NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

Spremljanje zaskrbljujočih novih kemikalij v okolju

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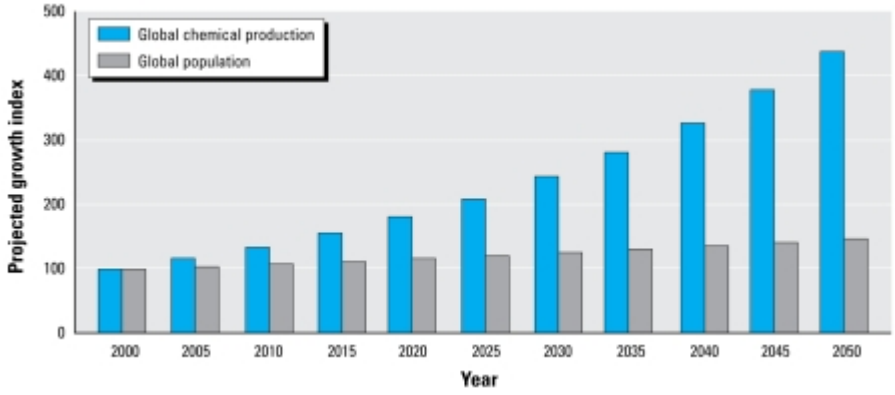
v.d. predstojnika Centra za kemijske analize živil, vod in drugih vzorcev okolja

NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

Kemijske spojine v številkah…



Global chemical production is projected to grow at a rate of 3% per year, rapidly outpacing the rate of global population growth, estimated at 0.77% per year. On this trajectory, chemical production will double by 2024, indexed to 2000 (American Chemistry Council 2003; OECD 2001; United Nations 2004).

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CAS Registry Number

From Wikipedia, the free encyclopedia

A **CAS Registry Number**,[1] also referred to as **CAS RN**[2] or informally **CAS Number**, is a unique identification number assigned by the Chemical Abstracts Service (CAS), US to every chemical substance described in the open scientific literature. It includes all substances described from 1957 through the present, plus some substances from as far back as the early 1800s.[3] It is a chemical database that includes organic and inorganic compounds, minerals, isotopes, alloys, mixtures, and nonstructurable materials (UVCBs, substances of **u**nknown or **v**ariable composition, **c**omplex reaction products, or **b**iological origin).[4] CAS RNs are generally serial numbers (with a check digit), so they do not contain any information about the structures themselves the way SMILES and InChI strings do.

The registry maintained by CAS is an authoritative collection of disclosed chemical substance information. It identifies more than 182 million unique organic and inorganic substances and 68 million protein and DNA sequences,[3] plus additional information about each substance. It is updated with around 15,000 additional new substances daily.[5] A collection of almost 500 thousand CAS registry numbers are made available under a CC-BY-NC license at ACS Commons Chemistry.[6]

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https://en.wikipedia.org/wiki/CAS_Registry_Number

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Kemijske spojine, okolje, človek...

NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

Emerging substances/Snovi, ki vzbujajo zaskrbljenost

NORMAN

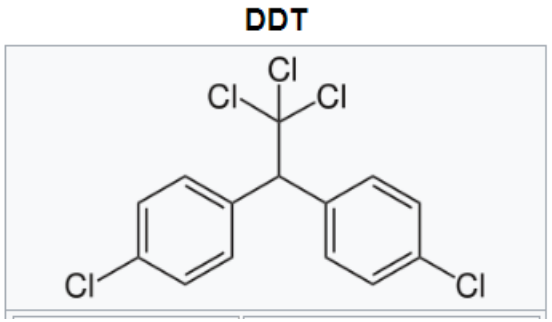
Network of reference laboratories, research centres and related organisations for monitoring of emerging environmental substances

- Emerging environmental substances are not necessarily new chemicals. They are substances that have often long been present in the environment but whose presence and significance are only now being elucidated.

- Examples from the LIST OF EMERGING SUBSTANCES are surfactants, flame retardants, pharmaceuticals and personal care products, gazoline additives and their degradation products, biocides, polar pesticides and their degradation products and various proven or suspected endocrine disrupting compounds (EDCs).

https://www.norman-network.net/

DDT (dichloro-diphenyl-trichloroethane), 1940-prvi sintetični insekticid v uporabi



NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

DDT (dichloro-diphenyl-trichloroethane), posledice….

