, have been known to source chemicals for MDMA production from major legitimate companies based in Europe or internationally. Criminal networks also attempt to procure chemicals directly from legitimate companies using fraudulent documents (NPNL, 2022). The chemicals are typically obtained in large quantities and stored in warehouses before being supplied to illicit synthetic drug production units.

Tabletting

Producing ecstasy tablets for the consumer market is a specialised skill. It first involves carefully mixing the ingredients in the correct proportions. Besides MDMA, ecstasy tablets may contain other ingredients such as:

- adulterants;
- binding agents, to ensure the integrity of the tablets;
- lubricants, to ensure the tablet is released from the mould;
- disintegrants to ensure that the tablet can be digested in the stomach;
- sweeteners/flavours, to mask the bitter taste of the MDMA;
- pigments/colouring, to make the tablets more appealing to consumers (these may also be added only as a coating).

The available data suggest that over the last decade, on average, European producers have adhered to a somewhat standard recipe to make ecstasy tablets, whereby a similar ratio of MDMA to other ingredients is used to make the tablet mixtures. The increase in MDMA content of ecstasy tablets during this time is mostly due to larger tablets being produced, rather than recipes using larger amounts of MDMA (Vrolijk et al., 2022). Signals from 2020 and 2021 suggest that a change in the ecstasy tablet recipe may have occured, with the proportion of MDMA reaching its lowest value in a decade (see section Retail markets — price and purity).

After being prepared, the mixtures containing MDMA and other ingredients are placed in a tabletting machine and manually or automatically pressed with the shape and logo desired using punches or stamps. Break lines or scoring may be introduced to facilitate breaking the tablet in two or more pieces so the consumer can use less than the whole tablet. This is important, as some individual tablets can contain dangerously high amounts of MDMA.

Tabletting has to be done in a dry location, typically separated from the MDMA production unit given that these tend to be wet environments. Tabletting machines can be bought new or sourced from the second-hand market.

China is a supplier of tabletting machines. These can be purchased online, without any restrictions. However, only a limited number of legitimate businesses will require their use. Research into the use of tabletting equipment in the Netherlands found that only a very small number of legitimate companies (pharmaceutical, candy or vitamin producing companies) use Chinese tabletting machines, suggesting to authorities that ecstasy production may be the final use for many imported machines. A total of 83 tabletting machines originating from China were seized in the Netherlands between 2017 and 2020, some of which were capable of producing thousands of tablets per minute (NPNL, 2022). Better quality European-made tabletting machines are available on the second-hand market.

Stamps or punches can be purchased online or made to order. Ecstasy tablets are known for featuring an endless variety of logos, including iconic fashion or vehicle brands, cartoon characters or personalities from popular culture. They are available in many colours, including glow-in-the-dark colours (Figure Dyes used in the making of ecstasy tablets and tablets produced with the dyes). Some stamps may also be produced for specific events, such

as electronic dance music festivals. Logos and colours are a way of marketing these products but they are easy to copy and so specific logos cannot typically be attributed to particular manufacturers.

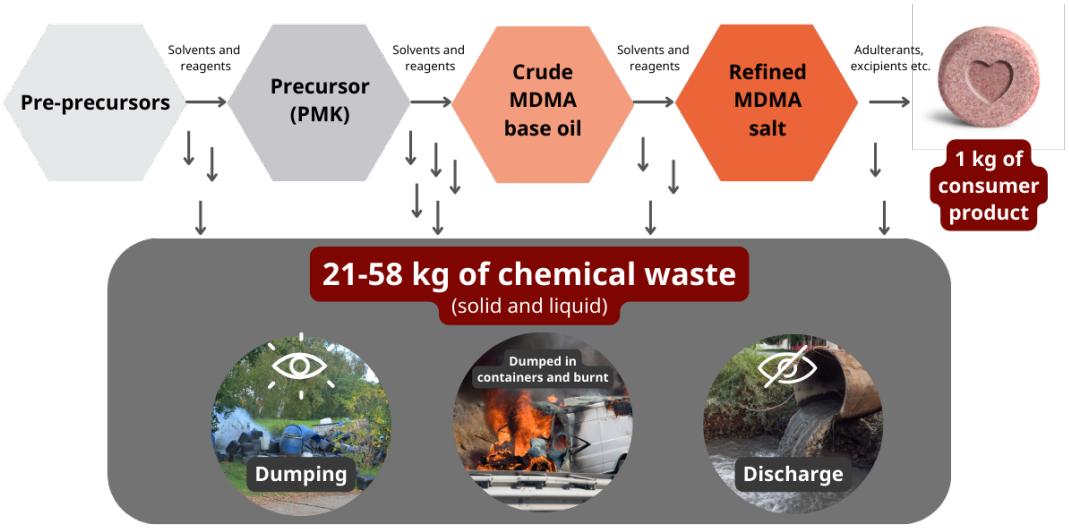
Dyes used in the making of ecstasy tablets and tablets produced with the dyes. Photos: Rita Jorge.

Environmental impact of MDMA production

Knowledge on the mechanisms and extent of environmental damage related to synthetic drug production is fragmented and further research is needed in this area. From the research available, three prominent (direct) damage pathways in synthetic drug production (including laboratories that produce the chemical starting materials) are described: water and soil pollution (through discharges of chemical waste) and air pollution through chemical reactions and fumes (ter Laak and Mehlbaum, 2022; UNODC, 2022). While stand-alone studies on some aspects of these impacts have been conducted, a more comprehensive assessment of the environmental impact of synthetic drug production has not been carried out, including for MDMA specifically.

The type of production waste generated in each step of the synthetic drug production chain has been described before (ter Laak and Mehlbaum, 2022; UNODC, 2022) (see Figure 4.7. Synthetic drug production and the possible waste products.

Figure 4.7. Synthetic drug production and the possible waste products



The first step is associated with the production of the chemical starting materials. Many of these are legally produced in China, primarily precursors and their designer precursor alternatives. China is one of the world's largest chemical and pharmaceutical manufacturers (Jia, 2007) and its industry appears to operate in a low-regulated environment, under licences that are reportedly often not enforced or inspected (US-CHINA Economic Security Review Commission [USCC], 2017, 2018). In 2017, it was estimated that more than 160 000 non-pharmaceutical chemical companies were operating 'legally and illegally in China, with some facilities manufacturing tonnes of chemicals every week' (USCC, 2017). Because of the complex nature of this industry, the data are insufficient to make a thorough estimate of the environmental impacts of this step of the production process.

More is known about the environmental impact of the subsequent steps of synthetic drug production in Europe. This involves the generation of chemical waste products, typically dumped away from the production sites and often in neighbouring countries, resulting in health risks, environmental damage and high clean-up costs for contaminated sites (see Box 4.3. Complications in cleaning up illicit drug waste dumping).

No dump sites specifically related to MDMA production were identified in the European Union in 2022, but at least seven were reported in 2021: six in Belgium and one in the Netherlands. This represents only a fraction of the total 234 dumping sites reported in the European Union that year. It is likely that many more of these sites were directly or indirectly related to MDMA production. This cannot be confirmed, however, as samples are not always taken for analysis to determine whether they are connected to a particular synthetic drug or chemical process.

Box 4.3. Complications in cleaning up illicit drug waste dumping

In March 2021, a forest ranger found a closed pit in a forest in the Dutch province of Noord-Brabant, close to a site where an illicit drug laboratory had been dismantled by the police. The pit had been used to repeatedly dump waste chemicals from drug production (van de Kasteele, 2022). Analysis found that the chemicals, such as acetone, ethanol and benzene, had penetrated the soil up to 8 metres deep. It was estimated that more than 4000 cubic metres of soil, or 37 twenty-foot equivalent maritime containers, and 7 million litres of groundwater had been contaminated (Nooijens, 2023). It has been estimated that the forest may take up to a century to recover from the damage caused (Joachems, 2023).

Cleaning up areas contaminated by chemical waste can be extremely expensive (Claessens et al., 2019), and there is an ongoing debate on who should cover the costs of the clean-up (DutchNews, 2022). For this particular site, clean-up was initiated in November 2023, by the province of Noord-Brabant. Although the dump site was not directly connected to the production of MDMA, it serves as an example of the environmental impact of synthetic drug production in the European Union.

Decontamination efforts at a dump site of chemical waste associated with drug production. Photo: Willem-Jan Joachems.

The quantities of chemical waste generated by the production of synthetic drugs in Europe can be estimated on the basis of instructions found in dismantled illicit laboratories. For the conversion of PMK to MDMA and the synthesis of PMK from alternative glycidic derivatives, it has been estimated that the manufacture of one kilogram of MDMA generates between 21 and 58 kilograms of chemical waste, depending on the production method used. This includes the waste resulting from the production of precursors out of designer precursors (ter Laak and Mehlbaum, 2022). These data, combined with information on discovered dump sites and seized precursors, make it possible to calculate a minimum estimated amount of

synthetic drug production waste generated in the European Union (see Box 4.4. Minimum estimated amount of chemical waste generated by MDMA production in the European Union).

Box 4.4. Minimum estimated amount of chemical waste generated by MDMA production in the European Union

In 2022, an assessment study was made of the chemical waste generated by synthetic drug production in the Netherlands (ter Laak and Mehlbaum, 2022). Based on data from registered dumping of drug production waste, it was estimated that at least 447 tonnes of chemical waste was generated by synthetic drug production in the Netherlands between 2017 and 2020. About 147 tonnes of that waste was attributed to MDMA production. Given the estimated product/waste ratio, this waste would result from the production of between 2.5 and 7 tonnes of MDMA over 4 years, depending on the production method used.

The most recent market size estimates suggest that 72.4 million MDMA tablets were consumed in the European Union in 2021 (see section Retail markets — market size estimate). This roughly translates to 11 tonnes of pure MDMA consumed (using the average content for that year, at 152 milligrams of MDMA per tablet). Given the waste ratios for MDMA production, and depending on the method used, this would generate an estimated 231-638 tonnes of chemical waste. It is important to note that this only accounts for the MDMA produced for (and consumed by) the European market. Accounting for the MDMA destined for export outside the European Union (Tops et al., 2018), it can be estimated that a further 924 to 2 553 tonnes of chemical waste associated with MDMA production has been produced in Europe.

Based on these assumptions, it is estimated that MDMA production in the European Union may have generated between 1 155 and 3 191 tonnes of chemical waste in 2021. This large quantity of chemical waste is directly or indirectly dumped into the environment, and does not undergo any type of treatment or processing.

A variety of methods may be used to dispose of large quantities of chemical waste associated with drug production. One method is to simply pour the waste down the sink or toilet. This is unlikely to be a common practice, however, as the waste can be corrosive or so viscous that it would damage the pipes or block the drains. However, if chemical waste is disposed of in this way, it may affect the quality of drinking water or adversely affect municipal wastewater treatment plants.

A more common occurrence is the dumping of waste in the countryside. In some cases, waste has been found buried underground or discharged directly on the soil, with possible long-lasting impacts on the environment, including the human food chain (Groenen et al., 2023). Waste may also be left in abandoned properties or loaded onto stolen vans or lorry trailers, which may then be set on fire to conceal forensic evidence. More elaborate methods have also been identified, including the use of modified vans that pump waste onto road surfaces (EMCDDA and Europol, 2019).

Overall, the dumping of synthetic drug production waste directly into surface waters, or indirectly via the sewers and wastewater treatment plants, can affect surface water quality. Scenario studies that use hydrological modelling illustrate that a large emission of drug production waste from an illicit laboratory into a sewer (or directly into surface water) can temporarily affect surface water quality over large distances. Waste discharged into surface water can be cleaned up when the water is stagnant, such as in lakes or ditches, and the response time is short. However, this is not possible in large rivers and fast-flowing streams (ter Laak and Mehlbaum, 2022). A study commissioned by the EUDA on the impact of synthetic drug production on the environment through the analysis of contaminants in groundwater samples sheds some light on this issue (see EU Drug Market: Amphetamine – In-depth analysis).

(1) PMK is piperonyl methyl ketone. Synonyms include: methylenedioxyphenyl-2-propanone; MDP2P and 3,4-MDP-2-P. IUPAC names include: 1-(2*H*-1,3-benzodioxol-5-yl) propan-2-one and 3,4-methylenedioxyphenyl-2-propanone.

(2) In the context of this report, 'glycidic derivatives of PMK' includes PMK glycidate, PMK glycidic acid, PMK ethyl glycidate, and PMK methyl glycidate.

(3) IUPAC name: 1,3-benzodioxole-5-acetonitrile.

(4) IUPAC name: 4-(2-nitroprop-1-en-1-yl)benzo[d][1,3]dioxole (also known as MDP2NP). The chemical is commercially available, but it may have been seized in an operating laboratory as part of the production process (as an intermediate).

(5) IUPAC name: methyl 3-oxo-2-(3,4-methylenedioxyphenyl)butanoate.

(6) IUPAC name: 5-[2-(1,3-benzodioxol-5-yl)acetyl]-2,2-dimethyl-1,3-dioxane-4,6-dione.

References

Consult the list of references used in this module.

The data used to generate the infographics and charts on this page may be found below (CSV format). Additional information, metadata and methodological notes may be found in the **EU Drug Market: MDMA source data entry in our data catalogue**.

Download all files (zip)

- Table EDMR2025-MDMA-4. Location of sites related to MDMA production in the European Union, 2019-2021
- Table EDMR2025-MDMA-6. Seizures of traditional and designer precursors used in the synthesis of MDMA in Europe, 2012-2023
- Table EDMR2025-MDMA-7a. Proportion of the total quantity of MDMA precursors seized in Europe, by seizing country, 2019-2021
- Table EDMR2025-MDMA-7b. Proportion of the total quantity of MDMA precursors seized in Europe, by seizing country, 2022-2023
- Table EDMR2025-MDMA-8. Quantity of hydrogen gas seized and stolen in Europe, 2012-2023

EU Drug Market: MDMA — Trafficking and distribution. Europe as a global supplier of MDMA

This resource is part of EU Drug Market: MDMA — In-depth analysis by the EUDA and Europol.

