Council of the
European Union

Brussels, 2 December 2015
(OR. en)

14785/15
ADD 2

CORDROGUE 95
SAN 415
ENFOPOL 385

NOTE

From:	EMCDDA
To:	Delegations
No. prev. doc.:	11558/15
Subject:	Risk assessment report on a new psychoactive substance: 1-phenyl-2-(pyrrolidin-1-yl)pentan-1-one (**α**-pyrrolidinovalerophenone, **α**-PVP) In accordance with Article 6 of Council Decision 2005/387/JHA on the information exchange, risk assessment and control of new psychoactive substances

Following the Council's request to conduct a Risk Assessment on a new psychoactive substance, 1-phenyl-2-(pyrrolidin-1-yl)pentan-1-one (**α**-pyrrolidinovalerophenone, **α**-PVP), the EMCDDA hereby presents the above-mentioned Risk Assessment Report drawn up by its Scientific Committee pursuant to Article 6 of Council Decision 2005/387/JHA on information exchange, risk assessment and control of new psychoactive substances.

Section E. Social Risks

E1. Individual social risks

There is no data on the effects of α-PVP on individual social risks.

E2. Possible effects on direct social environment

There is no data on the possible effects of α-PVP on the direct social environment.

E3. Possible effects on society as a whole

There is no specific data on the possible effects of α-PVP on society as a whole.

E4. Economic costs

There is no data on the effects of α-PVP on economic costs.

Given the lack of data available on acute health emergencies and healthcare utilisation related to the use of α-PVP, it is not possible at this time to estimate whether this substance is associated with greater healthcare costs than other stimulant drugs.

E5. Possible effects related to the cultural context, for example marginalisation

There is no specific data on the possible effects of α-PVP related to the cultural context.

Data reported to the EMCDDA suggests the use of α-PVP by high risk drug users, including those who inject opioids and stimulants. These user groups are often marginalised.

E6. Possible appeal of the new psychoactive substance to specific population groups within the general population

There is no specific data on the possible appeal of α-PVP to specific population groups.

The available data suggests that α-PVP is used by recreational stimulant users and high risk drug users. In the latter case this includes people who inject opioids and stimulants. The extent of the possible appeal of α-PVP to these groups of users is unknown.

Section F. Involvement of organised crime

F1. Evidence that criminal groups are systematically involved in production, trafficking and distribution for financial gain

Poland reported the seizure of two illicit production sites synthesising α-PVP. The first production facility, where brephedrone was also manufactured, was seized in July 2013 in Chorzow. Approximately 50 kg of α-PVP were produced in this site, which were destined both for the domestic market and for export. The second synthetic drug production facility,

dismantled in October 2014 in Krakow, also produced brephedrone and NEB (N-ethylbuphedrone). The amount of α-PVP and brephedrone seized totalled 4.5 kg. According to the Polish authorities, both cases were linked to a local group of 'football hooligans'. The synthesis was supervised by trained chemists, and the laboratories were operated by suppliers, producers and distributors of chemicals. The companies involved operated their own websites offering the sale and distribution of those substances across Poland.

Hungary reported that α-PVP was detected in two tablet manufacturing sites, dismantled in 2013 and in 2014, respectively. The synthesis of α-PVP did not take place in these sites. The site seized in 2013 was a tableting unit where pentedrone tablets were produced; 24,908 tablets containing pentedrone and 800 grams of α-PVP in powder form were seized. In 2014, the Hungarian police dismantled a tablet manufacturing site where pentedrone tablets were also produced. In the storage location linked to this site, 1.5 kg of α-PVP in powder form was seized. According to the Hungarian police, in both cases, the suspects intended to produce tablets using the α-PVP powder.

Information related to trafficking routes was provided by seven Member States (Bulgaria, France, Germany, Latvia, Luxembourg, Slovakia and Spain). In 10 of the 11 cases where trafficking route information was provided, China was noted as the source country for α-PVP. In the remaining case, Poland was indicated as a country of origin. Germany and France would appear to be transit points in the EU, possibly due to the location of air freight hubs. The large quantities of α-PVP seized in or en-route to Spain suggest that it may be an important point in the distribution chain of α-PVP. Romania reported that the main source country for importation of α-PVP is China, mainly via mail parcels. The Czech Republic reported that α-PVP is imported using mail shipments and courier services.

