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# QUALITY AND PURITY OF ILLICIT DRUGS, NEW PSYCHOACTIVE SUBSTANCES DETECTED IN SLOVENIA AND AWARENESS

## Report for the year 2015

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Report is available in Slovenian and English version and is published at web pages of the National Forensic Laboratory (NFL):

<http://www.policija.si/eng/index.php/generalpolicedirectorate/1669-nfl-page-response>

The main part of this document document will be included in the Slovenian national report on the drug situation, which is edited and issued yearly by NIJZ (National Institute of Public Health) in Slovenian and English languages. Slovenian national report is forwarded to the European Monitoring Centre on Drugs and Drug Addiction (EMCDDA), within the framework of the REITOX system.

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# Quality and purity of illicit drugs - foreword

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Data on the quality or purity of drugs are available only for certain seized drugs. In 2015, the sampling, analyses- chemical characterisations and statistical evaluations of results were carried out by the Chemistry department of the National Forensic Laboratory (hereinafter “NFL”), which has carried out regular annual monitoring since 2006 (since 1995 for heroin mixtures). NFL informs domestic stakeholders and ministries and is actively involved in the preparation of the Report on the Drug Situation of the Republic of Slovenia. Analytical results provided by NFL always represent a significant part of the reports delivered by the Republic of Slovenia to international institutions (UNODC and EMCDDA) and to EUROPOL via the national ENU contact point, where relevant. The Chemical Examination Section is also an active member of ENFSI-DWG (European Network of Forensic Science Institutes – Drugs Working Group), which is vital for a quick exchange of analytical data that are a prerequisite for the detection and forensic identification – chemical characterization of new compounds, especially with regard to the ‘explosion’ of new psychoactive substances on the market.

The NFL performs qualitative (identification) and a limited scope of quantitative (concentration of active compounds) tests of practically all drug samples (including precursors and new psychoactive substances (hereinafter “NPS”) related to the investigation of criminal acts, and of the samples seized in prisons and at customs as well as of samples for anonymous testing brought to NGOs by addicted persons believing they may contain unusual substances and/or when experiencing unexpected effects during use. A part of that programme and sample monitoring are cofunded by the EU Prevention and Fight against Crime programme within the scope of 2 international projects, i.e. [RESPONSE project 2015-2017], which is coordinated by Slovenian NFL, and [I-SEE project, 2015-2017], which is coordinated by Italy.

Quantitative analyses are performed primarily for monitoring purposes and, less frequently, at the request of clients (the police, prosecution, courts of law). Sampling is carried out according to pre-set criteria within the scope of routine tests of the material received. The samples collected for the past year are quantitatively evaluated in the first months of the following year. Quantitative monitoring includes only samples of weight exceeding the set bottom limit value. In 2015 the limiting mass values were changed:

- for seized heroin, cocaine, amphetamine and other amphetamine-type compounds samples from  $m_{\text{sample}} \geq 0.1\text{g}$  to  $m_{\text{sample}} >1\text{g}$
- for cannabis and hashis from  $m_{\text{sample}} \geq 10\text{g}$  to  $m_{\text{sample}} \geq 100\text{g}$  .

Qualitative and quantitative chemical tests are performed using different methods of analysis, primarily GC-MS and HPLC, and, in 2014, also HPLC-TOF, NMR and some other techniques due to a large increase in NPS cases.

Reported concentrations are always given (calculated) for the base form of substance. For cannabis THC concentration reported is equivalent to total THC amount, which represent the summarized concentrations of delta-9-THC in delta-9-THC-acid). Concentration of total TCH refers to dried plant material.