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Silent Spring

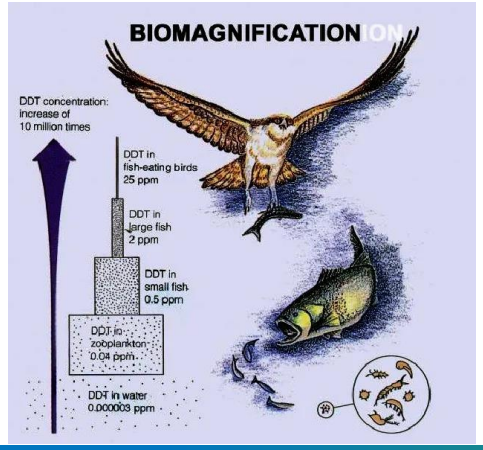
From Wikipedia, the free encyclopedia

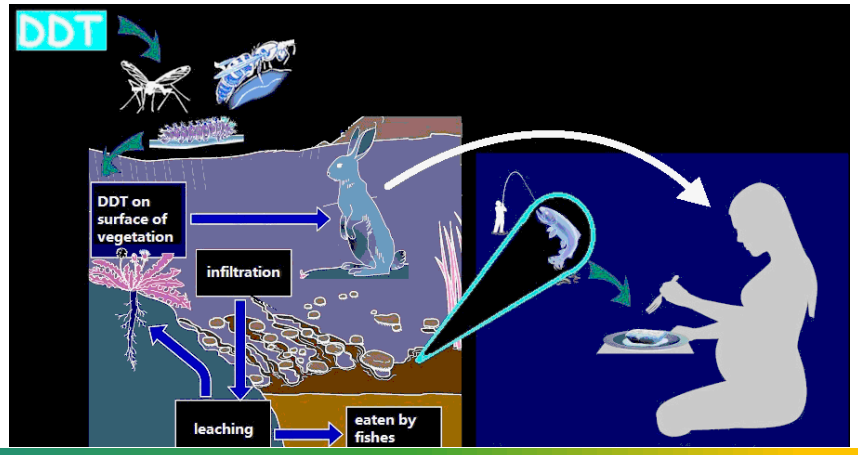
For other uses, see Silent Spring (disambiguation).

Silent Spring is an environmental science book by Rachel Carson.[1] Published on September 27, 1962, the book documented the environmental harm caused by the indiscriminate use of pesticides. Carson accused the chemical industry of spreading disinformation, and public officials of accepting the industry's marketing claims unquestioningly.

In the late 1950s, Carson began to work on environmental conservation, especially environmental problems that she believed were caused by synthetic pesticides. The result of her research was *Silent Spring*, which brought environmental concerns to the American public. The book was met with fierce opposition by chemical companies, but it swayed public opinion and led to a reversal in U.S. pesticide policy, a nationwide ban on DDT for agricultural uses,[2] and an environmental movement that led to the creation of the U.S. Environmental Protection Agency.[3][4]

In 2006, *Silent Spring* was named one of the 25 greatest science books of all time by the editors of *Discover* magazine.[5]





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DDT (dichloro-diphenyl-trichloroethane), pesticidi…

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DDT

From Wikipedia, the free encyclopedia

For other uses, see DDT (disambiguation).

Dichlorodiphenyltrichloroethane, commonly known as **DDT**, is a colorless, tasteless, and almost odorless crystalline chemical compound,[5] an organochloride. Originally developed as an insecticide, it became infamous for its environmental impacts. DDT was first synthesized in 1874 by the Austrian chemist Othmar Zeidler. DDT's insecticidal action was discovered by the Swiss chemist Paul Hermann Müller in 1939. DDT was used in the second half of World War II to limit the spread of the insect-borne diseases malaria and typhus among civilians and troops. Müller was awarded the Nobel Prize in Physiology or Medicine in 1948 "for his discovery of the high efficiency of DDT as a contact poison against several arthropods".[6]

By October 1945, DDT was available for public sale in the United States. Although it was promoted by government and industry for use as an agricultural and household pesticide, there were also concerns about its use from the beginning.[7] Opposition to DDT was focused by the 1962 publication of Rachel Carson's book *Silent Spring*. It talked about environmental impacts that correlated with the widespread use of DDT in agriculture in the United States, and it questioned the logic of broadcasting potentially dangerous chemicals into the environment with little prior investigation of their environmental and health effects. The book cited claims that DDT and other pesticides caused cancer and that their agricultural use was a threat to wildlife, particularly birds. Although Carson never directly called for an outright ban on the use of DDT, its publication was a seminal event for the environmental movement and resulted in a large public outcry that eventually led, in 1972, to a ban on DDT's agricultural use in the United States.[8]