Four Member States (Hungary, Latvia, Romania and Spain) provided information in relation to the involvement of organised crime in the manufacture or trafficking of α-PVP. Hungarian authorities reported that there are no 'classical' organised crime groups involved in the manufacture or trafficking of α-PVP. Latvian authorities reported that since 2014, a new trend has been observed in relation to the market in new psychoactive substances: a Latvian organised crime group was involved in the mixing and distribution of NPS in herbal form and in one such case, the herbal substance was mixed with α-PVP. Romania reported that criminal groups are not involved in the trafficking of α-PVP. Spain reported that they do not have any intelligence about α-PVP being linked to criminal groups.

F2. Impact on the production, trafficking and distribution of other substances, including existing psychoactive substances as well as new psychoactive substances

Based on the information available to the EMCDDA and Europol it does not appear that the production, trafficking and distribution of α-PVP impacts on other existing psychoactive substances or new psychoactive substances. α-PVP has been sold surreptitiously as drugs that are under international control, such as methamphetamine and MDPV, as well as 'ecstasy'. The extent of this practice is unknown.

F3. Evidence of the same groups of people being involved in different types of crime

No information has been received by Europol of evidence of the same groups of people being involved in different types of crime in connection with α-PVP.

F4. Impact of violence from criminal groups on society as a whole or on social groups or local communities (public order and safety)

No information has been received by Europol on incidents of violence in connection with α-PVP.

F5. Evidence of money laundering practices, or impact of organised crime on other socioeconomic factors in society

No information has been received by Europol on incidents of money laundering or impact of organised crime on other socioeconomic factors in society in connection with α-PVP.

F6. Economic costs and consequences (evasion of taxes or duties, costs to the judicial system)

There are no published data to be able to determine the impact of α-PVP in this area.

F7. Use of violence between or within criminal groups

There are no published data to be able to determine the impact of α-PVP in this area.

F8. Evidence of strategies to prevent prosecution, for example through corruption or intimidation

There are no published data to be able to determine the impact of α-PVP in this area.

References

Aarde, S. M., Creehan, K. M., Vandewater, S. A., Dickerson, T. J. and Taffe, M. A. (2015), 'In vivo potency and efficacy of the novel cathinone α-pyrrolidinopentiophenone and 3,4-methylenedioxypyrovalerone: self-administration and locomotor stimulation in male rats', *Psychopharmacology*, 232(16), pp. 3045–3055.

Amaratunga, P., Lemberg, B. L. and Lemberg, D. (2013), 'Quantitative measurement of synthetic cathinones in oral fluid', *Journal of Analytical Toxicology*, 37(9), pp. 622–628.

Armenta, S., Garrigues, S., Guardia, M., Brassier, J., Alcala, M., Blanco, M., Perez-Alfonso, C. and Galipienso, N. (2015), 'Detection and characterization of emerging psychoactive substances by ion mobility spectrometry', *Drug Testing and Analysis*, 7(4), pp. 280–289.

Bluelight (2015), http://www.bluelight.org/vb/threads/609259-Some-early-A-PVP-%28alpha-PVP%29-vs-MDPV-comparisons [October 2015]

Borova, V. L., Gago-Ferrero, P., Pistos, C. and Thomaidis, N. S. (2015), 'Multi-residue determination of 10 selected new psychoactive substances in wastewater samples by liquid chromatography-tandem mass spectrometry', *Talanta*, 144, pp. 592–603.

Casale, J. F. and Hays, P. A. (2012), 'The characterization of α-pyrrolidinopentiophenone', *Microgram Journal*, 9(1), pp. 33–38.

Cayman Chemical Company (2015). Safety data sheet '.alpha.-Pyrrolidinopentiophenone (hydrochloride)'. Revision: 02/01/2015. Cayman Chemical Company, Ann Arbor, MI, USA. Available at: http://www.caymanchem.com/msdss/9001083m.pdf [August 2015].