Last update: *March 2025*

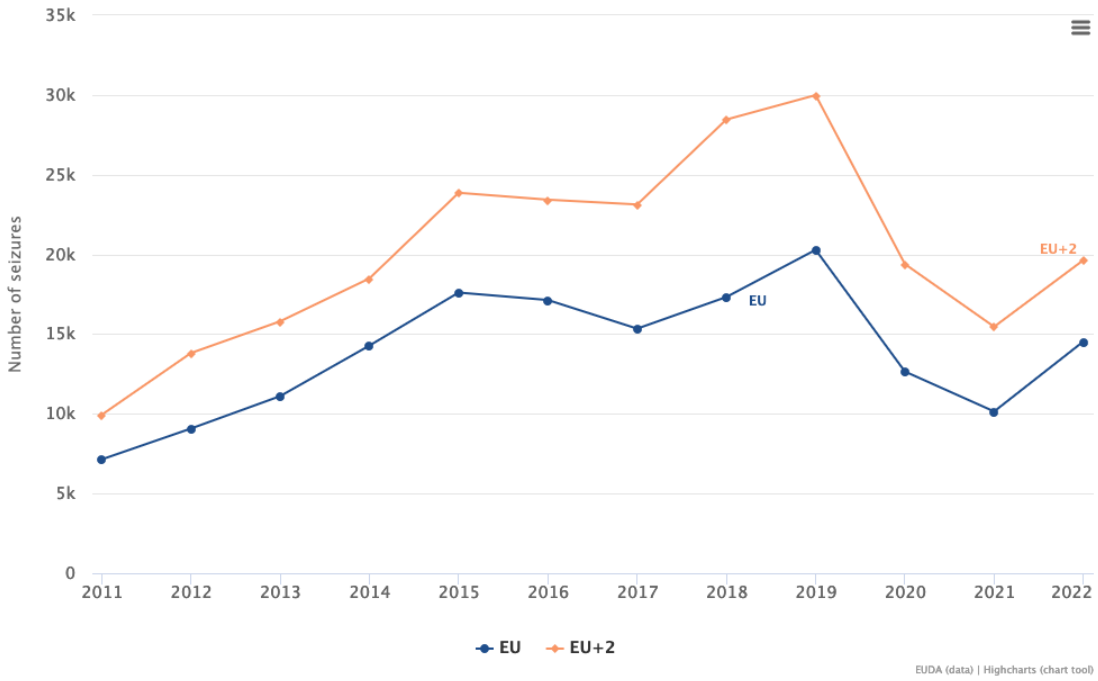
Number of MDMA seizures: will the impact of COVID-19 last?

The number of seizures of MDMA may be viewed as an indicator of the availability of MDMA at retail level. This is because, in aggregated datasets, the number of seizures tends to reflect seizures made by law enforcement at retail level, which typically occur more frequently (albeit in smaller quantities). Although these data need to be interpreted with caution, given that they are influenced by a number of factors including law enforcement priorities, in combination with other data sources they are useful for observing trends on the consumer market.

Between 2011 and 2019, the total number of MDMA seizures reported in the European Union, Norway and Türkiye increased steadily, reaching a historical peak of close to 30 000 seizures in 2019 (see Figure 5.1 Number of seizures of MDMA in the European Union, Norway and Türkiye, 2011-2022). Subsequently, seizures started to decline, reaching just under 15 500 in 2021, likely linked to reduced MDMA demand and availability during the COVID-19 pandemic. The available data suggest that this drop may have been short-lived, since by 2022 close to 19 600 MDMA seizures were reported – an increase of 27 % compared to 2021. It will be important to observe how these values evolve in future since the data do not include all countries. It should be noted that Germany, France and the Netherlands have not reported on the number of MDMA seizures since 2019 (and in some cases even further back), which may affect the interpretation of these data.

In 2022, the largest number of seizures was reported by Spain (6 390 seizures, 33 % of the total reported in the European Union, Norway and Türkiye), followed by Türkiye (4 519 seizures, 23 %), Poland and Sweden (1 438 and 1 380 seizures respectively, each representing roughly 7 % of all seizures reported in the European Union, Norway and Türkiye).

Figure 5.1. Number of seizures of MDMA in the European Union, Norway and Türkiye, 2011-2022



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Source: EUDA. See Methodology.

Quantity of MDMA seized: Türkiye remains the largest market

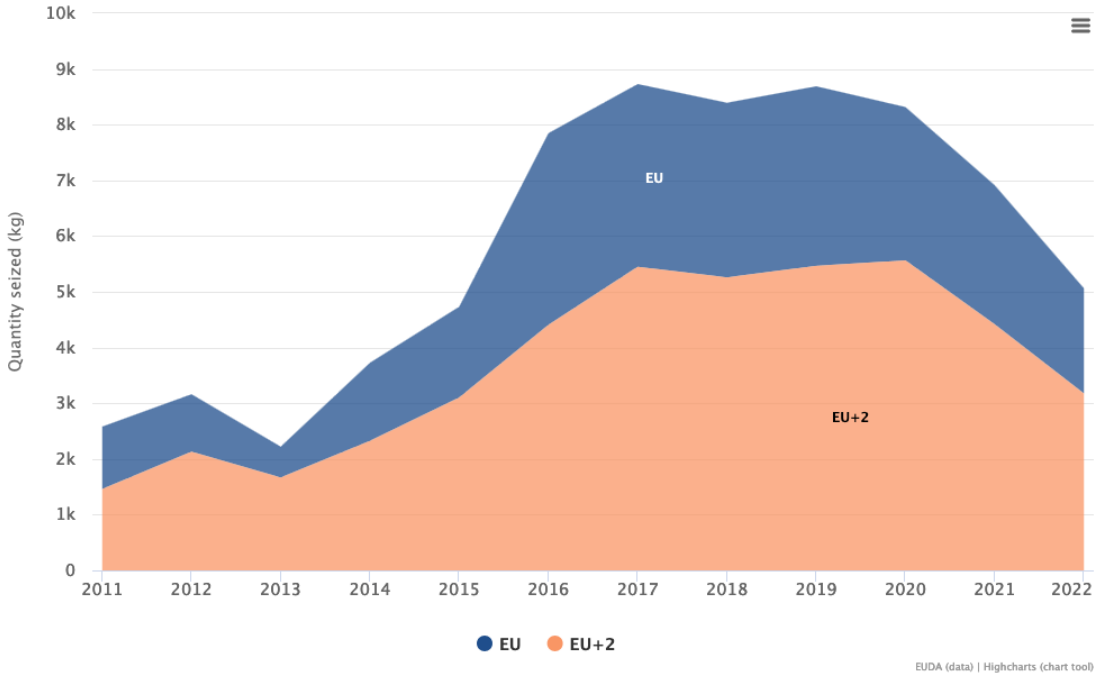
The quantity of MDMA seized tends to reflect large seizures made by law enforcement, especially by customs and border control agencies. This means that a small number of events where large quantities of MDMA were seized will constitute a larger proportion of the total quantities seized in Europe. For this reason, the quantity of MDMA seized may be viewed as an indicator of wholesale drug markets. As already mentioned, these data are influenced by several factors and should be interpreted with caution. Notably, not all countries report the quantity of MDMA seized, which may significantly affect the interpretation of trends.

The quantity of MDMA seized in the European Union, Norway and Türkiye has remained at a relatively low level since 2019 (see Figure 5.2 Quantity of MDMA seized in the European Union, Norway and Türkiye, 2011-2022). In the European Union, peak quantities were seized between 2016 and 2019, averaging at 3.3 tonnes per year. The Netherlands reported the

majority of those seizures (averaging 1 tonne per year) followed by France (366 kilograms), Belgium (298 kilograms) and Spain (244 kilograms). These values include seizures of powders and tablets (converted into mass) (see Methodology). During that period, Türkiye alone seized 1.8 tonnes of MDMA on average per year, more than half of the total quantity of MDMA seized by the EU Member States in the period between 2016 and 2019.

From 2020 onwards, the decrease in the quantity of MDMA seized appears to reflect the reduced demand and availability of MDMA associated with the closing of recreational settings during the COVID-19 pandemic. Between 2020 and 2022, 2.4 tonnes of MDMA were seized on average per year in the European Union. Spain reported average seizures of 545 kilograms per year, followed by the Netherlands (380 kilograms per year), France (352 kilograms) and Belgium (258 kilograms). While seizures decreased in the European Union, Türkiye continued seizing large quantities of MDMA between 2020 and 2022, amounting to approximately 2.0 tonnes per year. This, together with the large number of individual seizures reported by Türkiye (see above), likely indicates that a large consumer market for MDMA exists in Türkiye and perhaps also that the country is a transit area for MDMA destined for other non-EU markets.

Figure 5.2. Quantity of MDMA seized in the European Union and Türkiye and Norway, 2011-2022



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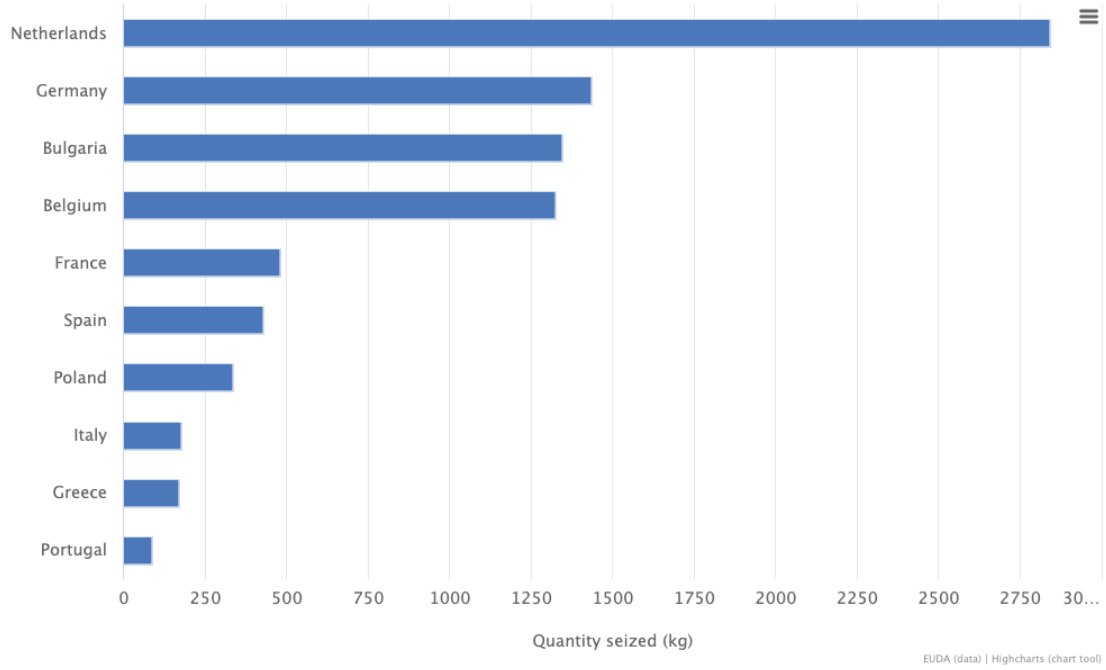
Source: EUDA. See Methodology.

MDMA trafficking: the role of the European Union as a global distribution hub

Given its central role in MDMA production globally, the European Union also serves as a hub for the trafficking of MDMA to non-EU countries. Information from 83 countries reporting to the UNODC between 2017 and 2021 on MDMA trafficking shows that the European Union, especially the Netherlands, remains the main origin of ecstasy trafficking flows worldwide (UNODC, 2023). European countries were mentioned as the origin of ecstasy seizures in 82 % of all reports, followed by Asia (8 %), the Americas (8 %) and Africa (3 %). Of all EU countries, the Netherlands was by far the most frequently cited origin (34 %).

Information reported to the World Customs Organization (WCO) also supports this finding ([1]). In the period between 2019 and 2022, at least 95 non-EU countries reported seizures of MDMA originating ([2]) in the European Union. The Netherlands was the country from which the largest quantities of MDMA were shipped (2.8 tonnes and 24 litres in 2 163 individual seizures), followed by Germany (1.4 tonnes and 12 litres in 809 seizures), Bulgaria (1.3 tonnes in 11 seizures) and Belgium (1.3 tonnes and 40 litres in 438 seizures) (see Figure 5.3. Top 10 EU countries of departure for global MDMA seizures (by quantity) 2019-2022).

Figure 5.3. Top 10 EU countries of departure for global MDMA seizures (by quantity), 2019-2022



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Source: CEN database of the World Customs Organisation (WCO). Provided by WCO RILO-WE (Regional Intelligence Liaison Office Western Europe). See Methodology.

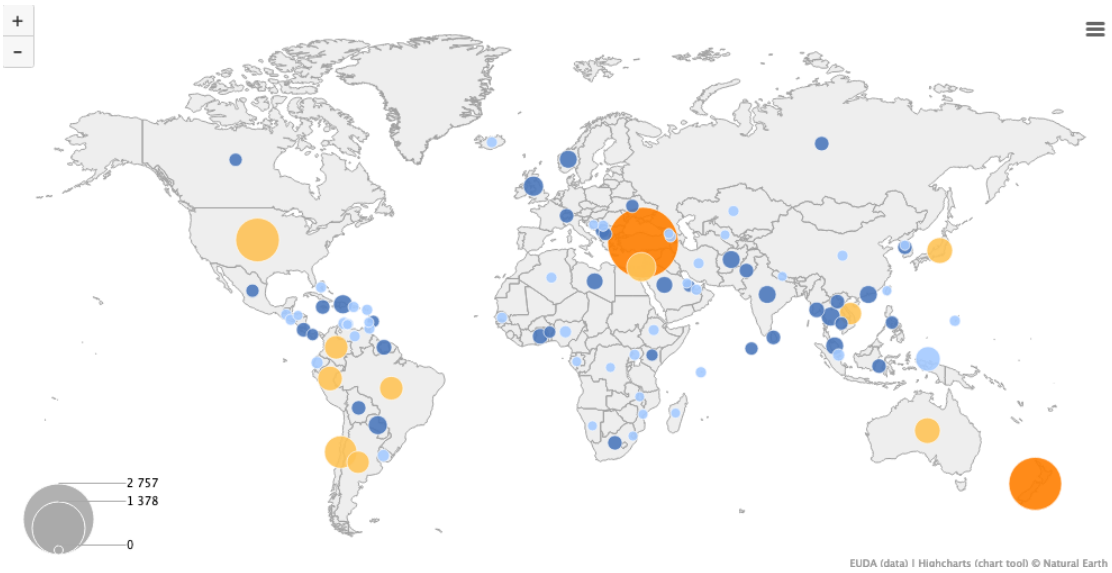
Based on the available data, Germany and Bulgaria appear to be emerging as distribution hubs for MDMA to both European and external markets. In the case of Germany, this is likely due to its proximity to the main production hubs overseen by Dutch criminal networks, who may also travel there to submit parcels to postal services, as well as the presence of large air hubs for major international courier, package delivery, and express mail services in the country. The available information shows that MDMA trafficking from the Netherlands to Germany occurs mainly through drug couriers, who also supply the local consumer market. In addition, this may be an indication that drug producers in the Netherlands and Belgium are relocating the distribution to Germany, potentially in response to interdiction by law enforcement. With regard to Bulgaria, its proximity to Türkiye, where there is a large MDMA market, is likely to be a contributing factor to its emergence as a distribution hub.