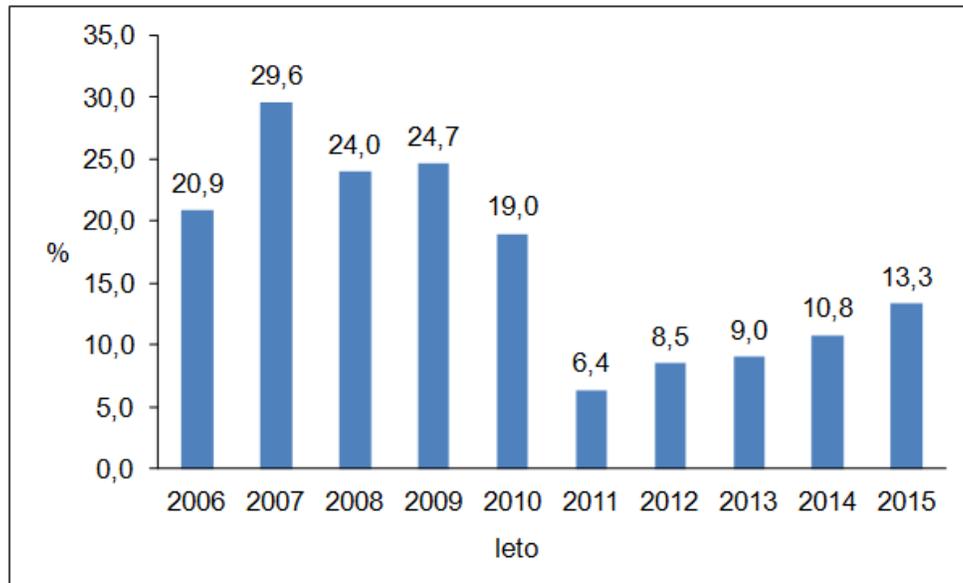
## Heroin mixtures

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In 2015, monitoring included 149 samples from 76 cases (of the total net weight of approximately 6.6 kg).

All samples contained heroin in base form, typical accompanying opium-derived heroin accompanying compounds, and cutting agents paracetamol and caffeine.

The average concentration of heroin was 13.3% (*Figure 1*). The highest measured content was 55.7%, and the lowest 3.4 %. We observed slightly increasing trend on average heroin concentration in the period of the last 5 years.



*Figure 1: Average heroin concentrations in the 2006-2015 period*

A detailed analysis showing the relationship between heroin concentration and the net weight of seized samples is shown in Figure 2 (*Figure 2*).