A worldwide ban on agricultural use was formalized under the Stockholm Convention on Persistent Organic Pollutants which has been in effect since 2004. DDT still has limited use in disease vector control because of its effectiveness in killing mosquitos and thus reducing malarial infections, but that use is controversial due to environmental and health concerns.[9][10]

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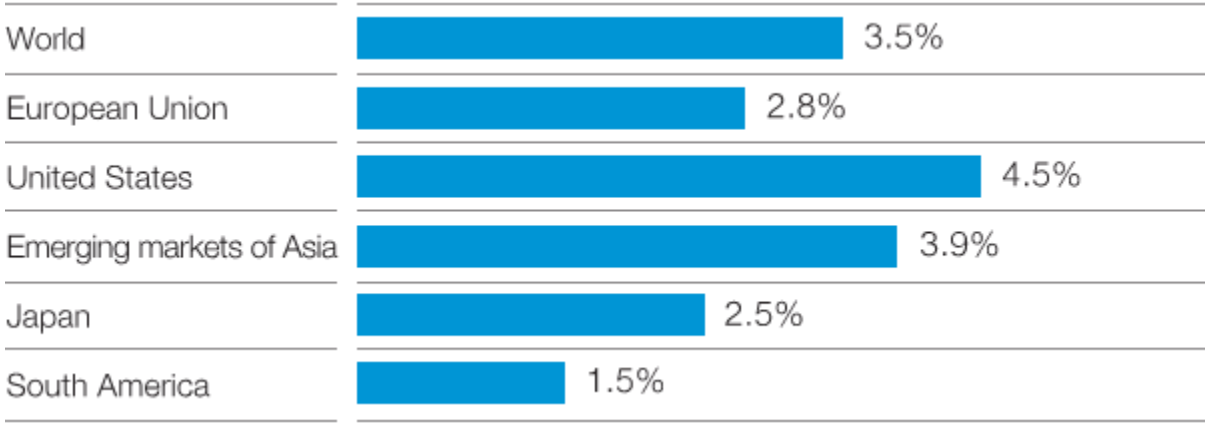
Danes, prihodnost…

- Dosti več kemikalij v uporabi, okolju in tudi veliko možnosti, da so med njimi nevarne, zaskrbljujoče..

Proizvodnja kemikalij se vsako leto povečuje:

