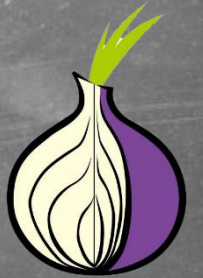


Studying the structure and organisation of illicit drugs trafficking on Darknet markets through the analysis of digital, chemical and physical traces.

L. Staehli, D. Rhumorbarbe, J. Broséus, Q. Rossy, P. Esseiva

Ecole des Sciences Criminelles



Aims of this study

An exploratory research

- Highlighting the purchase process of an illicit drug market on the Darknet
- Describing physical and chemical characteristics of ordered illicit drugs
- Analysing digital data to highlight the activity of a cryptomarket
- Exploring the relation between a cryptomarket and the conventional illicit drug market



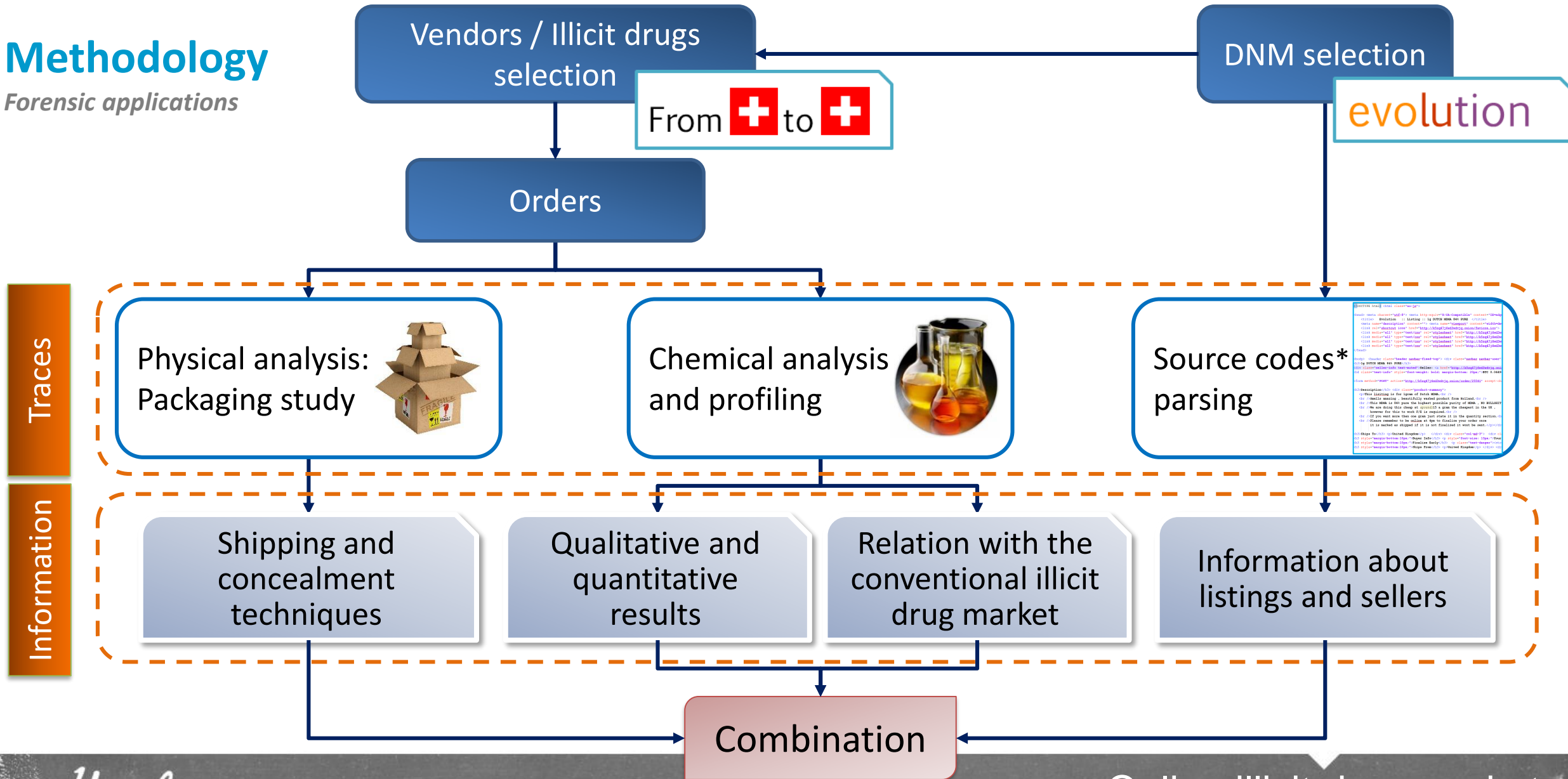
UNIL | Université de Lausanne
Ecole des sciences criminelles