Commission on Narcotic Drugs (2015). Decision 58/12. Inclusion of 3,4-methylenedioxypyrovalerone (MDPV) in Schedule II of the Convention on Psychotropic Substances of 1971. Available at: http://www.unodc.org/documents/commissions/CND/CND_Sessions/CND_58/2015_Desicions/Desicion_58_12.pdf [September 2015].

Concheiro, M., Anizan, S., Ellefsen, K. and Huestis, M. A. (2013), 'Simultaneous quantification of 28 synthetic cathinones and metabolites in urine by liquid chromatography-high resolution mass spectrometry', *Analytical and Bioanalytical Chemistry*, 405(29), pp. 9437–9448.

Concheiro, M., Castaneto, M., Kronstrand, R. and Huestis, M. A. (2015), 'Simultaneous determination of 40 novel psychoactive stimulants in urine by liquid chromatography-high resolution mass spectrometry and library matching', *Journal of Chromatography A*, 1397, pp. 32–42.

Davis, W.M., Hatoum, H.T., and Waters, I.W. (1987), 'Toxicity of MDA (3,4-methylenedioxyamphetamine) considered for relevance to hazards of MDMA (Ecstasy) abuse', Alcohol and Drug Research, 7(3), pp. 123–34.

Dr. A. Wander S.A (1963). α-Pyrrolidino-valerophenonesα-Pyrrolidino-valerophenones. Patent No. GB 927475. Dr. A. Wander S.A, Bern, Switzerland.

Dr. Karl Thomae GmbH (1963). α-Pyrrolidino-ketones. Patent No. GB 933507. Dr. Karl Thomae GmbH, Biberach an der Riss, Germany.

Dragogna, F., Oldani, L., Buoli, M. and Altamura, A. C. (2014), 'A case of severe psychosis induced by novel recreational drugs', *F1000Res*, 3(doi: 10.12688/f11000research.12683-12621.v12681.

Drugs forum. (2015), https://drugs-forum.com/forum/showthread.php?t=175637 [October 2015].

Eiden, C., Mathieu, O., Cathala, P., Debruyne, D., Baccino, E., Petit, P. and Peyriere, H. (2013), 'Toxicity and death following recreational use of 2-pyrrolidino valerophenone', *Clinical Toxicology*, 51(9), pp. 899–903.

Elie, M. P., Elie, L. E. and Baron, M. G. (2013), 'Keeping pace with NPS releases: fast GC-MS screening of legal high products', *Drug Testing and Analysis*, 5(5), pp. 281–290.

EMCDDA (2014). MDPV. Report on the risk assessment of 1-(1,3-benzodioxol-5-yl)-2-(pyrrolidin-1-yl)pentan-1-one (MDPV) in the framework of the Council Decision on new psychoactive substances. EMCDDA, Lisbon. Available at: http://www.emcdda.europa.eu/attachements.cfm/att_228256_EN_TDAK14003ENN.pdf [October 2015].

EMCDDA and Europol (2015). Joint Report on a new psychoactive substance: 1-phenyl-2-(1-pyrrolidinyl)-1-pentanone (α-PVP). EMCDDA, Lisbon, September 2015. Available at: http://www.emcdda.europa.eu/attachements.cfm/att_242501_EN_TDAS15001ENN.pdf [September 2015].

Erowid. (2015). Erowid Experience Vaults: alpha-PVP reports. Available at: http://www.erowid.org/experiences/subs/exp_alphaPVP.shtml [October 2015].

Flashback. (2015), https://www.flashback.org/u605277 [October 2015].

Fornal, E. (2014), 'Study of collision-induced dissociation of electrospray-generated protonated cathinones', *Drug Testing and Analysis*, 6(7-8), pp. 705–715.

Friscia, M., Wolf, S. E., Mohr, A. L. A., Diamond, F. X., Yeakel, J. K. and Logan, B. K. (2015), 'Identification of major metabolites in human blood and urine associated with the ingestion of alpha-pyrrolidinopentiophenone (Alpha PVP)', *K55, 67th Proceedings of the American Academy of Forensic Sciences*, 1125–1126. Available at: http://www.aafs.org/sites/default/files/2015/2015Proceedings.pdf [August 2015].