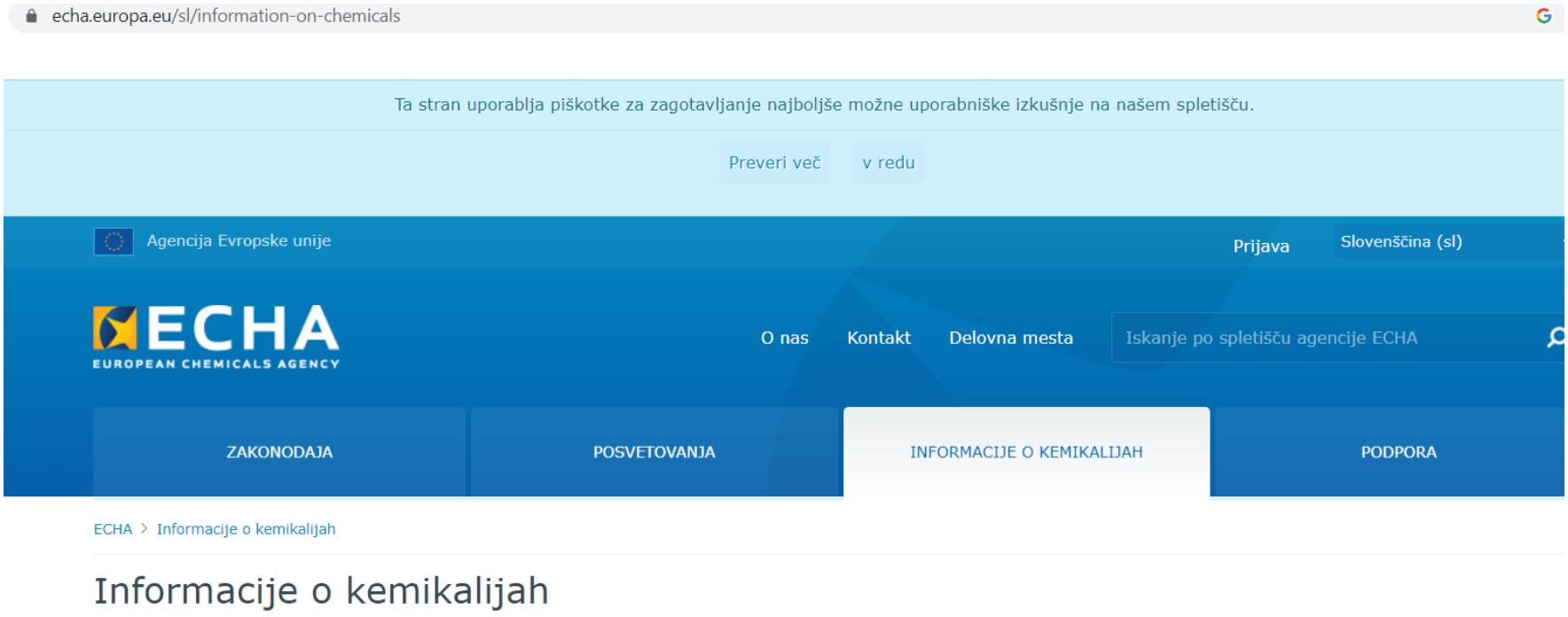


Outlook for chemical production 2022 (excluding pharmaceuticals), BASF Report

NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

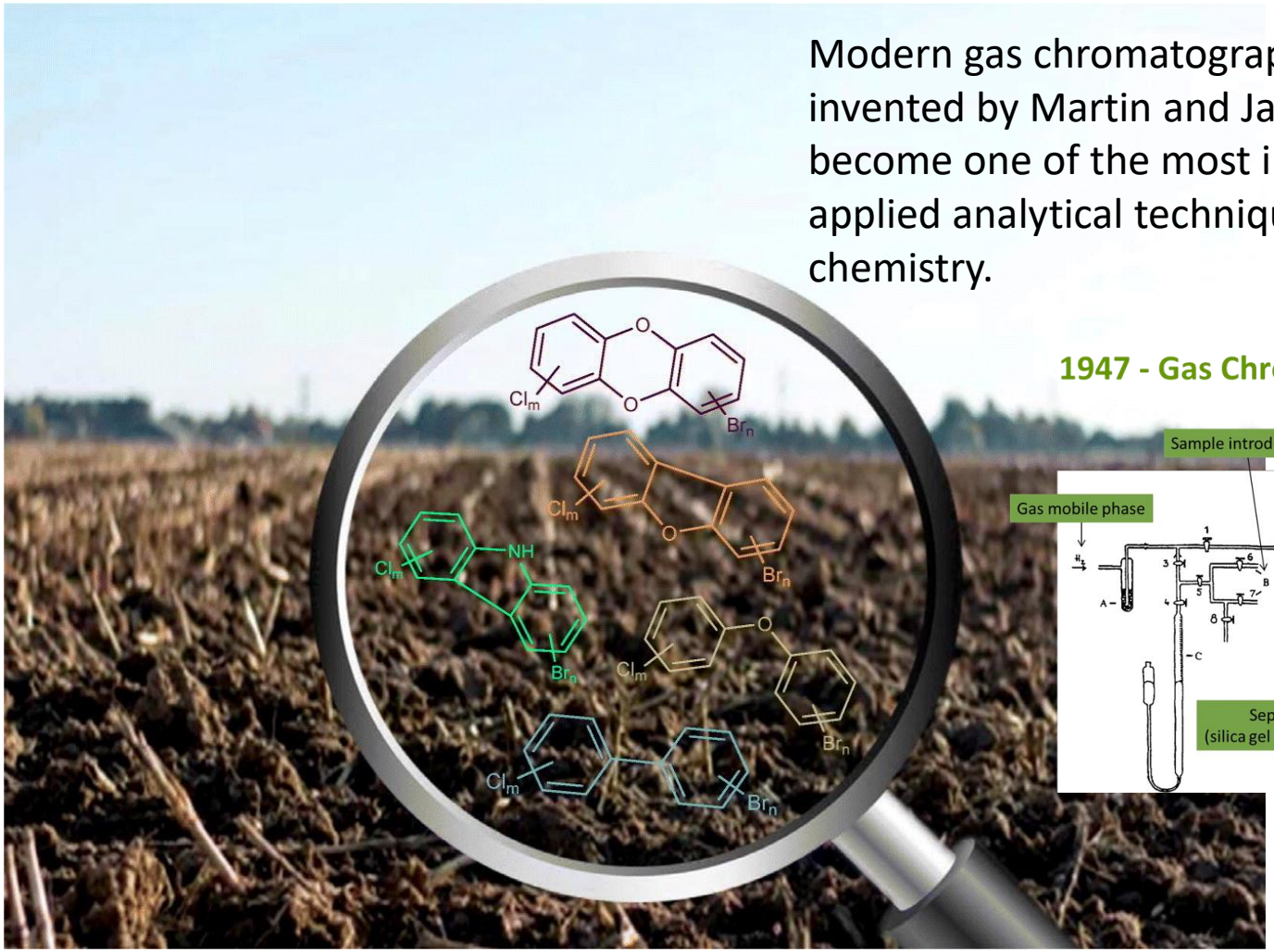
Danes, prihodnost…

- Večje zavedanje o potencialni nevarnosti novih snovi, več nadzora…
- Spremljanje v okolju, zakonodaja, ocene tveganja itd.

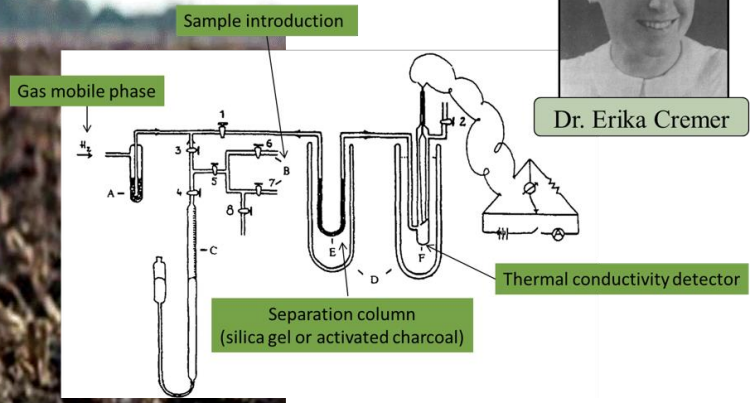


Spremljanje v okolju, orodja…

Modern gas chromatography (GC) was invented by Martin and James in 1952, and has become one of the most important and widely applied analytical techniques in modern chemistry.