Online illicit drug market

DFRWS EU 2016

Methodology

Forensic applications



Unil

UNIL | Université de Lausanne

Ecole des sciences criminelles

* Source : data from gwern

Retrieved on 30th April 2015, from

<https://www.reddit.com/r/DarkNetMarkets/comments/2zllmv>


<http://www.gwern.net/>


Online illicit drug market

DFRWS EU 2016

Data on Evolution

Example of a webpage

evolution 

Drugs Search for ...  Go

Active Filters Clear

x Active vendor


Categories

Drugs 14183


- Benzos 883
- Cannabis 3535
- Dissociatives 217
- Ecstasy 2513
- Opioids 903
- Prescription 1199
- Psychedelics 1382
- Steroids 792
- Stimulants 2262
- Tobacco 122
- Weight Loss 43
- Other 30
- Fraud Related 2114
- Guides & Tutorials 2706


Drugs


Filter Popularity - This month Sort




1g DUTCH MDMA 84% PURE
Stonelsland (100.0%) **Level 5 (2147)**
✈ FE
FAVORITE



1 X LSD Blotter - 110 µg (Sample)
LucyandMolly (97.7%) **Level 2 (706)**
✈ 
FAVORITE



1oz (28g) "A+" Grade - Northern Lights - Service en Français disponible
TopShelf420 (99.9%) **Level 5 (1347)**
✈ 
FAVORITE

Buy It Now BTC 0.0645

Buy It Now BTC 0.0079

Buy It Now BTC 0.4117

Unil

UNIL | Université de Lausanne


Ecole des sciences criminelles

Online illicit drug market

DFRWS EU 2016


Data on Evolution

Example of a webpage



All

[Home](#) / [Drugs](#) / [Ecstasy](#) / [MDMA](#) / 1g DUTCH MDMA 84% PURE



1g DUTCH MDMA 84% PURE
By [Stonelsland](#) (100.0%) Level 5 (2147)

BTC 0.0645
In stock.

Postage Option

Escrow No, this listing requires FE.
Class Physical
Ships From United Kingdom

Qty:

Details [Feedback](#) [Return Policy](#)

Description

This listing is for 1gram of Dutch MDMA.

Smells amazing , beautifully washed product from Holland.

This MDMA is 84% pure the highest possible purity of MDMA , NO BULLSHIT!!

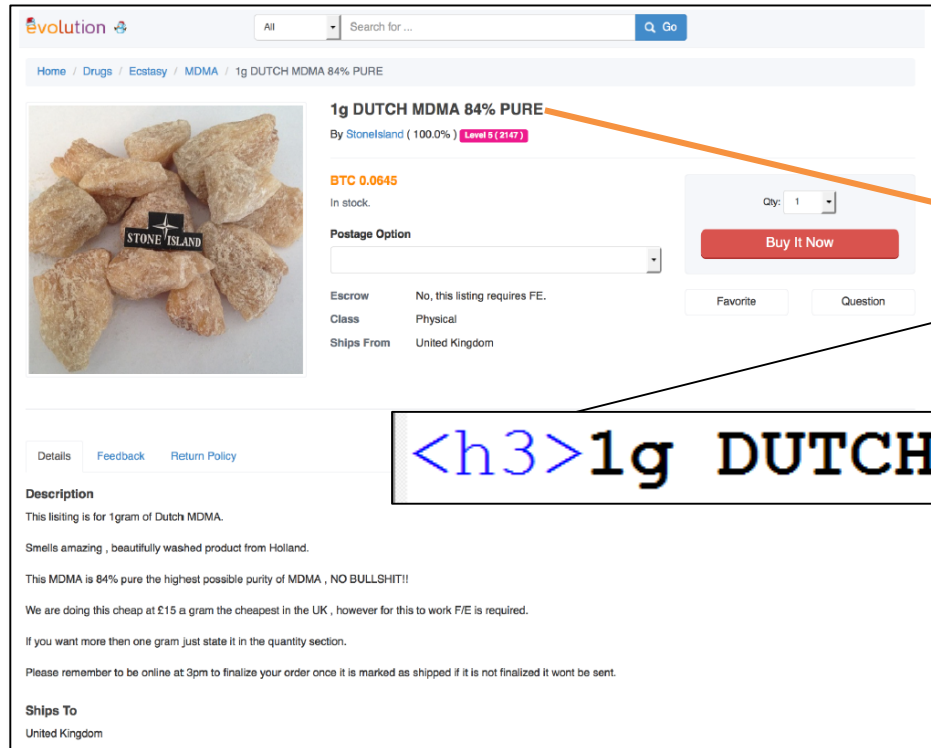
We are doing this cheap at £15 a gram the cheapest in the UK , however for this to work F/E is required.