An assessment by the Dutch Police indicates that the majority of the MDMA produced in the Netherlands is intended for more profitable overseas markets, where MDMA prices appear to be much higher than in the European Union, for example, in Oceania and Asia (NPNL, 2022). In addition to Oceania and Asia, important destination markets for MDMA produced in the European Union include the United Kingdom, Türkiye, the Americas and Africa.

Seizure data reported to the WCO also underscore Türkiye's importance as a destination for MDMA shipments originating from the European Union. Between 2019 and 2022, at least 2.8 tonnes of MDMA was shipped from the European Union to Türkiye (of which 1.3 tonnes was shipped from Bulgaria, 455 kilograms from the Netherlands and 316 kilograms from Poland). WCO data also confirm that large quantities of MDMA were trafficked from EU countries to destinations in Oceania (Australia, New Zealand), North America (the United States), South-East Asia (Thailand, Vietnam), Latin America (Brazil, Chile, Colombia, Peru), the Middle-East (Israel) and East Asia (Japan) (see Figure 5.4. Quantity of EU-origin MDMA seized in non-EU countries, 2019-2022).

Figure 5.4. Quantity of EU-origin MDMA seized in non-EU countries, 2019-2022

= Over 1000 kg | = 100-800 kg | = 5-100 kg | = Up to 5 kg



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Source: CEN database of the World Customs Organisation (WCO). Provided by WCO RILO-WE (Regional Intelligence Liaison Office Western Europe). See Methodology.

Information from the WCO also suggests that, occasionally, EU countries may serve as transhipment points between non-EU countries. Between 2019 and 2022, the available data show that at least 286 kilograms of MDMA seized in EU countries had originated from and was destined to countries outside the European Union (although it is not clear where the seized MDMA had been produced). A number of countries were involved in those shipments, with Belgium being the country where most seizures occurred, followed by Germany. For example, four shipments amounting to 26 kilograms were seized in Belgium in 2021. These were sent by postal services from the Democratic Republic of the Congo and were headed to Australia and New Zealand. An unusual seizure also occurred in 2021, when Germany appeared to have been the transhipment point of 5.5 litres of MDMA base oil that was sent by mail or express courier services from Brazil to Lebanon. This clearly suggests that MDMA oil is

exported from Europe for processing into MDMA hydrochloride close to consumer markets (see Section Trafficking of European MDMA base oil: an emerging trend?)

Substantial intra-regional trafficking flows also occur within Europe, mainly from production hubs to consumer markets in other European countries (UNODC, 2023).

MDMA trafficked from the European Union to Latin America: the reverse cocaine route?

There are well-established drug trafficking routes between Latin American and European countries, particularly for cocaine (see EU Drug Market: Cocaine). Recent indications suggest that these routes may also be used to traffic MDMA in the opposite direction.

Seizure data reported to WCO show that between 2019 and 2022, at least 1.2 tonnes of MDMA were trafficked from EU countries to Latin America. Destination countries for EU shipments included Chile (372 kilograms), Peru (160 kilograms), Brazil (141 kilograms), Colombia (136 kilograms), and Argentina (117 kilograms). Several attempts to smuggle MDMA from Europe to Latin America have been documented. For example, in June 2022, law enforcement authorities in the Netherlands and Chile dismantled a criminal network attempting to traffic nearly 500 000 MDMA tablets and over 100 kilograms of MDMA powder from the Netherlands and Belgium to ports in Chile. The investigation found that the criminal network concealed large numbers of MDMA tablets in caches within mobile home units and vehicles as well as in compressors (Shuldiner, 2022). In December 2022, an international operation led by the Spanish Police resulted in the seizure of 56 kilograms of MDMA in a boat headed to Argentina from Cadiz, via the Canary Islands. The boat had previously been used to transport 1.5 tonnes of cocaine and had been refurbished and renamed by the criminals to avoid attracting the authorities' attention. The crystal MDMA seized in this case was reportedly destined to be used to make MDMA tablets in Argentina (Policía Nacional España, 2022). In addition, large seizures of 'tucibi' (a mixture often containing ketamine, MDMA or other substances) have also occurred in Spain, destined for Colombia (see Box What is tucibi?).

The smuggling of MDMA to Latin American countries presents an important opportunity for MDMA producers in Europe, given the price of synthetic drugs in the region and the large potential market. Recent years have seen an increase in demand for synthetic drugs, including MDMA, in Latin American countries (UNODC, 2022, 2023). So far MDMA has been trafficked from Europe (typically Belgium, the Netherlands and, to a lesser extent, Germany) to the region using postal services and couriers on commercial flights (Ford, 2021b, a; UNODC, 2021). The increasing demand for MDMA and the possibility of high profits may motivate criminals based in the European Union to use established drug routes between Latin America and Europe, previously thought to be 'one-way' routes, to transfer larger amounts of MDMA to the region. In fact, several seizures of synthetic drugs, including MDMA coming from Europe, have been reported in Chile, a country that has been used as a distribution hub for cocaine headed to Europe.

Limited evidence also suggests that, on occasion, barter deals may take place where MDMA is exchanged for cocaine with no financial transactions involved. For example, in 2020, an investigation in Brazil identified ongoing barter deals between criminals in the state of Santa Catarina and Europe involving the exchange of cocaine for MDMA. Criminal groups specialised in this trade appeared to be leading these deals, but other major Brazilian organised crime groups such as the PCC and the PGC ([3]) were reported to have also become involved in the trade (Ford, 2021b). Although barter deals have not yet been sufficiently documented, the potential importance of this modus operandi should not be underestimated. For instance, it is probable that heroin-for-MDMA barter deals between Turkish and Dutch criminal networks in the early to mid-2010s contributed to the development of the Turkish market for MDMA, which now appears to be one of the largest in Europe.

Trafficking of European MDMA base oil: an emerging trend?

While most MDMA is trafficked as a solid (powders, crystals and tablets), there are indications that MDMA base oil may at times be smuggled directly from the main EU production sites (such as the Netherlands and Belgium) to EU and non-EU destination countries (Sanen, 2021). Since MDMA oil is not a consumer product, it needs to be further processed at destination in order to obtain powders or crystals which can then be used as, or transformed into, consumer products. This appears to follow an established trend in the trafficking of amphetamine oil within Europe (see EU Drug Market: Amphetamine).

At present, the phenomenon does not appear to be significant, but this may be a reporting artefact. Nonetheless, both European law enforcement data and information reported to the WCO indicate that it is occurring. According to the WCO, between 2019 and 2022, MDMA oil exported from Europe was seized in New Zealand (over 33 litres), Israel (23 litres), the United States (7.5 litres), Australia (2 litres) and Colombia (1.5 litres). Most of the oil seized was sent in mail or express courier packages.

Transporting MDMA: parcel post and the land route predominate

Drug traffickers use a variety of methods to traffic MDMA from the European Union to both EU and non-EU destinations. Methods of MDMA trafficking within the European Union include parcel post, land transportation, air transportation and occasionally maritime routes. Diverse concealment methods are used to smuggle MDMA, tailored to exploit the specific features of each mode of transportation. These sophisticated concealment strategies evolve continually in order to evade detection by law enforcement.

Land transportation, mainly using cars, vans and lorries, is primarily associated with intra-European destinations, and is particularly relevant for the trafficking of MDMA to Türkiye. Caches are often built within the vehicle's structure, integrated into the engine, spare wheel, dashboard, or in other hidden compartments. Alternatively, the drugs can be transported in the luggage of passengers on buses, trains and cars. Data reported to the WCO on MDMA seizures between 2019 and 2022 involving EU countries show that 56 % of the total quantity of MDMA seized between EU destinations was being transported by land. Although less commonly reported, land transportation allows the movement of larger quantities of MDMA compared with trafficking by mail or express couriers.

Air transportation appears to be less commonly used to smuggle MDMA within Europe, and is more relevant for the transportation of the drug overseas, via both cargo and passenger flights (NPNL, 2022). Air cargo is notably prevalent for destinations such as Australia, New Zealand and Japan. Passenger flights are used for a broader range of destinations, including Latin America. For air transportation, multifaceted concealment approaches are used. When trafficked via air cargo, MDMA is often concealed within commodities, such as construction material and other goods, in order to minimise the risk of detection. On passenger flights, MDMA can be placed inside the double lining of baggage, in hidden compartments, or carried attached to or inside a passenger's body. Trafficking by drug couriers on passenger flights is usually of smaller quantities in comparison to other methods.

Maritime cargo is also used, particularly for overseas markets (such as Latin America) and when shipping larger quantities of MDMA (see Section MDMA trafficked from the European Union to Latin America: the reverse cocaine route?). Concealment methods are similar to those used in air cargo flights (NPNL, 2022). The concealment techniques used for maritime trafficking of MDMA may also be adapted to the vessel structure.

Use of post and parcel delivery services

Criminal networks often exploit post and parcel delivery services to traffic smaller quantities of MDMA to retail-level distributors or directly to consumers both inside and outside the European Union. Such parcels are frequently associated with the online drugs trade. At times, in addition to retail-level distribution, mail and parcel services may also become a means of trafficking larger quantities of MDMA (amounting to several kilograms). For example, in December 2021, a drug trafficking network was dismantled in the Netherlands after attempting to ship MDMA tablets to Vietnam and Laos using parcel shipment services. The suspects tried to smuggle 47 000 ecstasy tablets to Vietnam and 14.2 kilograms of MDMA to Laos (NOS, 2021; Politie, 2021). Due to the quantities concerned, it is likely that this form of trafficking is intended for further distribution, for example by wholesalers.

There are strong indications that criminal networks from Asia use post and parcel services to traffic large quantities of MDMA purchased from drug-producing networks in the Netherlands. The drugs appear to be packaged by their criminal associates based in the

Netherlands into parcels containing between 5 and 10 kilograms of MDMA, disguised as legitimate goods. In order to mask the origin of the parcels and minimise the risk of detection, the members of these networks use mail or express couriers to first smuggle the parcels to countries such as Belgium, France and Germany, after which they are shipped to Asia (NPNL, 2022).

MDMA: online trade and distribution on darknet markets

MDMA is frequently traded online across a range of platforms, including darknet markets as well as surface web and social media platforms. Recently, social media platforms and instant messaging applications have become particularly dynamic channels through which MDMA is sold to consumers. The growing exploitation of these platforms is likely tied to the objective of reaching a wider population of consumers. Smaller quantities sold online are often dispatched in post and parcels from EU countries to consumer markets in Europe and globally, and cryptocurrencies are often used to settle these online transactions.

MDMA darknet markets

In addition to facilitating direct sales to consumers, MDMA produced in the European Union appears to be sold on darknet markets in wholesale and mid-level distribution quantities. These larger quantities are sold in kilograms and are purchased by criminal networks based both inside and outside the European Union. Contrary to what tends to happen for other drug markets, mid-level sales represent a relatively large proportion of all darknet MDMA sales, and the value of the mid-level sales is greater than the value of the retail sales (EMCDDA, 2017).

An EUDA analysis of 18 darknet markets conducted in 2022 ([4]) detected a total of 8 849 unique listings (sale offers) for MDMA in tablet (5 153, 58 %) and powder/crystal (3 696, 42 %) forms, purporting to ship from an EU country. The analysis did not include MDMA oil. Although caution should be exercised when interpreting these data, the number of listings provides a useful indicator of the scale of activity on darknet markets.

Listings of ecstasy tablets

The available data suggest that the majority of ecstasy tablet listings offered on darknet markets during 2022 originated in Germany (44 %), the Netherlands (36 %) and France (10 %). A further 6 % of tablet listings offered shipping from various other EU countries, Norway and Türkiye, and 4 % offered shipping from an unspecified country in Europe (see Figure 5.5. Proportion of ecstasy tablet and powder/crystal MDMA listings on major darknet markets by

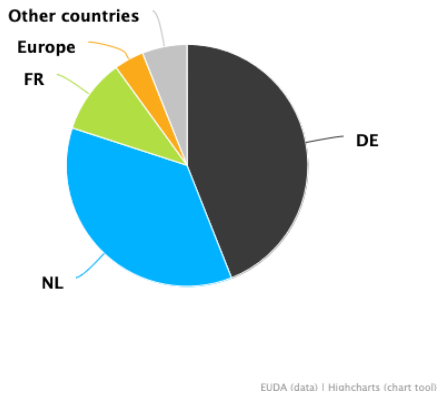
EU Member States, Norway and Türkiye, 2022).

Based on a subsample of 4 870 (94.5 %) listings of ecstasy tablets in 2022, where all required data were available, the vast majority (4 310, 89 %) of listings claimed to ship tablets with a very high MDMA content – between 201 and 300 milligrams per tablet. It should be noted, however, that these claims have not been verified by forensic testing.

Darknet sellers advertise ecstasy tablets in retail and wholesale amounts. Across the 4 870 listings of ecstasy tablets in 2022, the most frequently offered number of tablets in a single listing was 10 tablets (756 listings), followed by 1 (728) and 100 tablets (493). Around 10 % (503) of the listings of ecstasy tablets offered wholesale amounts (1 000 tablets or more). The most common wholesale amount on offer was 1 000 tablets (6.8 % of all listings), but a number of other listings offered quantities of several thousand tablets, up to 10 000 (14 listings).