Fujii, H., Waters, B., Hara, K., Kashiwagi, M., Matsusue, A., Takayama, M. and Kubo, S.-i. (2015), 'Direct-heating headspace solid-phase microextraction for the screening of illicit drugs', *Forensic Toxicology*, 33(1), pp. 61–68.

Gatch, M. B., Dolan, S. B. and Forster, M. J. (2015), 'Comparative behavioral pharmacology of three pyrrolidine-containing synthetic cathinone derivatives', *Journal of Pharmacology and Experimental Therapeutics*, 354(2), pp. 103–110.

Giese, C., Igoe, D., Gibbons, Z., Hurley, C., Stokes, S., McNamara, S., Ennis, O., O'Donnell, K., Keenan, E., De Gascun, C., Lyons, F., Ward, M., Danis, K., Glynn, R., Waters, A., and Fitzgerald, M. (2015), 'Injection of new psychoactive substance snow blow associated with recently acquired HIV infections among homeless people who inject drugs in Dublin, Ireland', *EuroSurveillance*, 20(40):pii=30036.

Guha, S., Rajeshkumar, V., Kotha, S. S. and Sekar, G. (2015), 'A versatile and one-pot strategy to synthesize α-amino ketones from benzylic secondary alcohols using N-bromosuccinimide', *Organic Letters*, 17(3), pp. 406–409.

Hasegawa, K., Suzuki, O., Wurita, A., Minakata, K., Yamagishi, I., Nozawa, H., Gonmori, K. and Watanabe, K. (2014), 'Postmortem distribution of α-pyrrolidinovalerophenone and its metabolite in body fluids and solid tissues in a fatal poisoning case measured by LC-MS-MS with the standard addition method', *Forensic Toxicology*, 32(2), pp. 225–234.

Haas, H. and Forth, W. (1956), 'Ein Beitrag zur Analyse der zentral erregenden Wirkungskomponenten einiger sympathicomimetischer Amine', *Arzneimittel-Forschung* 6(8), pp. 436–442.

Hayase, T., Yamamoto, Y., Yamamoto, K. (1996), 'Protective effects of buprenorphine against amplified cocaine and ethanol lethality in mice: role of cocaethylene', *Journal of Toxicological Sciences*, 21(2), pp. 143–56.

Heffe, W. (1966a). Verfahren zur Herstellung von α-pyrrolidino-valerophenonen. Patent No. CH 395998. Dr. A. Wander A.G., Bern, Switzerland.

Heffe, W. (1966b). Verfahren zur Herstellung von α-pyrrolidino-valerophenonen. Patent No. CH 395999. Dr. A. Wander A.G., Bern, Switzerland.

Heffe, W. (1966c). Verfahren zur Herstellung von α-pyrrolidino-valerophenonen. Patent No. CH 401054. Dr. A. Wander A.G., Bern, Switzerland.

Kaizaki, A., Tanaka, S. and Numazawa, S. (2014), 'New recreational drug 1-phenyl-2-(1-pyrrolidinyl)-1-pentanone (alpha-PVP) activates central nervous system via dopaminergic neuron', *Journal of Toxicological Sciences*, 39(1), pp. 1–6.

Knoy, J. L., Peterson, B. L. and Couper, F. J. (2014), 'Suspected impaired driving case involving α-pyrrolidinovalerophenone, methylone and ethylone', *Journal of Analytical Toxicology*, 38(8), pp. 615–617.

Kolanos, R., Sakloth, F., Jain, A. D., Partilla, J. S., Baumann, M. H. and Glennon, R. A. (2015), 'Structural modification of the designer stimulant α-pyrrolidinovalerophenone (α-PVP) influences potency at dopamine transporters', *ACS Chemical Neuroscience*, doi: 10.1021/acschemneuro.1025b00160.

Kolanos, R., Solis, E., Sakloth, F., De Felice, L. J. and Glennon, R. A. (2013), '"Deconstruction" of the abused synthetic cathinone methylenedioxypyrovalerone (MDPV) and an examination of effects at the human dopamine transporter', *ACS Chemical Neuroscience*, 4(12), pp. 1524–1529.