If you want more then one gram just state it in the quantity section.

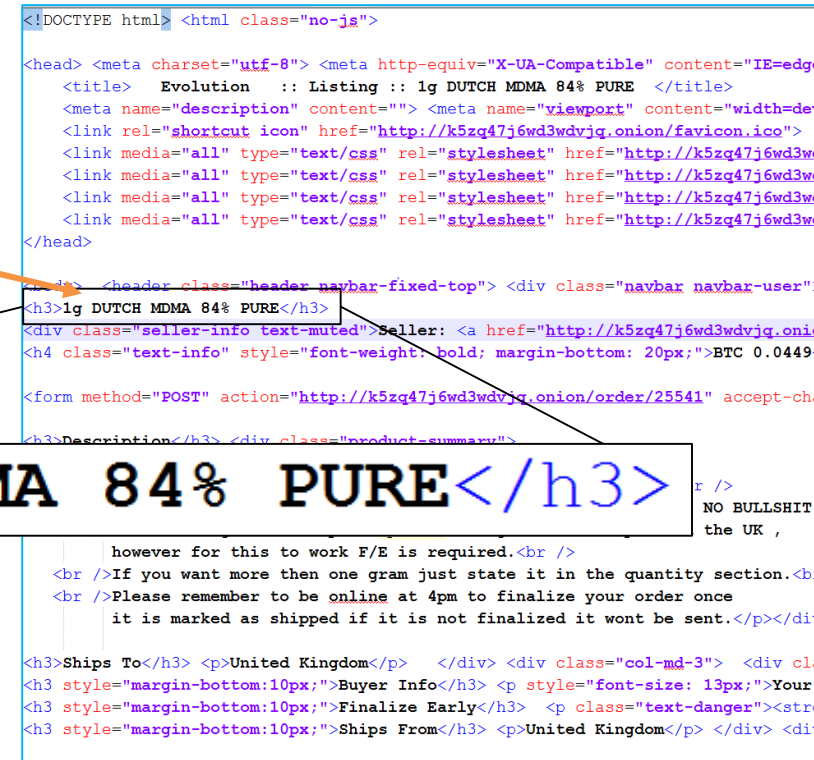
Please remember to be online at 3pm to finalize your order once it is marked as shipped if it is not finalized it wont be sent.