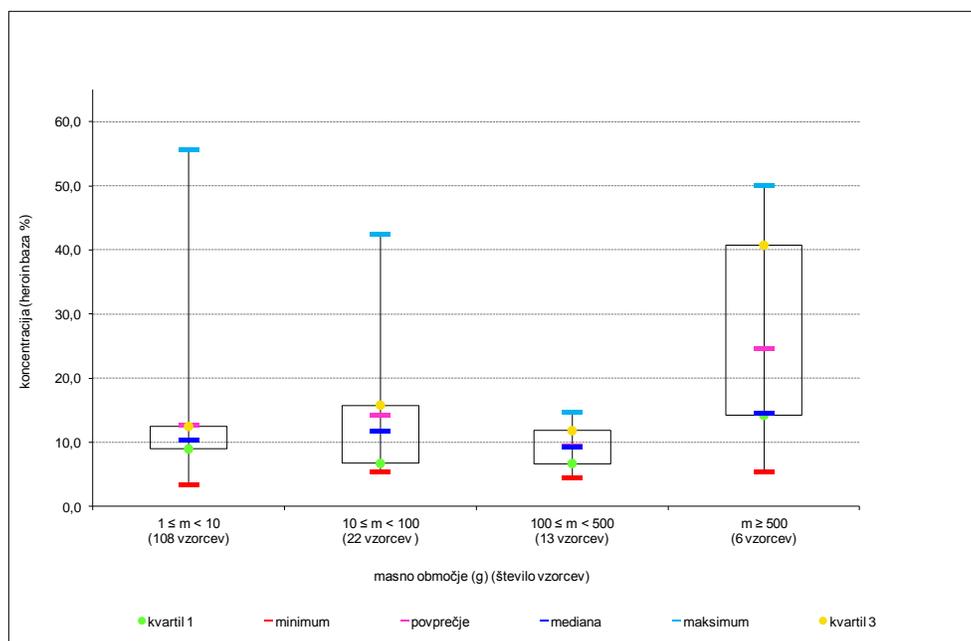


Figure 2: Heroin concentration in relation to net sample weight for 2015

## Cocaine mixtures

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Monitoring included 56 samples from 30 seizures. The total net weight of the samples included in monitoring roughly amounted to 1.7 kg. All samples contained cocaine in the form of hydrochloride. The average cocaine content was 54.6 % (Figure 3), minimum 14.1% and the maximum 84%.

The most common cutting agents detected were levamisole and lidocaine, similar as in previous years.

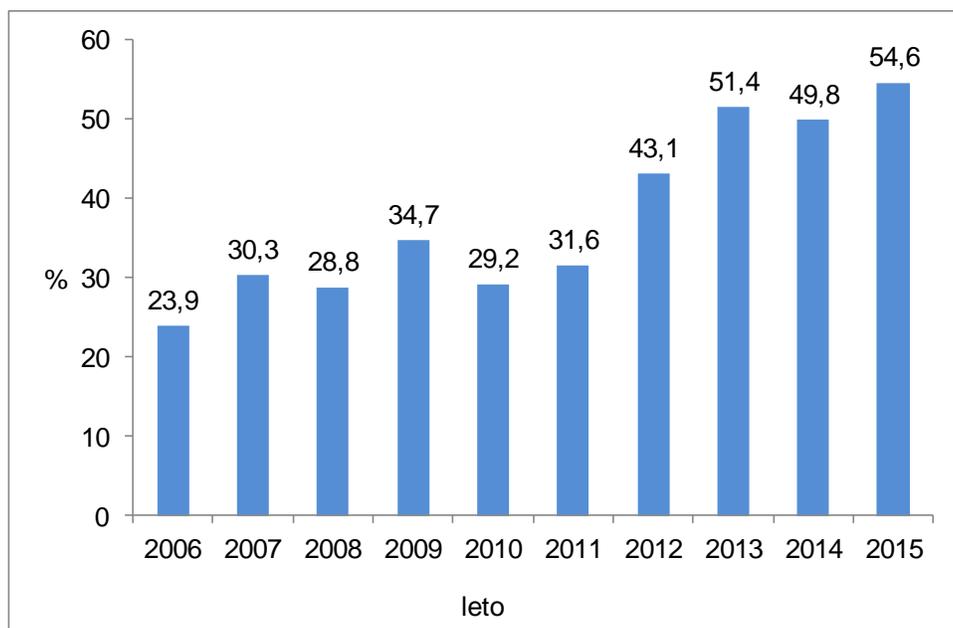


Figure 3: Average cocaine concentrations in the 2006-2015 period

A detailed analysis showing the relationship between cocaine concentration and the net weight of seized samples is shown in Figure (Figure 4).