Leffler, A. M., Smith, P. B., de Armas, A. and Dorman, F. L. (2014), 'The analytical investigation of synthetic street drugs containing cathinone analogs', *Forensic Science International*, 234, pp. 50–56.

Madras, B. K., Meltzer, P. C. and Butler, D. (2005). Madras BK, Meltzer PC, Butler D (2005). Pyrovalerone analogs and therapeutic uses thereof. Patent No. WO 2005/034878 A2. President and Fellows of Harvard College, USA; Organix, Inc.

Marinetti, L. J. and Antonides, H. M. (2013), 'Analysis of synthetic cathinones commonly found in bath salts in human performance and postmortem toxicology: method development, drug distribution and interpretation of results', *Journal of Analytical Toxicology*, 37(3), pp. 135–146.

Marusich, J. A., Antonazzo, K. R., Wiley, J. L., Blough, B. E., Partilla, J. S. and Baumann, M. H. (2014), 'Pharmacology of novel synthetic stimulants structurally related to the "bath salts" constituent 3,4-methylenedioxypyrovalerone (MDPV)', *Neuropharmacology*, 87, pp. 206–213.

McNamara, S., Stokes, S., Shine, A., Kilduff, R., O'Byrne, P. (2015), 'New psychoactive substances prevalence in samples tested in the NDTC laboratory 2010–2015', European Network of Forensic Science Institutes Drugs Working Group, 5–8 May 2015, Dublin.

Meltzer, P. C., Butler, D., Deschamps, J. R. and Madras, B. K. (2006), '1-(4-Methylphenyl)-2-pyrrolidin-1-ylpentan-1-one (pyrovalerone) analogs: a promising class of monoamine uptake inhibitors', *Journal of Medicinal Chemistry*, 49(4), pp. 1420–1432.

Meyer, M. R. and Maurer, H. H. (2010), 'Metabolism of designer drugs of abuse: an updated review', *Current Drug Metabolism*, 11(5), pp. 468–482.

Minakata, K., Yamagishi, I., Nozawa, H., Hasegawa, K., Wurita, A., Gonmori, K., Suzuki, M., Watanabe, K. and Suzuki, O. (2014), 'MALDI-TOF mass spectrometric determination of four pyrrolidino cathinones in human blood', *Forensic Toxicology*, 32(1), pp. 169–175.

Nagai, H., Saka, K., Nakajima, M., Maeda, H., Kuroda, R., Igarashi, A., Tsujimura-Ito, T., Nara, A., Komori, M. and Yoshida, K.-i. (2014), 'Sudden death after sustained restraint following self-administration of the designer drug α-pyrrolidinovalerophenone', *International Journal of Cardiology*, 172(1), pp. 263–265.

Namera, A., Konuma, K., Kawamura, M., Saito, T., Nakamoto, A., Yahata, M., Ohta, S., Miyazaki, S., Shiraishi, H. and Nagao, M. (2014), 'Time-course profile of urinary excretion of intravenously administered α-pyrrolidinovalerophenone and α-pyrrolidinobutiophenone in a human', *Forensic Toxicology*, 32(1), pp. 68–74.

Namera, A., Konuma, K., Saito, T., Ota, S., Oikawa, H., Miyazaki, S., Urabe, S., Shiraishi, H. and Nagao, M. (2013a), 'Simple segmental hair analysis for α-pyrrolidinophenone-type designer drugs by MonoSpin extraction for evaluation of abuse history', *Journal of Chromatography B*, 942-943, pp. 15–20.

Namera, A., Urabe, S., Saito, T., Torikoshi-Hatano, A., Shiraishi, H., Arima, Y. and Nagao, M. (2013b), 'A fatal case of 3,4-methylenedioxypyrovalerone poisoning: coexistence of alpha-pyrrolidinobutiophenone and alpha-pyrrolidinovalerophenone in blood and/or hair', *Forensic Toxicology*, 31(2), pp. 338–343.

Naylor, J. E., Freeman, K. B., Blough, B. E., Woolverton, W. L. and Huskinson, S. L. (2015), 'Discriminative-stimulus effects of second generation synthetic cathinones in methamphetamine-trained rats', *Drug and Alcohol Dependence*, 149, pp. 280–284.