Ships To
United Kingdom

Example of a webpage



Display in the browser

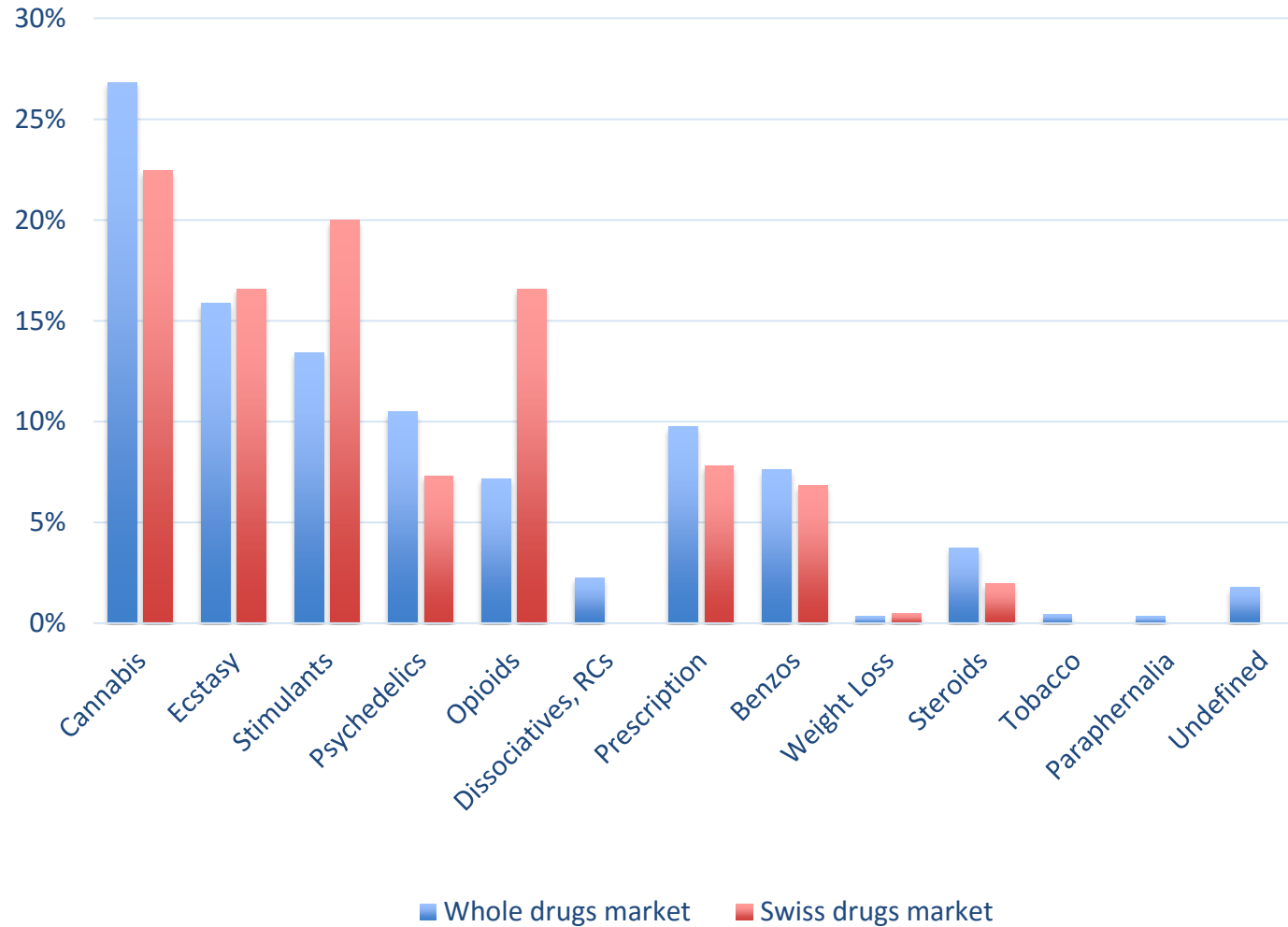


Page source code



Data analysis

General distribution according to drug category (n = 48'206)



Data analysis

General distribution by origin ($n = 48'206$)

(10 most frequent origins)



Origin	Occurrence
1. United States	11996 (24.9%)
2. Worldwide	7939 (16.5%)
3. United Kingdom	5972 (12.4%)
4. Netherlands	4767 (9.9%)
5. Germany	4579 (9.5%)
6. Australia	3047 (6.3%)
7. Canada	2092 (4.3%)
8. Sweden	1410 (3.0%)
9. China	1142 (2.7%)
10. France	949 (2.0%)
⋮	⋮
19. Switzerland	205 (0.4%)

Illicit drug purchases

Law dependencies

- Swiss Federal Act on Narcotics and Psychotropic Substances (NarcA) prohibits the purchasing of illicit drugs

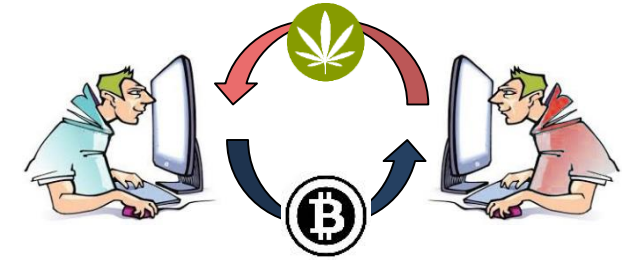


“Institutions involved in scientific research may be granted a license by the relevant cantonal authority to cultivate, acquire, store and use narcotics to the extent required for their own needs.”¹