Figure 5.5. Proportion of ecstasy tablet and powder/crystal MDMA listings on major darknet markets by EU Member States, Norway and Türkiye, 2022

Proportion of ecstasy tablet listings on major darknet markets by EU Member States, Norway and Türkiye, 2022



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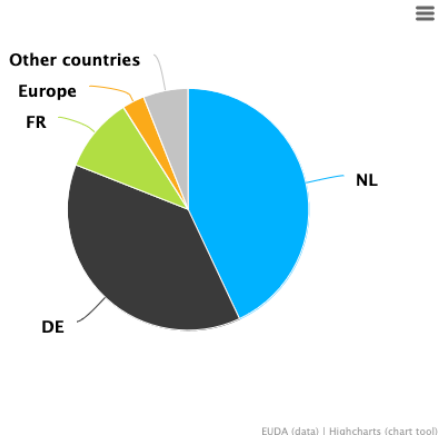
Proportion of powder/crystal MDMA listings on major darknet markets by EU Member States, Norway and Türkiye, 2022



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Darknet listings of powder/crystal MDMA

MDMA powders and crystal are also on offer on the darknet, with the vast majority on offer referring to crystal MDMA, rather than powders. Similar to listings for ecstasy tablets, the Netherlands (43 %), Germany (38 %) and France (10 %) dominated as the reported shipping countries for powder/crystal MDMA listings. A broad range of other European countries

featured as the shipping origin in 6 % of the listings; and an additional 3 % of listings purported to ship from an unspecified country in Europe (see Figure Proportion of ecstasy tablet and powder/crystal MDMA listings on major darknet markets by EU Member States, Norway and Türkiye, 2022).

Based on a subsample of powder/crystal listings (3 480, 94 %), where all required data were available, the most commonly offered quantity of MDMA was 5 grams (453, 13 %), followed by 10 grams (389, 11 %) and 50 grams (308, 8.9 %). Around 7 % (257) of the listings of powder/crystal MDMA were for wholesale amounts (1 kilogram or more). The most common wholesale amount was 1 kilogram (183; 5.26 % of all listings), but a listing offering quantities up to 50 kilograms was also identified.

Prices of MDMA on the darknet

Price data were available for 1 312 ecstasy tablet listings and 977 MDMA powder/crystal listings. The typical price per tablet and per gram, at different market levels, is shown in the tables 'Breakdown of listings by market level'. Overall, retail prices on the darknet appear to be cheaper than on the physical retail market, particularly for tablets. For example, a tablet containing 144 milligrams of MDMA would typically cost EUR 1.44 on the darknet, whereas offline prices vary between EUR 4 and EUR 19 (see Section Price). However, it should be noted that darknet data are not accompanied by forensic verification and therefore tablet content and strength are not confirmed, making these values a signal or indication, rather than a quantitative comparison.

Table 5.1. Breakdown of listings by market level and price per gram of MDMA in tablets

Market level	Number of listings	Typical price per gram (EUR)
Retail (<50 tablets)	712	10
Middle (50-999 tablets)	468	5.7
Wholesale (>1 000 tablets)	132	4.3

Note: For tablets, price per gram was calculated based on MDMA amount per tablet in each listing, as claimed by the darknet seller.

Table 5.2. Breakdown of listings by market level and price per gram of MDMA in crystal

Market level	Number of listings	Typical price per gram (EUR)
Retail (<50 grams)	611	10
Middle (50-999 grams)	313	6
Wholesale (>1 000 grams)	53	7

Note: For tablets, price per gram was calculated based on MDMA amount per tablet in each listing, as claimed by the darknet seller.

Criminal networks

The MDMA market presents numerous financial opportunities for criminal networks involved in different parts of the supply chain. Criminal networks are involved in sourcing chemicals, equipment and locations needed for MDMA production, disposing of evidence and waste related to the production, smuggling the substance, getting it to the consumer and handling payments and finances. Adaptability is evident throughout the chain. For example, designer precursors are used to avoid scheduled substances, new smuggling methods are developed, new trafficking routes explored and new digital technologies are introduced to sell MDMA on consumer markets, among several other innovations.

Dutch criminal networks remain the leading large-scale producers of MDMA in the European Union (Europol, 2021), operating production facilities outside the Netherlands as well. For example, they also control MDMA production in Belgium, through Belgian subsidiaries. These Dutch criminals also cooperate with networks of distributors to traffic MDMA to consumer markets in Europe and globally. Nonetheless, while MDMA production appears to be firmly controlled by Dutch networks, a broad range of criminals are involved in MDMA trafficking in Europe, some of whom originate from non-EU countries. For instance, criminal networks from the Western Balkan region engage in MDMA trafficking in some EU Member States, although they predominantly remain involved in the trafficking of cocaine and heroin. Asian criminal networks active in the European Union are also known to be involved in the trafficking of MDMA from the Netherlands to consumer markets in Asia (NPNL, 2022).

Crime-as-a-service

As with other illicit drugs, specialisation and division of labour are observed in the MDMA market. Criminal networks increasingly rely on specialist service providers at different stages of the MDMA production and trafficking chain. Some of these criminal service providers specialise in the procurement of chemicals and equipment (or its customisation) used in the production process, but also in tabletting, the identification and establishment of production sites, and money laundering.

Large-scale MDMA production, for example, is characterised by a high degree of specialisation among collaborating criminal networks, whereby certain stages of the production process are outsourced to dedicated criminal service providers. This often involves a high number of criminal networks that cooperate in order to optimise resources and increase profits. Some criminals are, for example, specialised in the importation, storage and supply of precursors, designer precursors, essential chemicals and catalysts to MDMA producers in the Netherlands and Belgium.

Equipment suppliers provide MDMA producers with a range of materials, such as custom-built or modified reaction vessels, other hardware, glassware, heating mantels and heating blankets as well as tabletting machines. This equipment is sourced both within and outside the European Union, with the exception of tabletting machines which appear to be predominantly imported from China (NPNL, 2022). It appears that drug producers also contract individuals and companies specialised in metal construction to build custom-made vessels or modify those intended for use within legal industries (see Section Production).

Specialists are also contracted for tabletting MDMA into ecstasy. These specialists may provide ready-made mixtures of adulterants, excipients and fillers used in the tabletting process, in addition to operating the machines. They are reported to take into account the desired potency, shape and logo of the ecstasy tablets and paid a fee per tablet produced (NPNL, 2022).

Brokers play an important role in connecting drug producers with specialised criminal service providers. On occasion, they are also responsible for finding suitable locations for drug production, by approaching owners of farms, warehouses and sheds. In some cases, the owners of such sites are complicit in the illicit activities conducted at their properties, and may also support the acquisition of furniture and materials needed for drug production.

(1) Through the CEN platform, the World Customs Organization (WCO) collects data on the location of seizures, departure points, destination countries, as well as the quantities seized, modes of transportation, and concealment techniques used by traffickers. These data are submitted on a voluntary basis by the WCO Member States and therefore the data may not reflect the totality of seizures made in the reporting countries nor in any of them individually, rather a proportion of it.

(2) In this context, a departure point may be the country where the drug is produced or a transit point along an extended trafficking route. Similarly, a destination country may be the final destination of the drugs seized or simply a transit point along the trafficking route.

(3) PCC – Primeiro Comando da Capital, a Brazilian organised crime group originally from São Paulo. PGC – Primeiro Grupo Catarinense, an organised crime group established in the state of Santa Catarina in Brazil.

(4) Darknet markets analysed: Abacus, Alphabay-v3, Archetyp, Ares, ASAP, Bohemia, Cocorico, Cypher, Darkfox, Hermes, Kingdom, Nemesis, Revolution, Royal, Tor2door, Tor-market, Versus and Vice City.

References

Consult the list of references used in this module.

The data used to generate the infographics and charts on this page may be found below (CSV format). Additional information, metadata and methodological notes may be found in the **EU Drug Market: MDMA source data entry in our data catalogue**.

Download all files (zip)

- Table EDMR2025-MDMA-10. Number of seizures of MDMA in the European Union, Norway and Türkiye, 2011-2022

EU Drug Market: MDMA — Retail markets

EUDA EUROPEAN UNION DRUGS AGENCY

EUROPOL

This resource is part of EU Drug Market: MDMA — In-depth analysis by the EUDA and Europol.

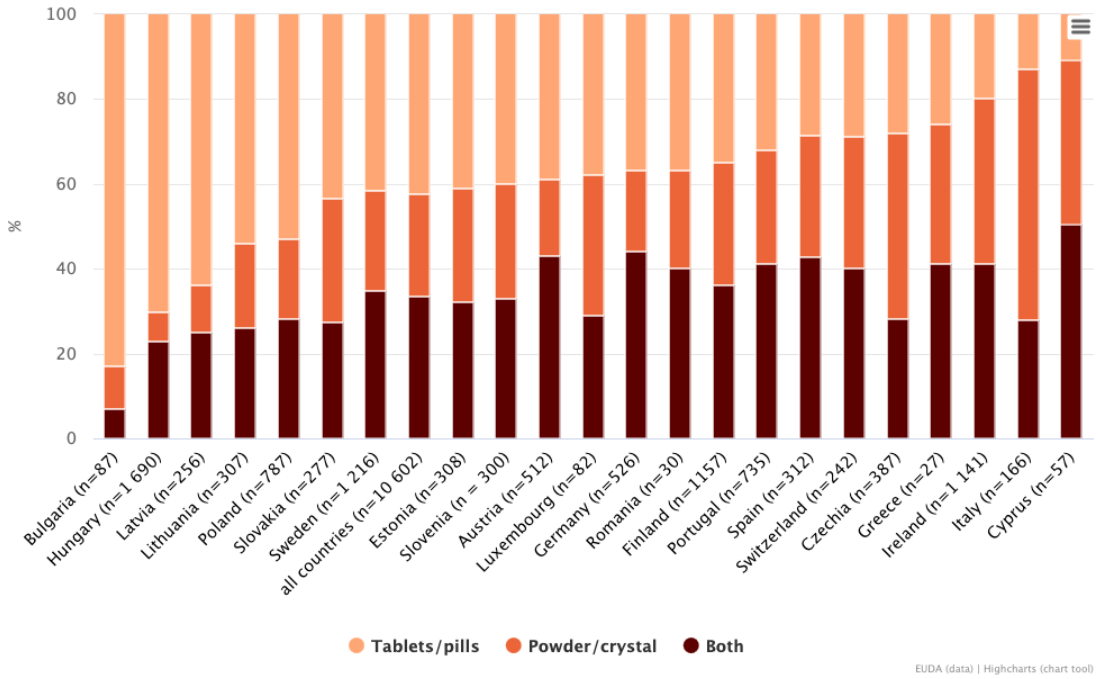
Last update: *March 2025*

How is MDMA sold in Europe?

MDMA is most commonly found on the European market in the form of ecstasy tablets, relatively pure crystals or powders (finely ground crystals of MDMA that are typically mixed with other substances). These products typically contain MDMA hydrochloride (see Box Forms of MDMA present on the European market).

Since they emerged on the European drug market in the 1990s, ecstasy tablets were the most common form of MDMA consumed in Europe, but following a period where consumer trust in these products was low around the mid to late 2000s, powders/crystals gained a share of the market (Gremeaux, 2022; Mounteney et al., 2018). According to 2021 data, tablets and powders/crystals share the EU MDMA market equally, with some variability among countries in terms of preference for either ecstasy tablets or MDMA powders/crystals (see Figure 6.1. Distribution of usual MDMA forms across countries). While not representative, data from the 2021 European Web Survey on Drugs (EWSD) ([1]) found that tablets were used by 42 % of the 17 098 respondents who had used MDMA in the last 12 months, compared with 24 % for powder/crystal. Around 33 % of respondents reported using both forms of the drug.

Figure 6.1. Distribution of usual MDMA forms across countries



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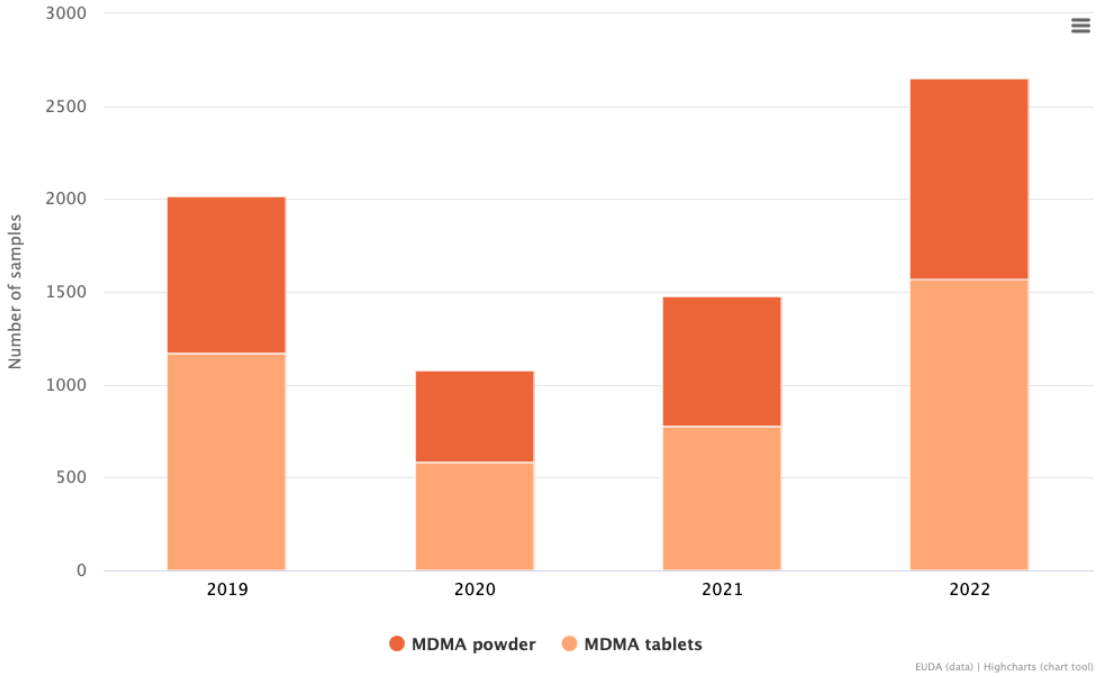
Source: European Web Survey on Drugs (EWSD), 2021. Survey question: 'What forms of ecstasy/MDMA do you usually use?'. See Methodology.

Samples submitted to drug-checking services can also provide an indication of the products available to consumers. However, these data are not generalisable either, and as such should be interpreted with caution. Of the 6 811 samples submitted as MDMA to drug-checking services in eight EU countries ([2]) between 2019 and 2022, 57 % were tablets and 42 % were crystals (including 'rocks') or powders, without significant year-on-year variation (see Figure 6.2. MDMA samples analysed by drug-checking services, 2019-2022). Additional data were shared with the EUDA by the Drug information and Monitoring System (DIMS) in the Netherlands. Of nearly 53 500 MDMA samples analysed by DIMS over the same period, the average proportion of tablets was 58 % (ranging from 48 % in 2020 to 65 % in 2022).