Negreira, N., Erratico, C., Kosjek, T., van Nuijs, A. L. N., Heath, E., Neels, H. and Covaci, A. (2015), 'In vitro Phase I and Phase II metabolism of α-pyrrolidinovalerophenone (α-PVP), methylenedioxypyrovalerone (MDPV) and methedrone by human liver microsomes and human liver cytosol', *Analytical and Bioanalytical Chemistry*, 407(19), pp. 5803–5816.

Power, J. D., McDermott, S. D., Talbot, B., O'Brien, J. E. and Kavanagh, P. (2012), 'The analysis of amphetamine-like cathinone derivatives using positive electrospray ionization with in-source collision-induced dissociation', *Rapid Commununications in Mass Spectrometry*, 26(22), pp. 2601–2611.

Psychonautwiki. (2015), A-PVP. Available at: https://psychonautwiki.org/wiki/A-PVP [October 2015].

Reagent-base.net. (2015), Table of reagents. Available at: http://reagent-base.net/reagents-table/ [September 2015].

Richards-Waugh, L. L., Bailey, K. M., Clay, D. J., Gebhardt, M. A., Newsome-Sparks, C. L., E., M. H., Venuti, S. E. and Kraner, J. C. (2013), 'Deaths involving the recreational use of α-PVP (α-pyrrolidinopentiophenone)', *K16, 65th Proceedings of the American Academy of Forensic Sciences*, 521–522. Available at: http://www.aafs.org/sites/default/files/pdf/ProceedingsWashingtonDC2013.pdf [August 2015].

Rickli, A., Hoener, M. C. and Liechti, M. E. (2015), 'Monoamine transporter and receptor interaction profiles of novel psychoactive substances: Para-halogenated amphetamines and pyrovalerone cathinones', *European Neuropsychopharmacology*, 25(3), pp. 365–376.

Saito, T., Namera, A., Osawa, M., Aoki, H. and Inokuchi, S. (2013), 'SPME-GC-MS analysis of alpha-pyrrolidinovaleorophenone in blood in a fatal poisoning case', *Forensic Toxicology*, 31(2), pp. 328–332.

Sauer, C., Peters, F. T., Haas, C., Meyer, M. R., Fritschi, G. and Maurer, H. H. (2009), 'New designer drug α-pyrrolidinovalerophenone (PVP): studies on its metabolism and toxicological

detection in rat urine using gas chromatographic/mass spectrometric techniques', *Journal of Mass Spectrometry*, 44(6), pp. 952–964.

Schneir, A., Ly, B. T., Casagrande, K., Darracq, M., Offerman, S. R., Thornton, S., Smollin, C., Vohra, R., Rangun, C., Tomaszewski, C. and Gerona, R. R. (2014), 'Comprehensive analysis of "bath salts" purchased from California stores and the internet', *Clinical Toxicology*, 52(7), pp. 651–658.

Seeger, E. (1964). Verfahren zur Herstellung von α-Pyrrolidinoketonen und deren Salzen. Patent No. DE 1161274. Dr. Karl Thomae GmbH, Biberach an der Riss, Germany.

Seeger, E. (1966). Compositions and methods for stimulating the central nervous system and increasing the blood pressure. Patent No. US 3287217. Boehringer Ingelheim GmbH, Biberach an der Riss, Germany.

Seeger, E. (1967). α-Pyrrolidino ketones. Patent No. US 3314970. Boehringer Ingelheim GmbH, Biberach an der Riss, Germany.

Sellors, K., Jones, A. and Chan, B. (2014), 'Death due to intravenous use of α-pyrrolidinopentiophenone', *Medical Journal of Australia*, 201(10), pp. 601–603.

Shanks, K. G., Behonick, G. S. and Terrell, A. R. (2013), 'Detection of alpha-PVP in postmortem blood casework by UPLC/MS/MS', *P12, Proceedings of the Society of Forensic Toxicologists*, Available at: http://soft-tox.org/files/meeting_abstracts/SOFT_2013_meeting_abstracts.pdf [August 2015].