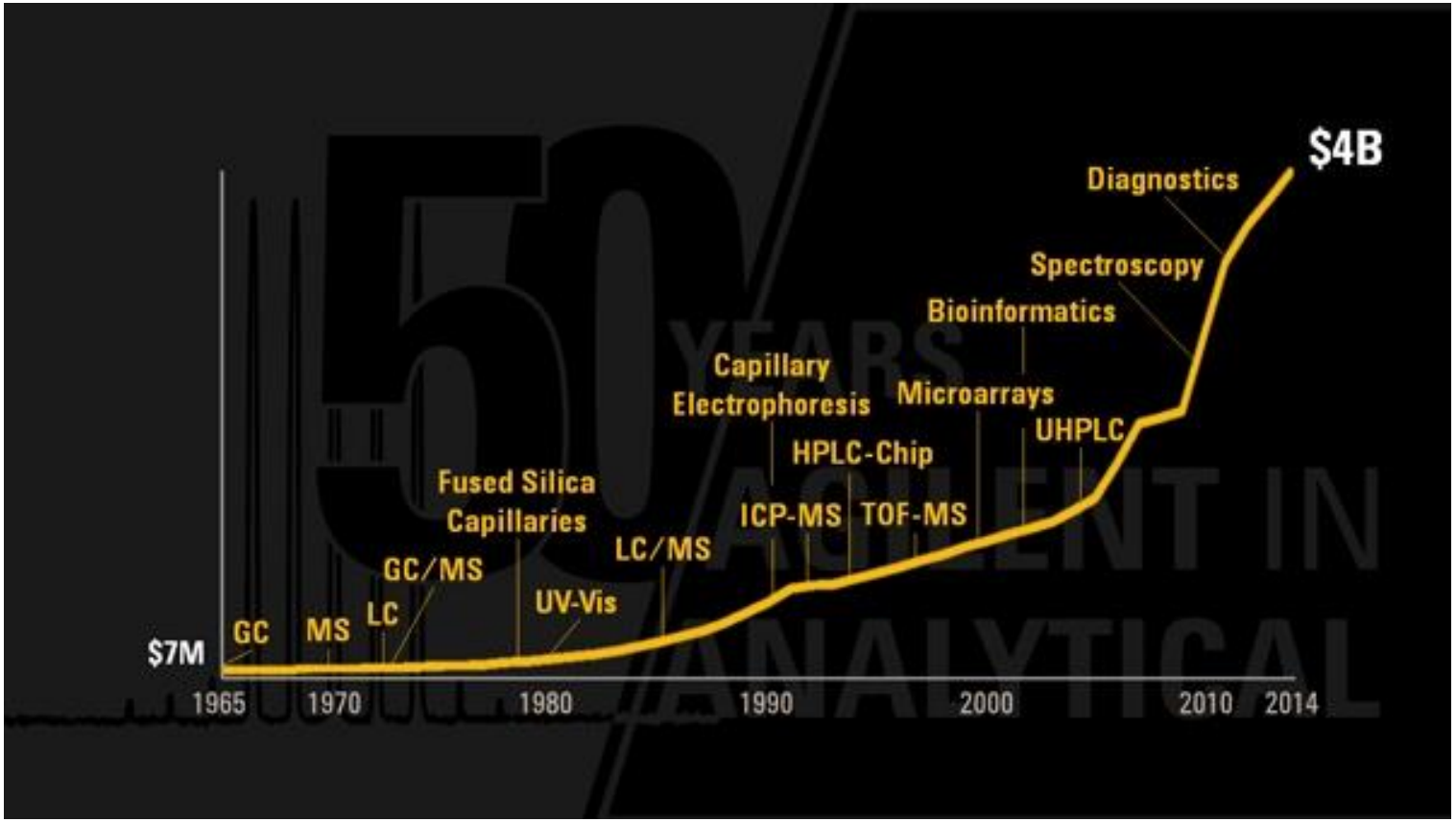


1947 - Gas Chromatography



Dr. Erika Cremer

Razvoj analitskih pristopov….



NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

Nacionalni laboratorij za zdravje, okolje in hrano (NLZOH) je osrednji in največji slovenski javnozdravstveni laboratorij, ki se ukvarja s področji varovanja okolja, diagnostično in javnozdravstveno mikrobiološko dejavnostjo, kemijskimi in mikrobiološkimi analizami različnih vrst vzorcev.

NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

NLZOH

-Center za kemijske analize vzorcev živil vod in drugih vzorcev okolja (CKA) v NLZOH sestavlja šest oddelkov s sedeži v **Celju, Kranju, Kopru, Mariboru, Novem mestu in Novi Gorici**.

-Osnovna dejavnost centra je izvajanje kemijskih analiz v različnih vrstah vzorcev. Izvajamo preko 600 različnih analitskih metod (z več kot 3000 parametri), od tega je več kot 350 različnih metod v obsegu akreditacije (listina LP-14),iste metode izvajamo na eni ali več lokacijah.

-Število metod nenehno povečujemo. Sproti se prilagajamo zahtevam naročnikov, spremembam v zakonodaji in dogodkom v okolju, za kar imamo ustrezno znanje, opremo in zmogljivosti.

NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

Center za kemijske analize živil, vod in drugih vzorcev okolja

-Sodelujemo tudi v različnih raziskovalnih projektih NLZOH in z drugimi partnerji.

-V centru CKA nas je zaposlenih 150 sodelavcev. Delo opravljajo visoko usposobljeni sodelavci: doktorji znanosti, specialisti, univerzitetni diplomirani kemiki in inženirji, laboratorijski tehniki in drugi sodelavci.

-Imamo najsodobnejšo opremo in sodobne laboratorij, zaradi šestih lokacij oddelkov pa smo enostavno dostopni po vsej Sloveniji.

-S svojo usposobljenostjo lahko zagotovimo tehnično podporo za naročnike, ki potrebujejo analize za redno kontrolo svojih postopkov in izdelkov ali za razvoj novih postopkov in izdelkov.

NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

Center za kemijske analize živil, vod in drugih vzorcev okolja

- Vse analize in potrebni postopki prevzema in priprave vzorcev potekajo na najvišjem nivoju zagotavljanja kakovosti in v skladu z zahtevami SIST EN ISO/IEC 17025 ter za dogovorjene programe v skladu z dobro laboratorijsko prakso (GLP) in dobro proizvodno prakso (GMP).