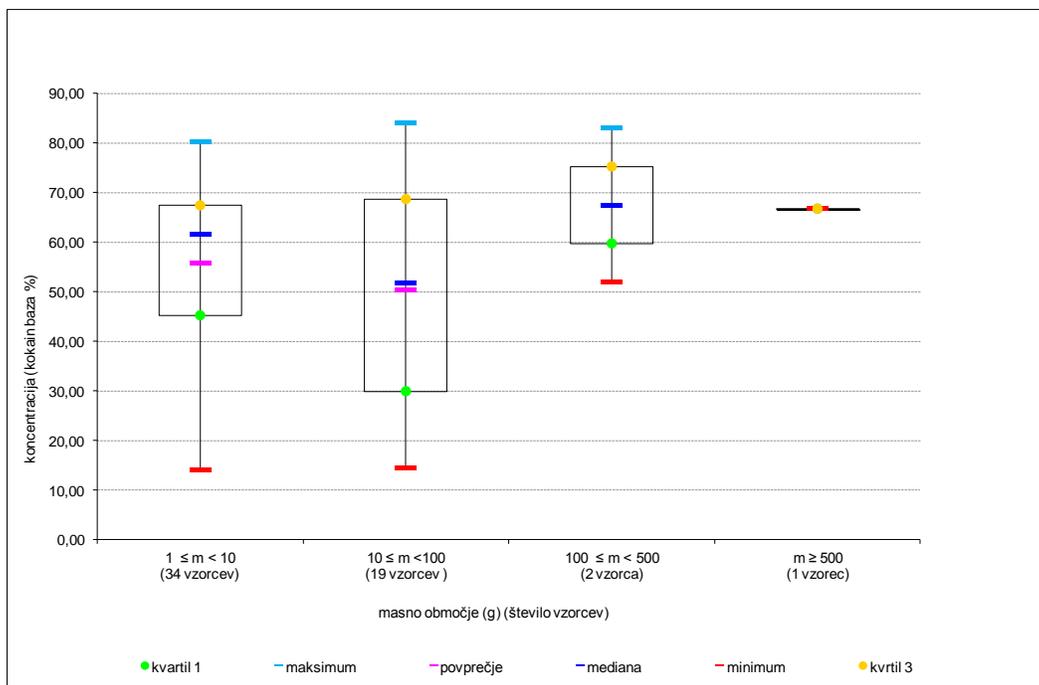


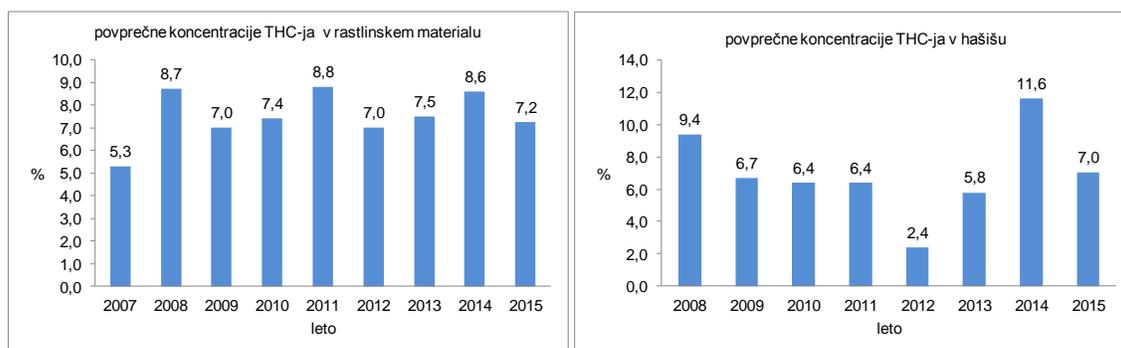
Figure 4: Cocaine concentrations in relation to sample weight for 2015

## Cannabis and Cannabis Products

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Monitoring included 246 samples of cannabis from 113 cases of total net weight approximately 158 kg and 28 hashish samples from 4 not correlated cases. The net weight of hashish samples was 1.7 kg.

The average concentrations (*Figure 5*) of the total THC in plant material were similar to those of previous years (average value of 7.2 %, minimum value of 0.1% and maximum value of 23.1%). Compared to previous year, the average concentration of total THC in hashish samples dropped (average value of 7.0 %, minimum value of 0.3 % and maximum value of 19.4%).



*Figure 5: Average concentrations of total THC in cannabis (marijuana and hashish) samples seized in the 2006-2015 period*

## Amphetamine-type stimulants (ATS)

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NFL investigated samples in powder form and pills as well.

### Powders

Most of the powdered samples seized in 2015 contained amphetamine. Seizures of powdered 3,4-methylenedioxy-N-methamphetamine (MDMA) and methamphetamine in powder form were rare.