Shanks, K. G., Dahn, T., Behonick, G. and Terrell, A. (2012), 'Analysis of first and second generation legal highs for synthetic cannabinoids and synthetic stimulants by ultra-performance liquid chromatography and time of flight mass spectrometry', *Journal of Analytical Toxicology*, 36(6), pp. 360–371.

Shima, N., Katagi, M., Kamata, H., Matsuta, S., Sasaki, K., Kamata, T., Nishioka, H., Miki, A., Tatsuno, M., Zaitsu, K., Ishii, A., Sato, T., Tsuchihashi, H. and Suzuki, K. (2014), 'Metabolism of the newly encountered designer drug α-pyrrolidinovalerophenone in humans: identification and quantitation of urinary metabolites', *Forensic Toxicology*, 32(1), pp. 59–67.

Shroomery (2015), http://www.shroomery.org/forums/showflat.php/Number/16110563. Accessed October 2015.

Simonsen, K. W., Edvardsen, H. M. E., Thelander, G., Ojanperä, I., Thordardottir, S., Andersen, L. V., Kriikku, P., Vindenes, V., Christoffersen, D., Delaveris, G. J. M. and Frost, J. (2015), 'Fatal poisoning in drug addicts in the Nordic countries in 2012', *Forensic Science International*, 248, pp. 172–180.

Sundström, M., Pelander, A., Simojoki, K. and Ojanperä, I. (2015), 'Patterns of drug abuse among drug users with regular and irregular attendance for treatment as detected by comprehensive UHPLC-HR-TOF-MS', *Drug Testing and Analysis*, doi: 10.1002/dta.1818.

Sykutera, M., Cychowska, M. and Bloch-Boguslawska, E. (2015), 'A fatal case of pentedrone and α-pyrrolidinovalerophenone poisoning', *Journal of Analytical Toxicology*, 39(4), pp. 324–329.

Taschwer, M., Seidl, Y., Mohr, S. and Schmid, M. G. (2014), 'Chiral separation of cathinone and amphetamine derivatives by HPLC/UV using sulfated ß-cyclodextrin as chiral mobile phase additive', *Chirality*, 26(8), pp. 411–418.

Tsujikawa, K., Kuwayama, K., Kanamori, T., Iwata, Y. T. and Inoue, H. (2013), 'Thermal degradation of α-pyrrolidinopentiophenone during injection in gas chromatography/mass spectrometry', *Forensic Science International*, 231(1-3), pp. 296–299.

Tyrkkö, E., Pelander, A., Ketola, R. A. and Ojanperä, I. (2013), 'In silico and in vitro metabolism studies support identification of designer drugs in human urine by liquid chromatography/quadrupole-time-of-flight mass spectrometry', *Analytical and Bioanalytical Chemistry*, 405(21), pp. 6697–6709.

Uchiyama, N., Matsuda, S., Kawamura, M., Shimokawa, Y., Kikura-Hanajiri, R., Aritake, K., Urade, Y. and Goda, Y. (2014), 'Characterization of four new designer drugs, 5-chloro-NNEI, NNEI indazole analog, alpha-PHPP and alpha-POP, with 11 newly distributed designer drugs in illegal products', *Forensic Science International*, 243 pp. 1–13.

Uralets, V., Rana, S., Morgan, S. and Ross, W. (2014), 'Testing for designer stimulants: metabolic profiles of 16 synthetic cathinones excreted free in human urine', *Journal of Analytical Toxicology*, 38(5), pp. 233–241.

Usdin, E. and Efron, D.H. (eds.) (1972), Psychotropic drugs and related compounds (2nd ed.), National Institute of Mental Health, Washington, District of Columbia, pp. 294.

Watterson, L. R., Burrows, B. T., Hernandez, R. D., Moore, K. N., Grabenauer, M., Marusich, J. A. and Olive, M. F. (2014), 'Effects of α-pyrrolidinopentiophenone and 4-methyl-N-ethylcathinone, two synthetic cathinones commonly found in second-generation "bath salts," on intracranial self-stimulation thresholds in rats', *International Journal of Neuropsychopharmacology*, 18(1), pp. doi: 10.1093/ijnp/pyu1014.