Figure 6.2. MDMA samples analysed by drug-checking services, 2019-2022

MDMA samples analysed by drug-checking services



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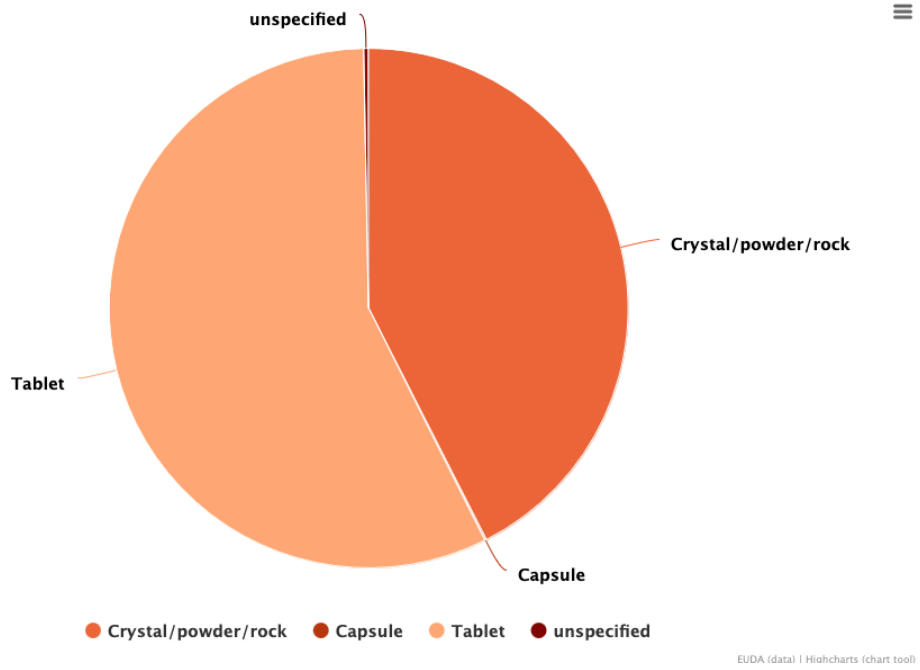
Source: TEDI (Trans-European Drug Information project).

MDMA samples analysed by drug-checking services by sample form, 2019-2022



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Source: TEDI (Trans-European Drug Information project).

Other types of MDMA products occasionally appear on the drug market. For example, alcoholic drinks containing MDMA are submitted for drug checking from time to time. More rarely, almost pure MDMA base in liquid form has been sold to consumers, which represents a serious health risk (Drugs Information Monitoring System [DIMS], 2022). In recent years, the appearance of alternative (non-tablet) edible consumer products containing MDMA has also been reported, including candies, jellies, gummies and lollipops (see Box 6.1. Lollipops containing MDMA seized in Belgium). These products may make the use of MDMA more socially acceptable and appeal to non-habitual consumers and young people.

Box 6.1. Lollipops containing MDMA seized in Belgium

Dozens of lollipops containing MDMA were seized in 2021 in Belgium. The products had a net weight of approximately 20 grams each and contained between 130 and 176 milligrams of MDMA, evenly distributed inside the lollipops. Although unusual, this was not the first time that these types of products had been found in Europe. Sugary products containing MDMA may disguise the taste of the substance and mask the Marquis reagent test that is commonly used to identify the presence of MDMA in a sample.

Source: Belgian Federal Police.

MDMA is mostly bought face-to-face from known sellers

Studying the drug purchasing behaviours of users is useful for understanding market dynamics, but challenging given the clandestine nature of these transactions. Web-based surveys, such as the EWSD, can provide a helpful insight, although the results cannot be generalised to the population as a whole, or indeed to all people who use drugs. Data from drug-checking services can also inform on the type of relationships that exist between the consumer and the provider.

Together, these two data sources suggests that the large majority of MDMA users buy the drug themselves, and that a smaller proportion obtains it for free, despite marked differences among EU countries. Consumers appear to mostly buy MDMA from what they perceive to be trusted sources (usual suppliers, close friends and friends), but street suppliers and acquaintances are also relevant sources, as is the internet (including surface web, darknet and social media), albeit to a smaller extent.

In 2021, among the EWSD respondents who had used MDMA in the last 12 months (*n* = 17 098), close to three quarters (72 %) reported mostly buying the drug, whereas one quarter (25 %) declared that they had obtained it for free. Differences between countries were apparent, however. For example, 79 % of the Polish respondents reported mostly buying the

drug, compared to 51 % of the respondents from Luxembourg.

Among EWSD respondents who provided further information (*n* = 6 946), a clear majority (78 %) had bought MDMA directly from a dealer, in person, via phone, mail or text message. Smaller numbers of respondents also reported using the darknet (13 %) and social media (7 %). The use of these methods differed between countries, indicating that some purchasing practices are more common in some countries than in others. For example, the proportion of those buying MDMA directly from a dealer ranged from 61 % in Finland and Sweden to 95 % in Spain, and figures for the use of the darknet ranged from 0 % in Bulgaria and Cyprus to about 44 % in Finland. It should be noted, however, that the sample sizes were small in some countries.

More than three quarters of EWSD respondents (77 %) reported meeting their dealer outside as the usual method for receiving drugs, followed by home delivery (17 %). An equal percentage of respondents reported delivery through regular mail or post, and picking the drugs up from a location without any personal contact (7 %).

Data collected from individuals submitting 6 811 MDMA samples to drug-checking services between 2019 and 2022 appear to support these findings from the EWSD. Based on reporting from drug-checking clients, the majority of samples were reported as being obtained from a supplier (either a trusted supplier or a random street supplier) and a smaller proportion (close to 5 %) as bought on the internet (surface web or darknet).

A smaller share of retail consumers buys MDMA online

MDMA is one of the most frequently traded drugs online across a range of platforms, including darknet markets (see Section Trafficking and distribution — online trade and distribution on darknet markets) as well as surface web and social media platforms. Despite this, on average, only a minority of EWSD respondents reported obtaining the drug online, although this varied widely across countries. This appears to be supported by existing studies that indicate that MDMA is bought online mostly by retail distributors for the purpose of re-sale rather than purchased directly by retail clients (Aldridge and Décary-Hétu, 2016; Gremeaux, 2022).

Recently, however, social media platforms and instant messaging applications have become particularly dynamic online channels through which MDMA is sold to consumers. The growing exploitation of these platforms is likely tied to the objective of reaching a wider audience. This is a development that requires closer monitoring.

Retail quantities sold online are often dispatched in post and parcels from EU Member States to consumer markets in Europe and globally, and cryptocurrencies are often used to settle these online transactions. Additionally, particularly with instant messaging applications, transactions may be organised online, but completed using in-person pick-up or ‘dead-drop’ delivery.

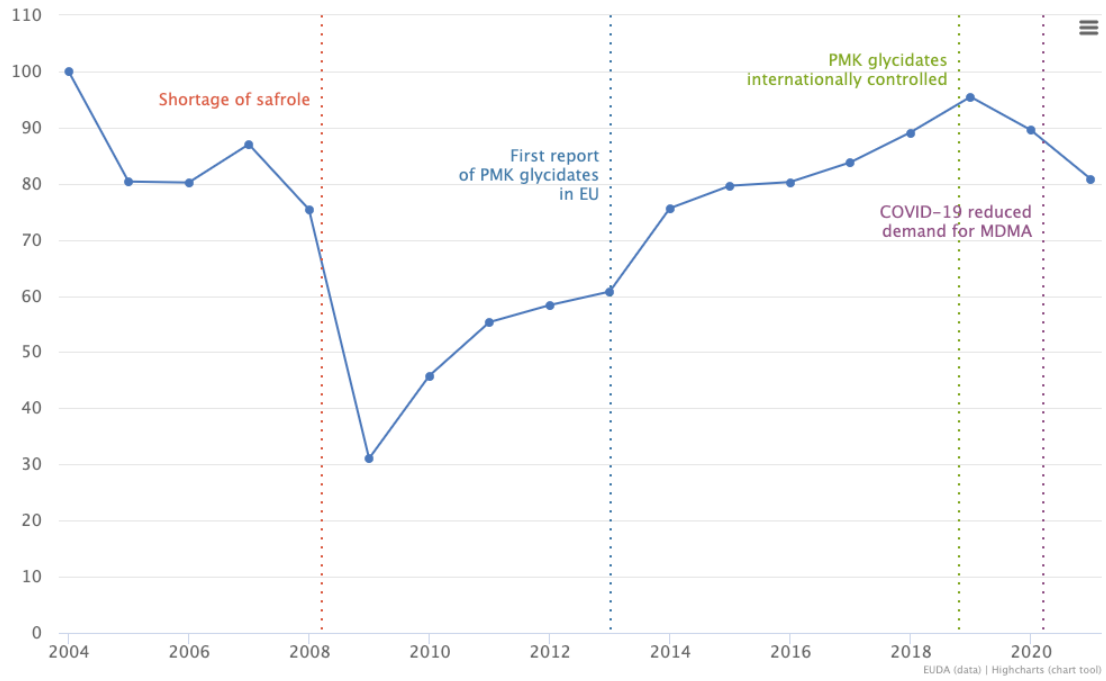
Price and purity

Although often used interchangeably, ecstasy and MDMA are not necessarily synonyms. Consumers buying ecstasy expect the tablets to contain MDMA. However, adulteration is commonplace, and therefore these tablets may contain a variety of substances in addition to, or instead of, MDMA. Rates of adulteration of ecstasy tablets, their MDMA content and their price tend to reflect broader changes in the factors that affect the MDMA market. This includes law enforcement pressure, a variety of factors affecting MDMA production, such as the availability of MDMA precursors, and, more generally, globalisation of the illicit drug supply chains.

Ecstasy adulteration is responsive to market pressures

When availability of MDMA is high, ecstasy tablets tend to contain MDMA as the main or only psychoactive ingredient, with the opposite occurring when there are shortages. These shortages tend to be transitory, which means that essentially there are cycles of adulteration. One way to observe these cycles is to monitor rates of adulteration, as expressed by the percentage of tested samples of seized ecstasy tablets that contain MDMA and no other scheduled substances. Although these data may not be representative of the market as a whole, they can provide an approximate historical overview of the changes in adulteration of ecstasy tablets in Europe (see Figure 6.3. Indexed trend of the average percentage of ecstasy tablets containing MDMA as the only scheduled substance).

Figure 6.3. Indexed trend of the average percentage of ecstasy tablets containing MDMA as the only scheduled substance



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From 2004 to 2009, the proportion of seized European ecstasy tablets that contained MDMA as the only scheduled substance dropped substantially. In 2009, on average, only 31 % of the tablets analysed contained MDMA alone, compared with almost 100 % in 2004. This drop coincided with a worldwide shortage of safrole, an essential precursor for MDMA which had been under international control since 1992 but was the target of a major law enforcement clampdown around 2008. In 2009 and the following years, it was therefore unlikely that consumers who purchased ecstasy in Europe would obtain unadulterated MDMA. Crystal MDMA appeared on the European market at that time, as a response to a fall in consumer confidence due to concerns about the low quality of ecstasy. Crystal MDMA was marketed as a purer product compared to ecstasy tablets, an assertion that was and remains largely true (see Section The trend of large tablets containing more MDMA may be reversing).

As producers found designer precursor alternatives to PMK, the availability of MDMA increased. PMK glycidate, first reported in Europe in 2013, had a particular role in this resurgence (see Section Production - designer precursors substitute scheduled MDMA starting materials). The increase in ecstasy tablets containing only MDMA from 2013 until 2019 is likely to be a reflection of this, at least in part.

From 2019 onwards a new cycle appears to have begun, whereby the number of ecstasy tablets containing other substances alongside, or instead of, MDMA has increased (as expressed by a drop in percentage in the indexed trends shown above from 96 % in 2019 to

73 % in 2022). Again, these data should be interpreted with caution and not necessarily be seen as statistically representative of the market as a whole. Nevertheless, it may be an indicator of MDMA market trends. This finding is also consistent with pressure on the MDMA market coming from reduced access to PMK glycidate (controlled internationally in 2019) and the closure of recreational settings associated with MDMA use during the COVID-19 pandemic.

Data from 10 drug-checking organisations belonging to the Trans European Drug Information (TEDI) network also support these findings: in 2019, 93 % of the 1 165 samples submitted as ecstasy contained MDMA alone, while in 2022 that percentage had dropped to 84 % (of 1 525 samples).

MDMA adulterants

Adulteration of MDMA occurs by adding other psychoactive substances, typically stimulants, to MDMA in tablet, powder or crystal form. A number of substances can also be sold as MDMA, in what is sometimes called mis-selling or adulteration by substitution – whereby another substance is passed off as MDMA to the consumer. Based on samples submitted to drug checking, one study in Spain found that mis-selling of MDMA is more frequent than adulteration: it is more common to find other substances sold as MDMA than to find other psychoactive substances added to MDMA (Vidal Giné et al., 2022). Adulteration appears to be more frequent in ecstasy tablets than in MDMA crystals.

Caffeine is the adulterant most commonly found in ecstasy tablets as well as in MDMA powders and crystals. In powders and crystals, common adulterants also include phenacetin, paracetamol or dextromethorphan (Vidal Giné et al., 2022). In tablets, adulterants typically include stimulants and MDMA-type substances – other phenethylamines with comparable subjective effects, such as MDA ([3]). In the period from 2019 to 2023, caffeine, 4-CMC ([4]), amphetamine, cocaine and MDA were the adulterants most commonly found in MDMA samples (tablets and powders/crystals) submitted to drug-checking organisations belonging to the TEDI network. Interestingly, synthesis by-products were also commonly reported, about which little is known and which may pose additional risks to consumers.

On occasion, neurotoxic compounds such as PMMA ([5]) are detected mixed with, or as a replacement for, MDMA in ecstasy tablets. Although rare, this seems to be more common in periods of low availability of MDMA and has been associated with fatal intoxications. Although MDMA alone is associated with a relatively small number of serious adverse events compared to other drugs, its health risks can drastically increase when taken in large quantities (see Box 6.3. High-strength MDMA tablets: understanding the risks) or mixed with other substances – particularly those which can synergistically increase the effects of MDMA.

One relatively recent adulteration pattern is the increase of synthetic cathinones mis-sold as MDMA or used to adulterate MDMA. These signals were reported to the EU Early Warning System from 2022 onwards, based on identifications occurring in Spain, the Netherlands and Austria, and there are similar indications for the United Kingdom (Pascoe et al., 2022). These

signals have occurred when the availability of cathinones seems to be at a historical high in the European Union (see EU Drug Market: New psychoactive substances – In-depth analysis). The detection of mixtures of MDMA and ketamine combined with other substances including cocaine have also increased in some regions of Europe, and are sold as 'pink cocaine', 'tuci' or 'tucibi' (see Box 6.3. What is tucibi?).