The average content of amphetamine in 47 samples from 19 cases was 12.2%. The average concentration is approximately at the same level as in previous year. (Figure 6). The minimum amphetamine concentration was 1.3% and the maximum 71.1%.

The average content of MDMA in two not correlated powdered samples (2 cases only) 67.8%. One sample contained 62.4% of MDMA and another one 73,2%.

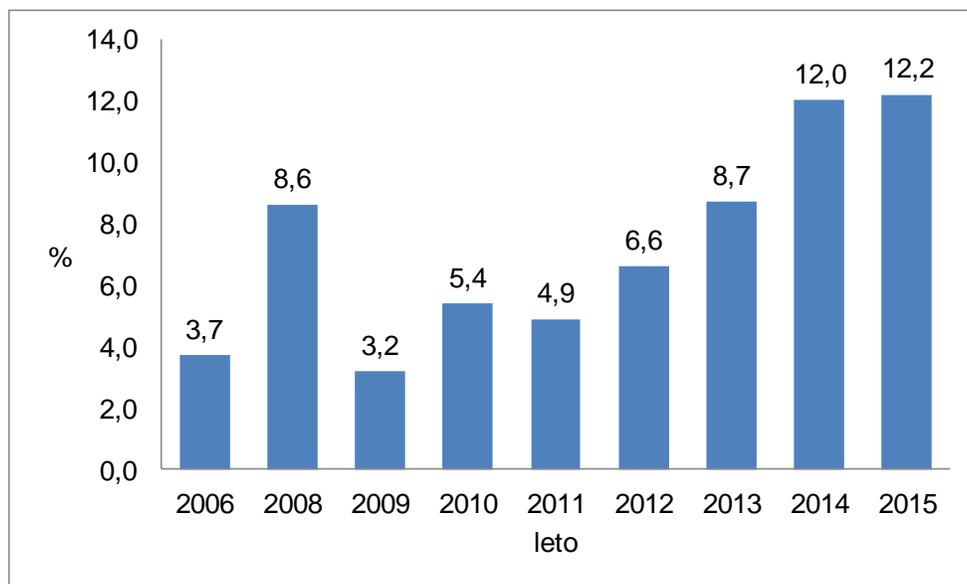


Figure 6: Average concentrations of amphetamine in the 2006-2015 period (no data is available for 2007)

A detailed analysis showing the relationship between amphetamine content and net weight of seized samples is shown in Figure (Figure 7).