- Attorney General of the Canton de Vaud granted us to proceed to several purchases on Swiss territory

Illicit drug purchases

Orders placed between October and December 2014



Order	Date of order	Date of receipt	Product	Vendor*	Price BTC (ca. US\$)
1	14.10.2014	16.10.2014	Cocaine	<i>Seller_A</i>	0,3620 (ca.135 \$)
2	14.10.2014	16.10.2014	Cannabis concentrate	<i>Seller_B</i>	0,1561 (ca. 60 \$)
3	27.11.2014	03.12.2014	Cocaine	<i>Seller_C</i>	0,2849 (ca. 110 \$)
	<i>Not ordered</i>	03.12.2014	MDMA	<i>Seller_C</i>	
4	10.12.2014	12.12.2014	Cocaine	<i>Seller_A</i>	0,4025 (ca. 150 \$)



* Vendors' names remain anonymous for this study

Unil

UNIL | Université de Lausanne

Ecole des sciences criminelles

Online illicit drug market

Reference : Rhumorbarbe D, Staehli L, Broséus J, Rossy Q, Esseiva P (2016). Studying illicit drug market on the Darknet through the contribution of the analysis of digital, physical and chemical data. *Forensic Science International*. (forthcoming)

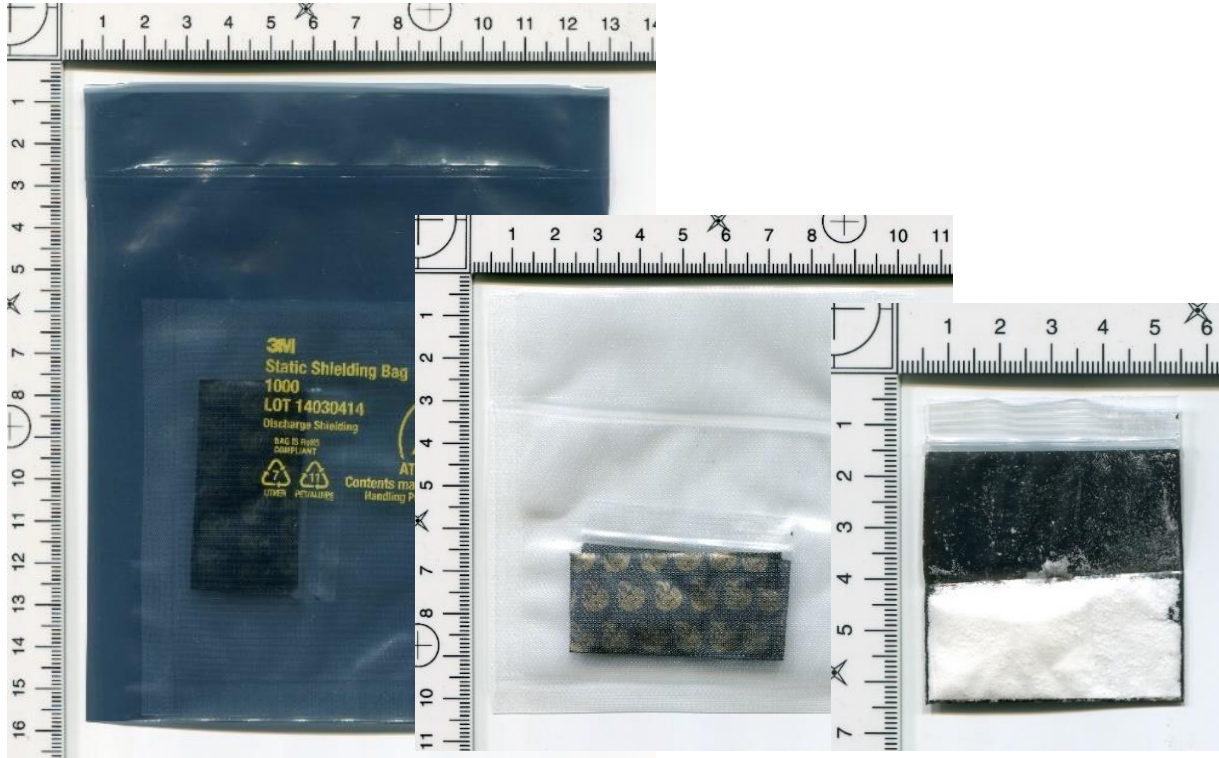
DFRWS EU 2016

Concealment techniques

"Stealth" methods



"[...] We double or triple seal our products in the package [...] scan secured [...]"