Box 6.2. What is tucibi?

Tuci or tucibi (also spelled tusi and tusibi) are phonetic transliterations of '2C' (a series of psychoactive phenethylamines) or '2C-B' (one of the most well-known derivatives of that series of substances). Tuci or tucibi products can also be sold under the name 'pink cocaine' despite rarely containing 2C-type phenethylamines or cocaine. Rather, tuci and tucibi are typically pink powders, often with a sweet smell derived from food colouring (Palamar, 2023). These mixtures were first reported around 2021 in Latin America (namely Colombia) and were found to contain a variety of substances: mostly MDMA and ketamine and sometimes also cocaine, methamphetamine, opioids or new psychoactive substances. It was hypothesised at the time that drug traffickers were trying to recreate some of the properties of 2C-B by mixing substances with stimulant and hallucinogenic properties (UNODC, 2022), or to counteract some of 2C-B's less appealing features for consumers (namely it is painful to snort and damaging to the sinuses and may result in gastrointestinal distress) (United States Department of Justice, 2001).

Throughout 2021, and continuing into 2022 and 2023, a number of detections of pink powders consistent with tucibi were reported to the EU Early Warning System. The majority of these identifications were reported by Spain, although pink powders have also been reported in Czechia, Germany, Estonia, Hungary, the Netherlands, Austria, Poland, Romania, Sweden and Norway. These detections have generally been small in quantity with the powders containing a range of different substances – always ketamine and MDMA, and typically additional substances including cocaine, caffeine or cathinones. However, larger seizures of these mixtures have also been reported in the European Union. For example, in August 2022 an organised crime group was dismantled in Spain; it was involved in the trafficking of tucibi and had connections to Colombia. More than 13 kilograms of a mixture described as pink cocaine was seized, alongside 6 kilograms of cocaine, 6 kilograms of ketamine, firearms and large sums of cash and luxury items (Guardia Civil, 2022). In May 2023, a criminal network smuggling tucibi inside 3D-printed double-bottomed packages to Colombia and Australia was dismantled in Seville, resulting in nine arrests. A somewhat similar scheme was uncovered several months later, in November 2023, where 3D-printed figurines used to conceal tucibi were intercepted before being shipped to the United States (Guardia Civil, 2022).

3D manufactured figurines containing shipments of tucibi, shipped from Spain to the United States. Source: Spanish Guardia Civil.

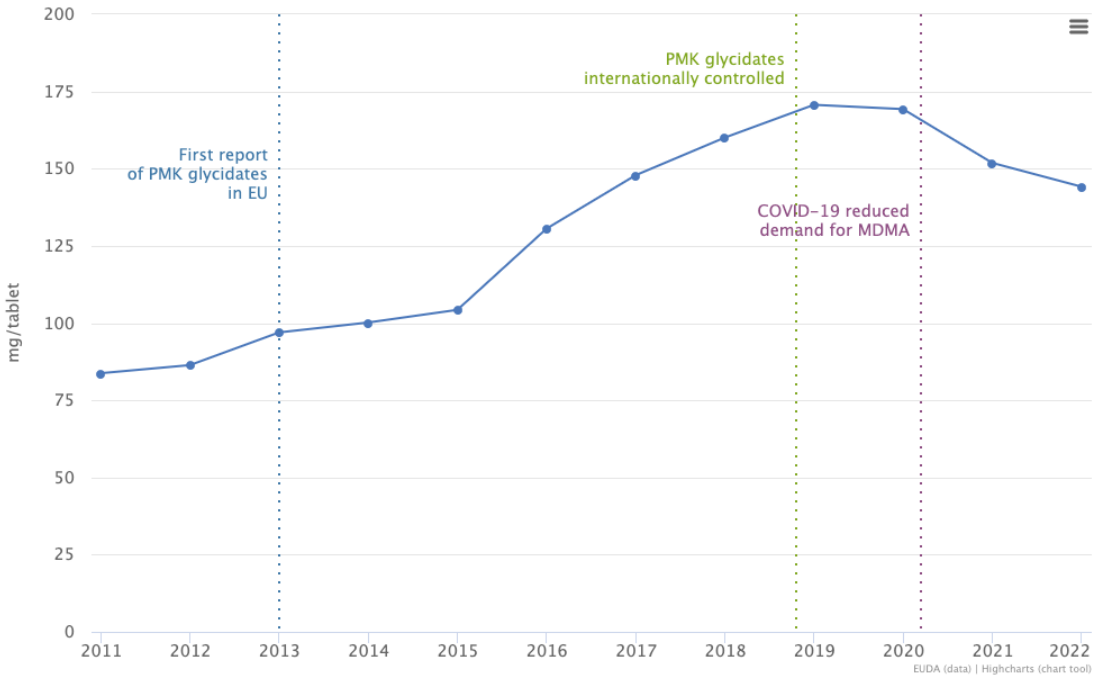
Although very rarely reported, opioids may also be found in tablets sold as MDMA. In Australia, in January 2024, potent opioids of the nitazene family were found in brightly coloured tablets with logos reminiscent of ecstasy tablets. At least three people were hospitalised after consuming these tablets.

The trend of large tablets containing more MDMA may be reversing

The average content of MDMA in ecstasy tablets appears to be on a slight downward trend from 2019, after close to a decade of increasingly stronger (and larger) tablets becoming available on the market. In 2011, ecstasy tablets contained on average between 35 milligrams and 119 milligrams of MDMA (mean: 84 milligrams). However, by 2019, those values varied between 118 milligrams and 202 milligrams (mean: 170 milligrams). This means that consumers buying ecstasy tablets in Europe in 2019 would obtain a product containing up to almost double the highest amount of MDMA recorded in ecstasy tablets in 2011.

However, from 2019 onwards, the quantity of MDMA found in tablets appears to have slightly decreased. In 2022, the values ranged between 104 milligrams and 168 milligrams (mean: 144 milligrams) – roughly comparable to values reported in 2017 (see Figure 6.4. Quantity of MDMA, in milligrams, per ecstasy tablet (mean)).

Figure 6.4. Quantity of MDMA, in milligrams, per ecstasy tablet (mean)



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Note: Includes base and salt forms.

In the first period, between 2011 and 2019, the increase in MDMA content is largely attributed to the sale of larger (heavier) ecstasy tablets. A study conducted by 10 drug-checking organisations from the TEDI network found that the increase in MDMA content in tablets in this time period was directly related to an increase in the average weight of ecstasy tablets (Vrolijk et al., 2022). This means that the ratio of MDMA to fillers (excipients) in the mixtures used to make ecstasy tablets did not increase over this time period.

While individual tablet weight cannot be a direct predictor of how much MDMA is present in each tablet, at population level this trend is consistent when comparing larger ecstasy tablets (almost always containing more MDMA) with smaller tablets (almost always containing less MDMA). It should be noted that this trend was observed across several countries in Europe. This is consistent with law enforcement information that suggests the MDMA market in Europe is supplied by the same pool of producers, mostly based in the Netherlands and Belgium.

However, this trend appears to be changing, as ecstasy tablets have tended to contain less MDMA since 2019. This trend may be a combination of the scheduling of PMK glycidate, and a reduction in demand for MDMA during the COVID-19 pandemic, and is in line with the changes observed in the adulteration of ecstasy tablets (see Section Ecstasy adulteration is responsive to market pressures).

Data reported to drug-checking services are generally in agreement with these trends. In 2023, 39 % of the MDMA tablets tested by drug checking organisations submitting data to the TEDI network contained between 100 and 149.0 milligrams of MDMA (35 % in the same period in 2022), and 26 % contained between 150 and 199.9 milligrams (29 % in 2022). On occasion, exceptionally high-strength ecstasy tablets were reported, reaching upwards of 250 milligrams of MDMA per tablet, which made up 1 % of all tablets tested in 2023 (3 % in the same period in 2022). High-strength MDMA tablets can have serious health consequences (see Box 6.3. High-strength MDMA tablets: understanding the risks).

Data reported to the EUDA over the last decade (2011-2021) show that while the proportion of MDMA in tablets has varied between 40 and 50 %, the purity of MDMA powder and crystals has typically varied between 70 and 80 %. Meanwhile, data from drug-checking services suggest that approximately 85 % of the powders tested in 2023 contained between 80 and 100 % MDMA (81 % in 2022).

Box 6.3.High-strength MDMA tablets: understanding the risks

Tablets containing more than 150 milligrams of MDMA are considered high-strength ecstasy tablets, given the dose of MDMA required to elicit subjective effects in adults ([a]). Occasionally, tablets containing 250 milligrams or more of MDMA are encountered on EU drug markets. For example, in August 2023, tablets containing 350 milligrams of MDMA were seized in Spain. In November 2023, two tablets collected by Energy Control's drug-checking services in Spain were also of very high-strength: one contained 371 milligrams of MDMA, and the other contained 300 milligrams. In December 2023, beige-golden ecstasy pills with an Audi-logo containing over 300 milligrams of MDMA (between 316 and 324 milligrams) were submitted to drug testing in the Netherlands (DIMS, 2023). These identifications of high-strength ecstasy tablets prompted harm reduction organisations to issue alerts.

Some of the high-strength ecstasy tablets are scored to allow consumers to divide them into smaller portions. Some tablets even contain stamping that indicate the quantity of MDMA present, although this is not always accurate and may also constitute a health risk. Nonetheless, even when dividing a high-strength tablet into smaller pieces, doses may still be too high and increase the risks of acute physical and psychological discomfort (e.g. anxiety), hyperthermia and even potentially fatal reactions such as cardiac events, and serotonin syndrome (see Section Harms and risks). Harm reduction responses, including the provision of drug-checking services and appropriate risk-communication strategies, are crucial to minimise these risks.

Tablets seized in Spain containing 350 milligrams of MDMA. Source: Spanish Police.

([a]) In clinical trials, doses of MDMA capable of producing subjective effects vary from 1.5 to 1.7 mg/kg of body weight, or approximately 105 to 119 milligrams for a 70-kilogram individual. Individual factors and sex affect this dose, with women considered to be more susceptible to the 5-HT-releasing effects of MDMA (Liechti et al., 2001).

Price

Data on the retail price of MDMA in the European Union are limited, but the available indicators suggest that prices have not changed significantly over the past decade (2012-2021). For countries reporting data in 2022, a considerable retail price range was observed, with prices per ecstasy tablet ranging from EUR 4 to EUR 19 (mean) and prices of MDMA powder from EUR 6 to EUR 50 per gram. Some of the price disparity may be attributed to local factors, including distance to the producing centres (Netherlands and Belgium), but statistical artefacts (e.g. small sample sizes) may also be a factor.

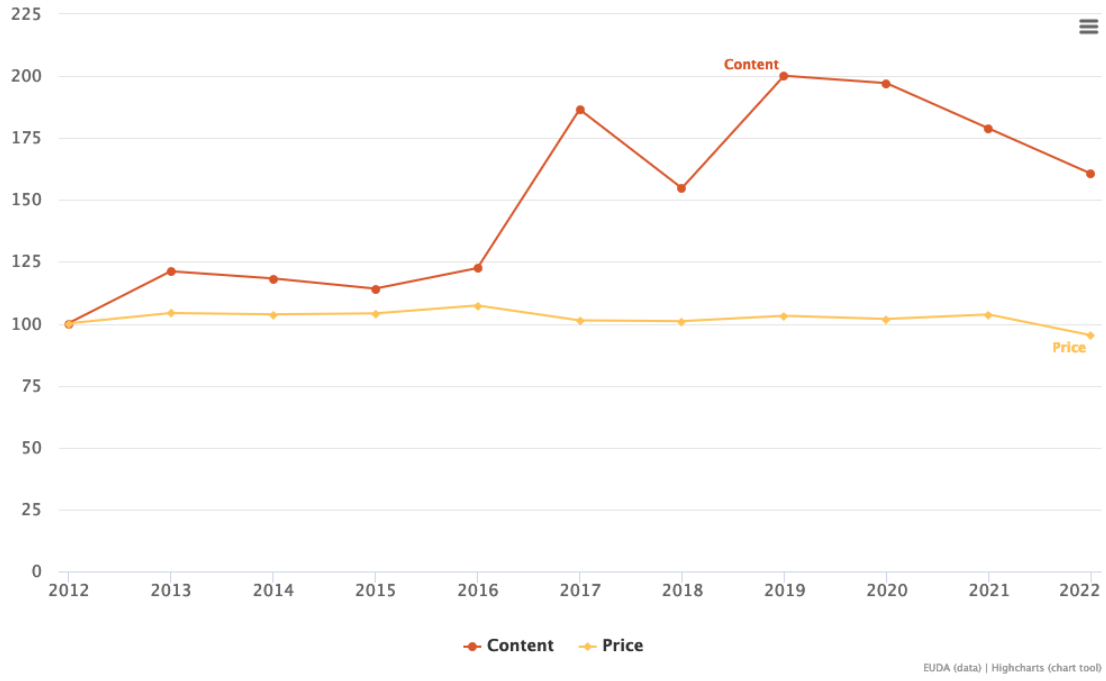
In 2021, adult respondents to the EWSD reported paying a median of EUR 7.20 per ecstasy tablet and a median of EUR 37.40 per gram for MDMA powder.

Analysis of darknet data reveals that the typical price paid is EUR 10 per gram of MDMA in tablets (a tablet containing 144 milligrams of MDMA costs on average EUR 1.44) when purchasing less than 50 tablets and EUR 10 per gram of crystals when purchasing less than 50 grams (see Section Trafficking and distribution — online trade and distribution on darknet markets).

The increase of the quantity of MDMA present in ecstasy tablets noted in the 2012-2019 period was not reflected in an increase in price per tablet (see Figure 6.5. Indexed trends in MDMA content and price of ecstasy tablets, 2012-2022). In fact, it could be argued that MDMA

in the form of ecstasy tablets became cheaper between 2012 and 2019 as tablets containing larger quantities of MDMA became increasingly available on the market (see Section The trend of large tablets containing more MDMA may be reversing). In part, this may have occurred because of lower production costs associated with the increasing availability of cheap designer precursor alternatives from China around this time. The subsequent drop in MDMA content in tablets since 2019 does not appear to have been accompanied by a significant drop in price. While a slight decrease in price was observed in 2022 for ecstasy tablets, this may not be statistically significant or sustained in the coming years.