- Vključeni smo v več kot 10 različnih primerjalnih shem in z dobrimi rezultati potrjujemo svojo visoko usposobljenost, zanesljivost naših rezultatov in primerljivost z izvajalci izven Slovenije.

- Letno izvedemo preiskave v več kot 40000 vzorcih, podamo več kot miljon rezultatov za posamezne parametre…

NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

Analitika sledov organskih spojin

Plinska kromatografija (GC)

- FID (Flame ionization detector)
- ECD (Electron capture detector)
- PCB, organoklorni pesticidi

Plinska kromatografija v povezavi z masno spektrometrijo (GC/MS)

- GC/MS
- Ciljane analize:
- Pesticidi, PAH, ftalati, lahkohlapne organske spojine, mineralna olja…
- Neciljane analize

Plinska kromatografija v povezavi z masno spektrometrijo (GC/MS)

- GC/MS/MS
- GC/HRMS

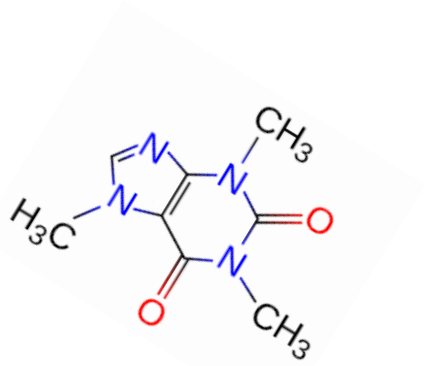
- Ciljane analize:
- Obstojna organska onesnaževala (PCDD/F, PCB, PBDE, PCA..)
- Pesticidi itd.

Tekočinska kromatografija v povezavi z masno spektrometrijo-LC/MS

- LC/MS/MS

- Ciljane analize:
- Pesticidi, farmacevste spojine, akrilamid, melamin, mikotoksini, rastlinski toksini, alkaloidi, kanabinoidi, perfluoro spojine…

FMC, vode



Najpogosteje zaznani: benzotriazoli, karbamazepin, sulfametoksazol, kofein

zap. st.	Ime spojine	formula	CAS No.	Mol.m (g/mol)	Klasifikacija
1	Amoksicilin	$C_{16}H_{19}N_3O_5S$	26787-78-0	365,4	antibiotik
2	Androstendion	$C_{19}H_{26}O_2$	63-05-8	286,4	hormon
3	Atenolol	$C_{14}H_{22}N_2O_3$	29122-68-7	266,3	β-blokator
4	Azitromoicin	$C_{38}H_{72}N_2O_{12}$	83905-01-5	749,0	makrolidni antibiotik
5	1H-benzotriazol	$C_6H_5N_3$	95-14-7	119,1	zaviralec korozije
6	1-metil-1H-benzotriazol	$C_7H_7N_3$	13351-73-0	133,2	zaviralec korozije
7	4-metil-1H-benzotriazol	$C_7H_7N_3$	29878-31-7	133,2	zaviralec korozije
8	5-metil-1H-benzotriazol	$C_7H_7N_3$	136-85-6	133,2	zaviralec korozije
9	Betaksolol	$C_{18}H_{29}NO_3$	63659-18-7	307,4	β-blokator
10	Bezafibrat	$C_{19}H_{20}ClNO_4$	41859-67-0	361,8	regulator lipidov
11	Ciprofloksacin	$C_{17}H_{18}FN_3O_3$	85721-33-1	331,3	antibiotik
12	Dietilstilbestrol	$C_{18}H_{20}O_2$	56-53-1	268,4	hormon
13	Diklofenak	$C_{14}H_{11}Cl_2NO_2$	15307-86-5	296,1	antirevmatik/analgetik/antipiretik
14	Ekvilin	$C_{18}H_{20}O_2$	474-86-2	268,4	hormon
15	Eritromicin	$C_{37}H_{67}NO_{13}$	114-07-8	733,9	makrolidni antibiotik
16	17β-Estradiol	$C_{18}H_{24}O_2$	50-28-2	272,4	hormon
17	Estron	$C_{18}H_{22}O_2$	53-16-7	270,4	hormon
18	Estriol	$C_{18}H_{24}O_3$	50-27-1	288,4	hormon
19	17α-Etinilestradiol	$C_{20}H_{24}O_2$	57-63-6	296,4	hormon
20	Fenofibrat	$C_{20}H_{21}ClO_4$	49562-28-9	360,8	regulator lipidov
21	Fenoterol	$C_{17}H_{21}NO_4$	13392-18-2	303,4	bronhodilator
22	Gemfibrozil	$C_{15}H_{22}O_3$	25812-30-0	250,3	regulator lipidov
23	Ibuprofen	$C_{13}H_{18}O_2$	15687-27-1	206,3	antirevmatik/analgetik/antipiretik
24	Indometacin	$C_{19}H_{16}ClNO_4$	53-86-1	357,8	antirevmatik/analgetik/antipiretik
25	Karbamazepin	$C_{15}H_{12}N_2O$	298-46-4	236,3	antiepileptik
26	Ketoprofen	$C_{16}H_{14}O_3$	22071-15-4	254,3	antirevmatik/analgetik/antipiretik
27	Klaritromicin	$C_{38}H_{69}NO_{13}$	81103-11-9	748,0	makrolidni antibiotik
28	Klofibrična kislina	$C_{10}H_{11}ClO_3$	882-09-7	214,7	regulator lipidov
29	Kloramfenikol	$C_{11}H_{12}Cl_2N_2O_5$	56-75-7	323,1	antibiotik
30	Klorotetraciklin	$C_{22}H_{23}ClN_2O_8$	57-62-5	478,9	tetraciklinski antibiotik
31	Kodein	$C_{18}H_{21}NO_3$	76-57-3	299,4	analgetik/opiat
32	Kofein	$C_8H_{10}N_4O_2$	58-08-2	194,2	psihoanaleptik
33	Krotamiton	$C_{13}H_{17}NO$	483-63-6	203,3	antipruritik