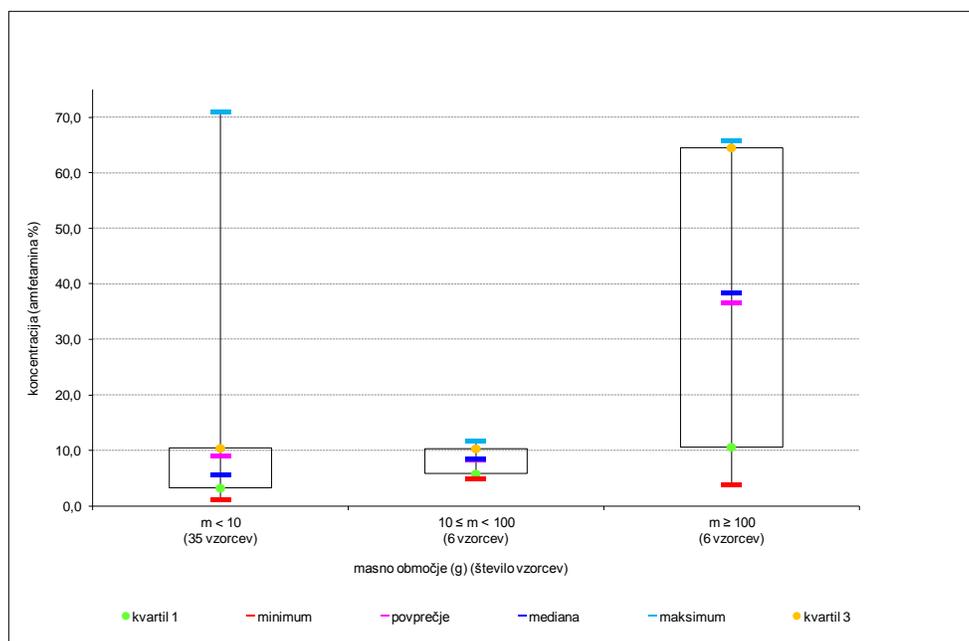
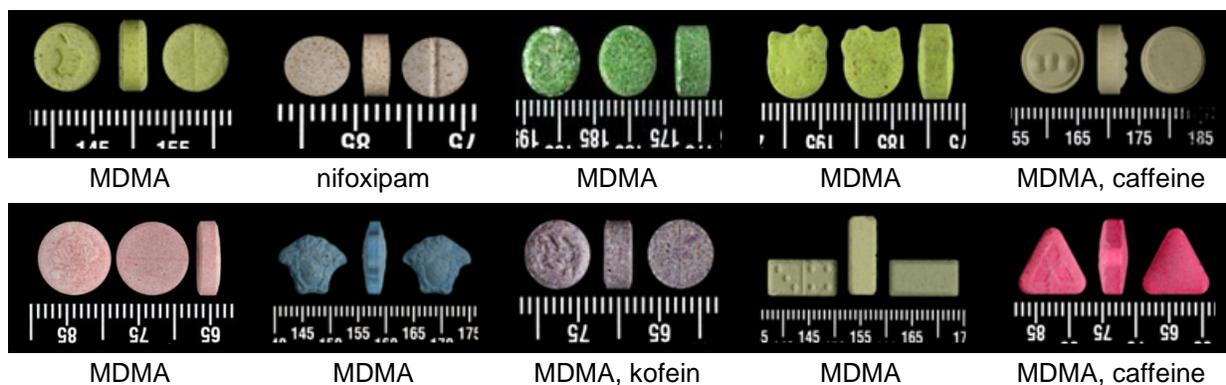


Figure 7: Amphetamine concentrations in samples classified by weight for 2015

## Tablets

In 2015, the police seized 41 new types of ecstasy pills (in view of the logo or active substance) in Slovenia. Most of the pills contained MDMA, while other types of compounds were rarely detected (Figure 8). Average, minimum and maximum MDMA content per tablet was 99 mg, 60mg and 155 mg, respectively.





# New psychoactive substances

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The customers (mostly Police), Slovenian EWS, EMCDDA and in some cases also EUROPOL were promptly informed about substances detected in Slovenia for the first time. A comprehensive overview on NPS identified at NFL in the period January – December 2015 is available on line at the web pages of NFL [NFL, 2016]:

[http://www.policija.si/eng/images/stories/GPUNFL/PDF/NPS-SI\\_EWS\\_Report\\_January-December2015.pdf](http://www.policija.si/eng/images/stories/GPUNFL/PDF/NPS-SI_EWS_Report_January-December2015.pdf).

## *Seizures*

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Minor quantities of samples (up to several tenth grams) were seized by the Police involving natural persons in the field and in prisons. Larger quantities were detected in routine customs/police checks of shipments.

In 2015 NFL processed 44 cases (seizures) where altogether 23 different NPS were identified. The plant material impregnated by compound 5F-AKB48 was the most popular. It was identified in sixteen non correlated seizures of herbal preparations (dark pasty substance). Furthermore in one case (shipment from China) 7 kg of pure powdered form of 5F-AKB48 and 5kg of powdered (pure) 5F-PB22 were seized. It is also worth to mention a seizure (shipped from China) of 12 kg of pure compound in powder form where new - previously unknown substance CUMYL-5F-P7AICA was identified. Huge amount (approximately 1500 kg) of plant material impregnated by two types of synthetic cannabinoids PB-22 (one type of samples) and Cumyl-Pinaca (another type of samples) was seized in Koper port. At Ljubljana airport (Brnik) two shipments of the fresh plant *Katha Edulis* (altogether 66 kg) with active compound katinone and one shipment of 2.5 kg of *Mitragyna speciosa* (kratom) were seized. Data for other minor seizures one can see here:

[http://www.policija.si/eng/images/stories/GPUNFL/PDF/NPS-SI\\_EWS\\_Report\\_January-December2015.pdf](http://www.policija.si/eng/images/stories/GPUNFL/PDF/NPS-SI_EWS_Report_January-December2015.pdf).