Figure 6.5. Indexed trends in MDMA content and price of ecstasy tablets, 2012-2022



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Wholesale price data on MDMA is limited. For the six countries that reported data for 2022, prices for 1 000 tablets varied from EUR 733 to EUR 7 228. In the Netherlands, in 2022, the price of 1 kilogram of (locally produced) MDMA crystals was reported at EUR 2 300, whereas 1 litre of MDMA oil (which can be converted into crystals or powder, and subsequently ecstasy tablets) was reported at EUR 1 550 per litre. Dutch law enforcement reports that during 2020, particularly during lockdown periods associated with the COVID-19 pandemic, prices of MDMA oil dropped drastically due to reduced demand. The effect appeared to have been short-lived, and by the end of 2020 the price returned to pre-pandemic values (NPNL, 2022).

Profits generated by the sale of MDMA tablets are expected to be significant given the volume of the trade. The limited literature on the subject suggests that, in 2019, the

production cost of a single tablet of MDMA in the Netherlands varied between EUR 0.25 and EUR 0.40. According to Dutch Police, these tablets are sold to distributors at EUR 0.59 per unit (2022 values), who in turn re-sell them at EUR 1.78 each (for quantities above 99 tablets). Consumers in the Netherlands will typically pay EUR 4.50 per tablet but, as stated above, prices may reach as high as EUR 19 per tablet in some European countries, and more in other regions of the world.

Prevalence and patterns of use

Historically, MDMA has been one of the most widely used illicit stimulant drugs in the European Union, associated with patterns of consumption in the context of nightlife and other recreational settings. The latest available data suggest an overall relatively stable level of consumption of MDMA in the European Union, although there are variations at national level. An estimated 12.3 million adults in the European Union (aged 15-64), or 4.3 % of this age group, have used MDMA at least once in their lifetime (EMCDDA, 2024).

Data on prevalence of use provide an indication of the structure, location and approximate size of retail MDMA markets in the European Union.

Males make up the majority of MDMA consumers in the European Union, and are three times as likely as females to report using MDMA. Males also make up the majority (68 %) of the relatively few new entrants into drug treatment in 2021 for MDMA-related problems, and the majority of patients (69 %) that experienced a hospital emergency associated with MDMA exposure in 2022 (see Section Harms and risks). This gender distribution is a commonly found pattern across other substances.

MDMA use is more likely to be reported by young adults. Surveys conducted by 26 EU countries between 2015 and 2023 suggest that 2.2 million young adults (aged 15 to 34) used MDMA in the last year (2.2 % of this age group), and 1.1 million young adults aged 15 to 24 years are estimated to have used MDMA in the last year (2.3 % of this age group) (see Figure 6.6. Key prevalence data for MDMA/ecstasy use in Europe). The age distribution of those seeking help for MDMA-related harms also reflects the higher prevalence of use among young adults: the majority of new treatment entrants for MDMA-related problems are between 15 and 24 years old and the majority of individuals presenting to hospital following an MDMA-related emergency are under 25.

According to survey data, the two largest MDMA consumer markets per capita in the European Union are the Netherlands and Ireland, with 6 % or more people aged 15 to 34 reporting to have consumed MDMA in the last year. General population surveys in many countries showed that MDMA prevalence was declining from peak levels attained in the early to mid-2000s. Of the 13 EU countries that undertook surveys since 2021 and provided confidence intervals, four reported higher estimates than their previous comparable survey, nine reported stable estimates and one reported a decrease. Where prevalence is higher, it

may suggest that MDMA is no longer a niche or subcultural drug limited to dance clubs and parties in those markets. Importantly, reported use of the drug declined temporarily during periods of social distancing during the early phases of the COVID-19 pandemic, coinciding with the closure of nightlife and the cancellation of events where MDMA is typically consumed.

Wastewater data from 2023 complement the available data from general population surveys, drug treatment and hospital emergency admissions; however, wastewater is not uniformly analysed across the European Union. The data show that large quantities of MDMA are used in cities in Belgium, Czechia, the Netherlands, Spain and Portugal. However, use varies considerably across the study locations, typically being higher in larger cities compared to smaller ones. Looking at longer-term trends in wastewater analysis, in most cases the levels increased between 2011 and 2016, and have since fluctuated. In 2020, during the COVID-19 pandemic, almost half of the cities (24 of 49) reported a decrease in MDMA levels, with 18 reporting an increase. In 2021, 38 out of 58 cities reported a decrease. Of the 69 cities that have data for 2022 and 2023, 42 reported an increase, 11 reported a stable situation and 16 a decrease. All of the 10 cities with data for both 2011 and 2023 had higher MDMA levels in 2023 than in 2011 (see Figure 6.6. Key prevalence data for MDMA/ecstasy use in Europe).

Figure 6.6. Key prevalence data for MDMA/ecstasy use in Europe

This data explorer enables you to view our data on the prevalence of MDMA use by recall period and age range. You can access data by country by clicking on the map or selecting a country from the dropdown menu.

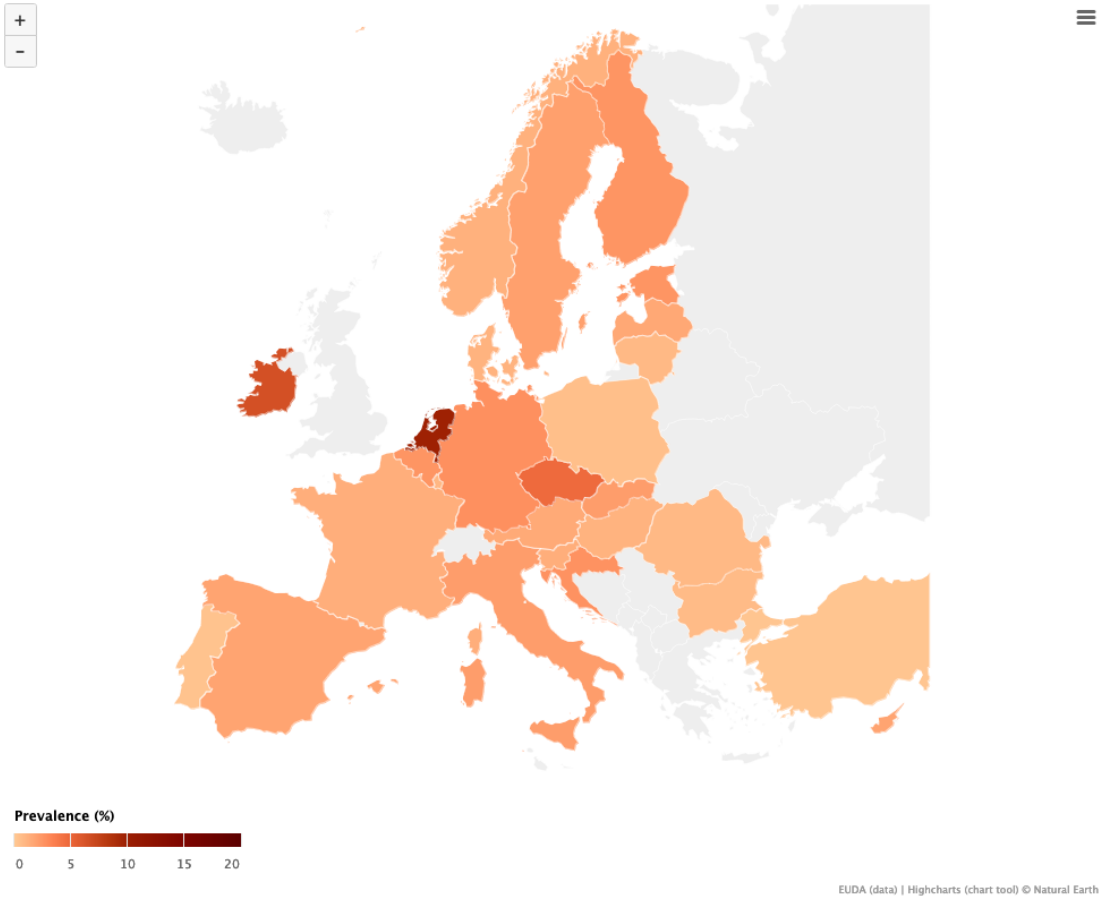
Recall period

Last month | Last year | Lifetime

Age

Young adults (15-34) | All adults (15-64)

Country



Notes

Prevalence data presented here are based on general population surveys submitted to the EMCDDA by national focal points. For the latest data and detailed methodological information please see the Statistical Bulletin 2024: Prevalence of drug use.

Graphics showing the most recent data for a country are based on studies carried out between 2013 and 2023.

Prevalence estimates for the general population: age ranges are 18-64 and 18-34 for Germany, Greece, France, Italy and Hungary; 16-64 and 16-34 for Denmark, Estonia and Norway; 18-65 for Malta; 17-34 for Sweden.

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Patterns of use

Polydrug use is common among MDMA users. Cannabis, alcohol and to a lesser extent cocaine, amphetamine, methamphetamine, ketamine and GHB are consumed in combination with MDMA. Cannabis is the most frequently used substance alongside MDMA, as reported by EWSD respondents in 2018 (Gremeaux, 2022) while alcohol is present in the majority of hospital emergencies associated with MDMA exposures (see Section Harms and risks).

Information gathered in the 2021 EWSD suggests that, on average, those who reported having used MDMA in the last 12 months, consumed one ecstasy tablet or 0.4 grams of MDMA in crystal or powders form each time they used the drug. While the number of tablets used per session has not changed substantially from literature findings dating from several decades ago, today's MDMA users generally ingest higher quantities of the psychoactive substance than before (Gremeaux, 2022). This is because ecstasy tablets now contain more MDMA, on average, than they did in the past (see Section Price and purity).

According to EWSD respondents, the main motivations for MDMA use are 'to get high/for fun' and 'to socialise'. Wastewater data also reflect the predominant use of ecstasy in recreational settings, with more than three quarters of cities reporting that higher loads of MDMA were present in wastewater during the weekend than during weekdays in 2022. This is in accordance with literature findings, which further suggest that the substance is typically consumed in discrete episodes: over a 24-hour period (usually Friday or Saturday night) or over a whole weekend or duration of a music festival (Cole, 2014). There are rare reports of extended use of ecstasy over longer periods of time.

Market size estimate

Demand-based estimate

The basic approach used to estimate the value of the European MDMA market is to gauge the quantity of MDMA consumed in Europe and multiply it by its price (EMCDDA, 2019a). The total quantity of MDMA consumed in Europe is reached by multiplying the number of users by the amount used, combining prevalence data from general population surveys and the amount used from the EWSD.

Prevalence rates of the number of MDMA users, obtained from general population surveys, are multiplied by 2021 Eurostat population data of the 15-64 age group. Similar to the MDMA market size estimate published in 2019, it was only possible to distinguish two broad groups of MDMA users from the general population surveys, based on frequency of use, which were mapped onto the data available from the EWSD as follows:

- **infrequent users** who used MDMA less than 11 times per year, approximated in the general population surveys by those using in the last year but not in the last month

(subtracting last month prevalence from last year prevalence); and

- **frequent users** who used MDMA on 11 or more days per year, approximated in the general population surveys by those using in the last month.

As such, only last year prevalence and last month prevalence data are required to distinguish these two groups. In the case of Belgium, Czechia, France, Luxembourg, Malta, Norway and Portugal, no recent data for last month prevalence of MDMA were reported, so data were imputed.

The amount of MDMA used annually by these two different user groups was estimated using data from the EWSD. The annual amounts used, in tablets, could be estimated for each survey participant based on their responses to questions on the number of tablets used on a typical day, multiplied by the number of days they said they used the drug in a year. In calculating the amounts used, it was assumed that the maximum realistic amount to use in a day was five tablets; those reporting higher values were excluded. Sharing tablets was not accounted for, which could support higher values. For some countries (Belgium, Croatia, Denmark, France, Malta, Netherlands, Norway and Türkiye) no data were available from the EWSD. In these cases, the missing information was replaced with the mean, computed on the remaining countries.

The price data used was the average retail price for MDMA in the country concerned, drawn from the EUDA's annual data collection (see Section Price and purity). When more than one price point was provided, the rule was to use the following: mode, median, mean, average of minimum and maximum (min-max average), in order of availability.

By combining these data, the estimated annual value of the retail market for MDMA in Europe is at least EUR 594 million, around 90 % of which can be attributed to frequent users. Estimates of amounts used suggest that about 72.4 million ecstasy tablets were consumed in the European Union in 2021.

Wastewater-based methods

Demand-based estimates may underestimate the size of drug markets for a number of reasons, including difficulty reaching some groups of users, and underreporting of prevalence and quantities used by respondents. Drug residue measurements in wastewater show promise as an alternative method to estimate city-level drug consumption (van Nuijs et al., 2011), since the amount found in waste is directly related to the quantity of drugs consumed by the population served by the wastewater treatment plant. In a study commissioned for this analysis, wastewater estimates were found to give different results, either higher or lower, than demand-based estimates, depending on the drug concerned. Estimates based on wastewater data for MDMA were noted to be more than double the amount estimated by the demand-based estimate.

When using wastewater data to estimate MDMA markets, the use of MDMA is based on the excreted parent drug, rather than on an excreted metabolite (which is the case for some other drugs, such as cocaine and heroin). This raises the possibility that this method may overestimate use if large quantities of unused MDMA are discharged directly into the sewerage system (Bettington et al., 2018; Guirguis, 2010).

It was possible to construct estimates of city-level MDMA market sizes by combining wastewater data with country-level data for average retail purity and price. City-level market size estimates were developed for Brussels, in Belgium, and five cities in Sweden (see Table 6.1. Estimated value of MDMA consumed in selected European cities, 2020). While the population of Brussels is larger than that of Stockholm, the amount of MDMA consumed is almost 30 % higher in Stockholm. Furthermore, when factoring in the higher price of MDMA in Sweden, the market value in Stockholm is about 3.5 times that of Brussels. While affected by limitations and uncertainties, this type of data analysis shows great promise as a complementary information source to monitor the size and changes in drug markets (Quireyns et al., 2023).

Table 6.1. Estimated value of MDMA consumed in selected European cities, 2020

Country	City	Population	Amount of pure drug consumed (grams/year)	Amount of retail-level drug consumed (grams/year)	Value (EUR/year)
Belgium	Brussels	953 987	34 137	262 596	1 376 002
Sweden	Gävle	85 000	4 377	26 856	375 980
Sweden	Sandviken	28 000	826	5 069	70 967
Sweden	Söderhamn	14 500	343	2 105	29 470
Sweden	Stockholm	860 800	55 223	338 790	4 743 058
Sweden	Uppsala	200 000	6 541	40 126	561 765

Harms and risks

MDMA consumption is associated with an increase in the activity of serotonin and dopamine in the brain, which may elicit feelings of euphoria, empathy and stimulation. Harms associated with MDMA are typically modest and transient in their impact, but serious adverse events, including those with fatal outcomes, may occur – especially when large quantities of MDMA are consumed.