Order 1 – Seller_A – October 2014



Order 3 – Seller_C – November 2014

Unil

UNIL | Université de Lausanne

Ecole des sciences criminelles

Reference : Martin J (2014). Drugs on the Dark Net - How Cryptomarkets are Transforming the Global Trade in Illicit Drugs. *Palgrave MacMillan, UK.*

Online illicit drug market

DFRWS EU 2016

Chemical analyses

Minor and major alkaloids, purity and cutting agents



Order	Advertised product	Chemical composition		
		Active ingredient	Average purity	Cutting agents
1	1g Reines Koks (uncut min. 95%)	Cocaine HCl	33.7 ± 0.8 %	glucose levamisole
2	1 gr. Cannabis concentrate (sap/wax)	THC ¹	49.6 ± 8.3 %	N/A
3	1g Pure Cocaine (Fishscale / Flake) ~87% Purity	Cocaine HCl	69.0 ± 1.2 %	levamisole phenacetin
		MDMA ²	26.7 ± 0.2 %	palmitic acid stearic acid
4	1g Reines Koks (uncut min. 95%)	Cocaine HCl	30.2 ± 0.1 %	glucose levamisole inositol phenacetin

¹ Δ9-tetrahydrocannabinol

² 3,4-methylenedioxy-methamphetamine

Unil

UNIL | Université de Lausanne

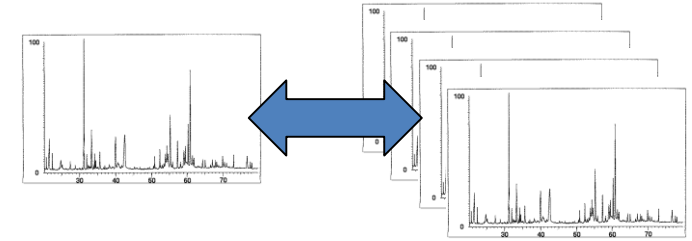
Ecole des sciences criminelles

Online illicit drug market

DFRWS EU 2016

Profiling of cocaine specimens

Comparison with street cocaine seizures



- On the three orders of cocaine, two were related to drug seizures processed by Western Swiss police forces

Order	Date of order	Product	Vendor	Related seizure Place – date of seizure
1	14.10.2014	Cocaine HCl	Seller_7	<i>Not related</i>
3	27.11.2014	Cocaine HCl	Seller_10	<i>Not related</i>
4	10.12.2014	Cocaine HCl	Seller_7	Vevey – May 2013 Lausanne – May 2014 Lausanne – Sept. 2014

- Cocaine specimen of the 4th order and cocaine specimens from the police seizures were **once part of the same physical unit**

Discussion and Conclusion

An exploratory research



- Digital data reliability
 - Crawling performed by another entity
 - Crawling methods and comparison difficulties
 - *Results lead to trends*
- Drugs quality and sellers information
 - Chemical characteristics of cocaine specimens differ from the advertised products
 - Importance of packaging for assessing quality
 - Profiling: meanings of links with police seizures ?
 - H_1 : Drugs bought on the street and then sold online ?
 - H_2 : Same wholesaler dealer ?

Perspectives

An exploratory research

- Further research
 - Authorisations: orders need to be justified and planned to address specific questions
 - Ethic consideration: encouragement of illicit markets by placing orders
- Forensic and investigation purposes
 - Digital investigation: Darknet markets comparison
 - Person identification: exploitation of fingermarks and DNA
 - Physical profiling
 - *Provide leads to detect illicit drug packages in postal services*
 - Chemical profiling
 - *Determination on the ways of distribution and supply of illicit drugs*

Combining digital data with physical and chemical results provides information about the functioning of illicit drug market on the Darknet



Thank you...
for your very kind attention !

Questions ?

Corresponding author :

Ludovic Staehli

ludovic.staehli@unil.ch

Unil

UNIL | Université de Lausanne

Ecole des sciences criminelles

Reference (*forthcoming*):

Rhumorbarbe D., Staehli L. *et al.*

Studying the illicit drug market on the Darknet through the analysis of digital, physical and chemical data. FSI.

Online illicit drug market

DFRWS EU 2016