Westphal, F., Junge, T., Klein, B., Fritschi, G. and Girreser, U. (2011), 'Spectroscopic characterization of 3,4-methylenedioxypyrrolidinobutyrophenone: a new designer drug with α-pyrrolidinophenone structure', *Forensic Science International*, 209(1-3), pp. 126–132.

Wurita, A., Hasegawa, K., Minakata, K., Gonmori, K., Nozawa, H., Yamagishi, I., Suzuki, O. and Watanabe, K. (2014), 'Postmortem distribution of alpha-pyrrolidinobutiophenone in body fluids and solid tissues of a human cadaver', *Legal Medicine*, 16(5), pp. 241–246.

Yap, S., and Drummer, O. H. (2015), 'Prevalence of new psychoactive substances in Victorian fatally-injured drivers', *Australian Journal of Forensic Sciences*, doi: 10.1080/00450618.00452015.01050066.

European Monitoring Centre
for Drugs and Drug Addiction

Annex 2. List of participants at the risk assessment meeting of 1-phenyl-2-(pyrrolidin-1-yl)pentan-1-one (α-pyrrolidinovalerophenone, α-PVP)

18 November 2015

A. Extended Scientific Committee

Dr Henri BERGERON
Centre National de la Recherche Scientifique (CNRS), Institut d'Études Politiques de Paris (IEP), Paris

Professor Dr Gerhard BUEHRINGER
Addiction Research Unit, Dep. of Clinical Psychology and Psychotherapy, Technische Universität Dresden
Institut für Therapieforschung (IFT), Munich
Chair of the Scientific Committee

Professor Catherine COMISKEY
Director, Centre for Practice and Healthcare Innovation, Trinity College Dublin

Professor Paul DARGAN
Clinical Toxicology, St Thomas' Hospital, Guy's and St Thomas' NHS Foundation Trust, London

Professor Dr Gabriele FISCHER
Medical University Vienna, Center of Public Health

Professor Dr Krzysztof KRAJEWSKI
Department of Criminology, Jagiellonian University, Krakow

Dr Fernando RODRIGUEZ de FONSECA
Fundación IMABIS, Hosp. Univ. Carlos Haya de Málaga

Professor Dr Rainer SPANAGEL
Institute of Psychopharmacology, Central Institute of Mental Health, Mannheim

Professor Félix CARVALHO
Faculty of Pharmacy, University of Porto, Porto

Professor Éva KELLER
Semmelweis University, Department of Forensic and Insurance Medicine, Budapest

Professor Ilkka OJANPERÄ
Department of Forensic Medicine, University of Helsinki, Helsinki

Dr Dariusz ZUBA
Institute of Forensic Research, Krakow

Elsa MAIA
DG HOME – Anti drugs policy unit, European Commission, Brussels

Fabiano RENIERO
Institute for Health and Consumer Protection (IHCP), Joint Research Centre, Ispra

Dr Leon Van AERTS
Section Pharmacology, Toxicology and Biotechnology (FTBB), College ter Beoordeling van Geneesmiddelen, Medicines Evaluation Board, Utrecht (on behalf of European Medicines Agency)

Werner VERBRUGGEN
Serious and Organised Crime Unit - Europol, The Hague

Paul GRIFFITHS
Scientific Director, EMCDDA, Lisbon

Dr Roumen SEDEFOV
Head of unit, Supply reduction and new drugs unit, EMCDDA, Lisbon

B. Invited Experts / EMCDDA

Dr István UJVÁRY
Budapest University of Technology and Economics, Budapest

C. EMCDDA Staff

Ana GALLEGOS
Head of Sector, Action on new drugs, Supply reduction and new drugs unit

Michael EVANS-BROWN
Scientific analyst, Action on new drugs, Supply reduction and new drugs unit

Anabela ALMEIDA
Project assistant, Action on new drugs, Supply reduction and new drugs unit

Rachel CHRISTIE
Scientific analyst, Action on new drugs, Supply reduction and new drugs unit

Rita JORGE
Scientific analyst, Action on new drugs, Supply reduction and new drugs unit

Maria MOREIRA
Principal quality officer, Scientific committee, Scientific division

Helene JENSVOLL
Trainee, Action on new drugs, Supply reduction and new drugs unit

Agata RYBARSKA
Trainee, Scientific division

2