MDMA use can lead to dangerous levels of hyperthermia and dehydration – often exacerbated by the environments in which it is commonly consumed, such as crowded nightclubs or music festivals. In addition, in those conditions, some people may drink too

much water leading to hyponatremia or water intoxication, which can be fatal (Parrott, 2013). MDMA use may be particularly risky for individuals with pre-existing cardiac issues (Liechti, 2003). Long-term and excessive use of the substance, however rare (see Section Patterns of use), has been associated with neurotoxic effects and can result in impairments in cognitive function, depression, and anxiety (Buchert et al., 2003; Parrott, 2013).

Acute MDMA toxicity is associated with serotonin syndrome (serotonin toxicity), whereby too much serotonin is present in synapses in the brain, resulting in a combination of neuromuscular, autonomic and psychologic symptoms (Foong et al., 2018), manifested in a range of mild to severe symptoms. Mild symptoms can include restlessness and tremors, whereas more serious symptoms may include severe hyperthermia and muscle stiffness, which have the potential to be life-threatening (Makunts et al., 2022). The use of MDMA in high doses (for example in ecstasy tablets with high MDMA content) and the use of MDMA alongside substances with serotonergic effects such as selective serotonin reuptake inhibitors (commonly prescribed as antidepressants), other stimulants and opioids substantially increases the risk of serotonin syndrome. Nonetheless, generally speaking, the number of drug-related deaths associated with exposure to MDMA is low compared to other illicit substances, considering the number of people that consume the drug.

MDMA use continues to represent an important issue for prevention and harm reduction messaging and interventions, not only because its toxicity can be fatal, but also because the availability of high-strength and adulterated products increases the risk of adverse health outcomes associated with its consumption (Roxburgh et al., 2021).

MDMA toxicity can result in hospital emergencies and fatalities, but incidence is low

MDMA-related deaths are relatively infrequent. However, studies have suggested that an increase has been observed in some countries. A review of MDMA-related mortality in Australia and three European countries (Portugal, Finland and Türkiye) showed an increase in the number of fatalities between 2011 and 2017 (Roxburgh et al., 2021). This increase coincided with a period of increased purity and availability of MDMA in these markets, suggesting that changes in MDMA supply may result in serious public health risks. A minority of these fatalities (13-25 %) were due to MDMA toxicity alone, with multiple drug toxicity being more prevalent.

MDMA is reported in small numbers of drug-induced deaths, and in most countries less than 1 in 20 cases involve the drug. For example, in Germany, MDMA was mentioned in 1 in 25 fatal overdoses in 2022, with most of the cases involving multiple drugs. Türkiye is an outlier, with MDMA identified in almost 1 in 5 drug-induced deaths (46 out of 246 in 2022). The majority of drug-induced deaths in Türkiye are among younger people, predominantly males, and are more likely to involve stimulant drugs rather than opioids, compared with the European Union and Norway.

In 2022, hospital emergencies associated with MDMA were registered in 19 of the 23 sentinel centres that reported data to the EUDA through the Euro-DEN Plus project. The share of acute drug-toxicity presentations involving MDMA increased as compared to other substances and the previous year (or MDMA was reported for the first time) in 10 of the Euro-DEN hospitals. In 5 hospitals, this share decreased and in 4 it remained stable. Only in the sentinel hospitals in Belgium, France and the Netherlands, was MDMA involved in more than 1 in 10 presentations.

A minority of hospitalisation cases were severe, and admission to the intensive care unit was needed in 5 % of these presentations. Half of the centres reported no MDMA-related admissions to the intensive care unit.

The median percentage of drug-related presentations involving MDMA was 4.7 % across the reporting hospitals in 2022, and 2.8 % for presentations involving MDMA as the sole drug reported. Alcohol was co-consumed across 67 % of all MDMA-related hospital emergencies, and the other drugs commonly consumed alongside MDMA included cocaine, amphetamine, methamphetamine, ketamine, heroin, GHB and cannabis.

Demographic insights obtained from drug-related emergencies are in general agreement with other data sources (see Section Prevalence and patterns of use). Emergencies mostly occurred among young adults aged below 25 years, which is the group most likely to consume MDMA. Across the 24 hospitals reporting presentations with MDMA in 2022, the median proportion of presentations aged below 25 years was 45 %. In contrast, the median proportion of presentations aged over 45 years was 4 % across the 24 hospitals. Most MDMA-related hospital emergency cases involved males, confirming trends in prevalence and patterns of use.

MDMA rarely cited as a reason for entering drug treatment in Europe

At EU and country level, people seeking drug treatment for MDMA-related problems represent a very small proportion of all clients entering drug treatment – typically less than 0.5 % of all new entrants into drug treatment in any given year. In 2022, a total of 853 clients entered drug treatment for the first time due to MDMA-related problems in 2022. Almost two thirds (503) of all new treatment entrants were reported from three countries, Germany (213); France (169) and Hungary (121). This may not reflect use patterns, but rather differences in the offer, legal requirement and access to drug treatment between countries.

The total number of clients who entered treatment for the first time due to MDMA-related problems has remained relatively stable in Europe over the years, with a slight decrease in 2020 and 2021, likely due to the disruptions to nightlife and treatment or monitoring activities at treatment centres during the COVID-19 pandemic.

(1) The European Web Survey on Drugs (EWSD) is a voluntary, anonymous survey run by the EUDA and its partners targeting directly people who use drugs who are 18 years old or older, and are living in one of the participating countries.

(2) Data reported to the Trans-European Drug Information project (TEDI) by drug-checking services in Austria, Belgium, France, Italy, Luxembourg, Portugal, Slovenia and Spain.

(3) MDA is phenethylamine also known as 'sass' or 3,4-Methylenedioxyamphetamine. IUPAC name: 1-(2*H*-1,3-benzodioxol-5-yl)propan-2-amine.

(4) 4-CMC is a cathinone also known as 'clephedrone'. IUPAC name: 1-(4-chlorophenyl)-2-(methylamino)propan-1-one.

(5) PMMA is a structural analogue of PMA (para-methoxyamphetamine) and methamphetamine. IUPAC name: *N*-methyl-1-4-(methoxyphenyl)-2-aminopropane.

References

Consult the list of references used in this module.

The data used to generate the infographics and charts on this page may be found below (CSV format). Additional information, metadata and methodological notes may be found in the **EU Drug Market: MDMA source data entry in our data catalogue**.

Please note that prevalence and patterns of use as well as wastewater data can be found in European Drug Report 2024: Trends and Developments: source data.

MDMA markets data

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- Table EDMR2025-MDMA-15. Distribution of usual MDMA forms across countries
- Table EDMR2025-MDMA-16a. MDMA samples analysed by drug-checking services
- Table EDMR2025-MDMA-16b. MDMA samples analysed by drug-checking services by sample form, 2019-2022
- Table EDMR2025-MDMA-17. Indexed trend of the average percentage of ecstasy tablets containing MDMA as the only scheduled substance
- Table EDMR2025-MDMA-19. Indexed trends: price and MDMA content, retail (2011=100)
- Table EDMR2025-MDMA-20a. Prevalence of MDMA ('ecstasy') use in Europe
- Table EDMR2025-MDMA-20b.MDMA residues detected in wastewater in selected European cities: most recent data
- Table EDMR2025-MDMA-6.4 Quantity of MDMA, in milligrams, per ecstasy tablet (mean), 2004-2022

Prevalence of drug use data tables including general population surveys and wastewater analysis (all substances)

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- Table EDR24-GPS-1. Prevalence of drug use in Europe, based on most recent general population surveys (2022 or most recent year)
- Table EDR24-GPS-2. Prevalence of drug use in Europe, trends
- Table EDR24-WW-1 Mean weekly measurements by targeted substance from wastewater analysis in selected European cities in 2023, in

EU Drug Market: MDMA — Actions to address current threats and increase preparedness

The large-scale production of MDMA in the European Union poses a complex set of health and security problems. At the strategic level, two priority areas emerge.

- **Improving the intelligence picture on MDMA trafficking**, for both European and external markets, including the criminal networks involved. This will require enhanced monitoring, sharing and gathering of information in order to effectively address the associated health and social problems, including criminality.
- **The reduction of MDMA production and distribution in the European Union**, including by reducing the importation of designer precursors; disrupting precursor flows into the European Union and trafficking of the drug to consumer markets in Europe and beyond.

To respond to the current and future threats, the following actions are required.

This resource is part of EU Drug Market: MDMA — In-depth analysis by the EUDA and Europol.

Last update: *March 2025*

Improve the strategic and intelligence picture: monitoring and detection

- **Further enhance the exchange of operational and strategic information** in order to improve the intelligence picture on MDMA trafficking and allow for targeted actions:
  - Criminal networks, modi operandi, routes and enablers of MDMA trafficking in the European Union, innovation in the methods used to produce MDMA, expansion of production or processing to countries beyond the Netherlands and Belgium, the trafficking of MDMA oil within the European Union;
  - Special attention is needed to address the EU-based production and trafficking of MDMA to global markets
- **Enhance monitoring and control of precursors and essential chemicals** used in MDMA production. Understanding of these critical elements need to be improved, particularly concerning the role of source countries, the trafficking of chemicals between Member

States and how criminal networks adapt to legislation and control measures.

- **Monitor, enhance intelligence gathering and investigate** legal business structures established, acquired or infiltrated for illegal purposes, including the supply or procurement of precursors, essential chemicals and equipment for MDMA production.
- **Enhance information sharing and data collection on the money-laundering infrastructure** employed by EU-based MDMA traffickers, on which information is currently lacking. This includes enhanced monitoring of networks delivering financial services remotely through hubs outside the European Union.
- **Improve data collection on MDMA, including further enhancing reporting** and analysis of different consumer products available in Europe. While ecstasy tablets and MDMA powders/crystals are the main consumer products currently found on the market, there has been an emergence of other consumer products, such as sweets and edibles. Refining data collection methodologies to account for the different consumer products available in the European Union will enable a better understanding of market trends.
- **Strengthen monitoring of the composition of ecstasy tablets in the European Union**. Monitoring the composition of such tablets has been a useful indicator of broader market trends.
- **Improve monitoring and understanding of the use of social media platforms and instant messaging applications** used to distribute MDMA to consumers.
- **Enhance monitoring and information sharing related** to barter deals involving MDMA for cocaine and linkages between European and Latin American criminal networks in this area.

Strengthen responses to reduce supply and enhance security

- **Ensure that cross-border investigations tackle the entire production and supply chain.** In addition to EU producers of MDMA end products ready for distribution on user markets, identify and map the criminal networks involved in the production of precursors and MDMA oil in the European Union, as well as the criminal networks and brokers specialising in the supply of precursors, designer precursors, chemicals, reagents and equipment as a service to EU-based MDMA producers.
- **Enhance targeted action against the support infrastructure that underpins MDMA production and trafficking in Europe**, including legal business structures established, acquired or infiltrated for illegal purposes, document fraud and money laundering.

- **Initiate investigations into high-value targets involved in MDMA trafficking.** This has the potential to significantly disrupt serious and organised crime, as high-value targets operate at the upper echelons of criminal networks or may act as brokers, working with more than one criminal network involved in MDMA production, trafficking and distribution.
- **Enhance the use of innovative technological solutions for detecting MDMA production laboratories** and for tracing and intercepting online sales and shipments of both consumer products and precursors and essential chemicals.
- **Strengthen precursor control, including the control of essential chemicals and equipment** used in MDMA production. Further enhance the control and targeted actions against criminals sourcing chemicals and equipment from outside the European Union.
- **Fully engage the EU-level cooperation frameworks,** such as the European Multidisciplinary Platform Against Criminal Threats (EMPACT), operational task forces, joint investigation teams and other resources and capabilities of EU agencies with a relevant mandate in combating and preventing MDMA production and trafficking.

Strengthen international cooperation

- **Further enhance cooperation between the Member States, EU institutions and international stakeholders, including the private sector** working to reduce the supply of MDMA, precursors and other essential chemicals. This cooperation should be based on active engagement combined with an intensified exchange of operational and strategic information.
- **Initiate multilateral investigations into criminal networks trafficking precursors into the European Union**. Closer cooperation within the European Union is needed, but also externally with source countries for precursor chemicals, such as China. Intensify cooperation with countries linked to cocaine production and trafficking in order to counter barter deals of MDMA for cocaine between EU-based and Latin American criminal networks.

Investment in capacity-building

- **Increase awareness of the threats related to MDMA market**. Raise awareness and provide training for law enforcement on the criminal networks, routes, concealment methods and modi operandi used for trafficking MDMA, precursors and essential chemicals. In particular, the risk of smuggling MDMA base oil within the European Union and for export should be highlighted.

- **Support the forensic analysis and chemical profiling of MDMA seizures**. Greater efforts are needed to harmonise the routine forensic analysis of MDMA seizures in the European Union. The transfer of samples for chemical profiling should be facilitated by the Member States with a view to improving the intelligence picture and determining production methods.
- **Enhance innovation and investment into advanced analytical tools**, including artificial intelligence (AI), to process and analyse data from a variety of sources, facilitating the early detection of emerging trends and the identification of novel methods for producing and distributing MDMA.
- **Increase capacities to safely dismantle MDMA production sites**. Training and access to specialised equipment are required for law enforcement and other first responders in order to manage the safety risks at locations related to MDMA production, chemical storage and waste dumping.
- **Implement training programmes for law enforcement**, including police, customs, forensic officers and other relevant stakeholders on the latest trends and techniques in MDMA production and trafficking.

Strengthen policy, public health and safety responses

- **Further invest in development of prevention, harm reduction and treatment responses.** There is a need for greater public awareness of the presence of high-strength ecstasy tablets on MDMA retail markets. Further attention should also be given to improving the understanding of how patterns of use differ between countries, which could have implications for harms associated with MDMA use.
- **Enhance the understanding and awareness of the environmental impacts of MDMA production**. An EU-wide analysis of the environmental impact of synthetic drug production is needed. This will inform the development of strategies and actions to address the environmental impacts of MDMA production, such as pollution, hazards to health and the economic costs associated with cleaning contaminated sites and disposing of chemical waste.