## *Anonymous testing*

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Within the scope of the Slovenian Early Warning (EWS-SI) around 20 samples were received for anonymous testing, free of charge for users. Most of samples contained classic illicit drugs or

drugs were not detected at all. In six samples the following NPS were identified: 3-MeO-PCP, nifoxipam, clonazepam, 2-MAPB, 4-fluoroamphetamin and etylphenidate.

In 2015 anonymous testing was financially supported in the framework of two European projects, i.e. I-SEE and RESPONSE. In the frame of the I-SEE project NFL performed analyses by its accredited routine analysis GC-MS and by FTIR-ATR. New compounds (without reference material available) were identified in the frame of the RESPONSE project. Namely, for the first identifications of compound without reference material available the additional confirmation methods shall be applied (HPLC-TOF, GC-MS-FTIR, SPME-GC-MS, ion chromatography and in NMR). An example of identification of new compound where the capacities of both projects were applied was given at the 22nd ENFSI-DWG meeting (European Network of Forensic Science Institutes – Drugs Working Group), Bled, Slovenija 2016 [Klemenc, 2016a].

## *Research, development and awareness*

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Research and development of drug related matters in NFL was performed in the framework of the RESPONSE project which addresses two specific fields of drugs investigation, i. e. drugs profiling and NPS identification. Some of the project results, presentations given on conferences, one day one topic seminar contents have been published here: <http://www.policija.si/eng/index.php/generalpolicedirectorate/1669-nfl-page-response>

With regard to NPS basic aims were fast chemical characterization and dissemination of results including raw MS and FTIR spectra (which are of utmost importance for forensic and customs laboratories). Strategy of chemical characterizations, some problems and different platforms applied for dissemination of project results have been presented at different conferences and meetings, see for example [Klemenc, 2016b].

A part of the RESPONSE project was focused on the detection [Reitzel et al, 2015] and test purchases of novel NPS which are advertised and sold over the Internet. Only the 'surface web' (accessible via common search engines as for example Google) was investigated, while "dark web" was not a part of the project interest.

In 2015 NFL identified more than 80 novel compounds from more than 100 test purchases. Around 20-30 compounds was new (or analytical results were not available) at the time of

purchasing. Most of the results have been published in public opened database "Drugs monographs NPS and related compounds«. Database was developed and is managed by NFL [NFL, 2015a]. Since October 2015 public open database is accessible via link: [http://www.policija.si/apps/nfl\\_response\\_web/seznam.php](http://www.policija.si/apps/nfl_response_web/seznam.php). In the database analytical profiles of some seized and collected samples as well as profiles obtained by characterizations of reference materials are also available..

From a user perspective, the most worrying fact is that on the web about 20% to 30% of the substances is incorrectly advertised (number of test purchases > 100 in 2015). Some websites are highly unreliable. More information and some selected examples have already been presented at conferences and are freely accessible [Klemenc and co-authors, 2016b].

Some information about Internet providers, which are better of being avoided, users can also find on the website "RCSources /wiki/vendors."

# Acknowledgement

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A part of the examinations was partly financed from the funds of the EU “Prevention and Fight against Crime” programme (project RESPONSE (monitoring, NPS identification and test purchases – AG JUST/2013/ISEC/ DRUGS/AG/4000006413 in project I-SEE - routine analyses of approximately 20 samples collected in Slovenia for anonymous testing). We kindly acknowledge this!

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