zap. st.	Ime spojine	formula	CAS No.	Mol.m (g/mol)	Klasifikacija
34	Metoprolol	$C_{15}H_{25}NO_3$	51384-51-1	267,4	β-blokator
35	Naproksen	$C_{14}H_{14}O_3$	22204-53-1	230,3	antirevmatik/analgetik/antipiretik
36	Oksitetraciklin	$C_{22}H_{24}N_2O_9$	79-57-2	460,4	tetraciklinski antibiotik
37	Paracetamol	$C_8H_9NO_2$	103-90-2	151,2	analgetik/antipiretik
38	Penicilin G	$C_{16}H_{18}N_2O_4S$	61-33-6	334,4	antibiotik
39	Propranolol	$C_{16}H_{21}NO_2$	525-66-6	259,3	β-blokator
40	Propifenazon	$C_{14}H_{18}N_2O$	479-92-5	230,3	analgetik/antipiretik
41	Roksitromicin	$C_{41}H_{76}N_2O_{15}$	80214-83-1	837,1	makrolidni antibiotik
42	Salbutamol	$C_{13}H_{21}NO_3$	18559-94-9	239,3	bronhodilator
43	Salicilna kislina	$C_7H_6O_3$	69-72-7	138,1	analgetik/antipiretik
44	Sotalol	$C_{12}H_{20}N_2O_3S$	3930-20-9	272,4	β-blokator
45	Sulfadiazin	$C_{10}H_{10}N_4O_2S$	68-35-9	250,3	antibiotik
46	Sulfadoksin	$C_{12}H_{14}N_4O_4S$	2447-57-6	310,3	antibiotik
47	Sulfamerazin	$C_{11}H_{12}N_4O_2S$	127-79-7	264,3	antibiotik
48	Sulfametazin	$C_{12}H_{14}N_4O_2S$	57-68-1	278,3	antibiotik
49	Sulfametoksazol	$C_{10}H_{11}N_3O_3S$	723-46-6	253,3	antibiotik
50	Sulfatiazol	$C_9H_9N_3O_2S_2$	72-14-0	255,3	antibiotik
51	Tamoksifen	$C_{26}H_{29}NO$	10540-29-1	371,5	hormonski antagonist
52	Teofilin	$C_7H_8N_4O_2$	58-55-9	180,2	bronhodilator
53	Terbutalin	$C_{12}H_{19}NO_3$	23031-25-6	225,3	bronhodilator
54	Testosteron	$C_{19}H_{28}O_2$	58-22-0	288,4	hormon
55	Tetraciklin	$C_{22}H_{24}N_2O_8$	60-54-8	444,4	tetraciklinski antibiotik
56	Triklosan	$C_{12}H_7Cl_3O_2$	3380-34-5	289,5	antibakterijsko sredstvo
57	Trimetoprim	$C_{14}H_{18}N_4O_3$	738-70-5	290,3	antibiotik

EPA 1694

EPA 539

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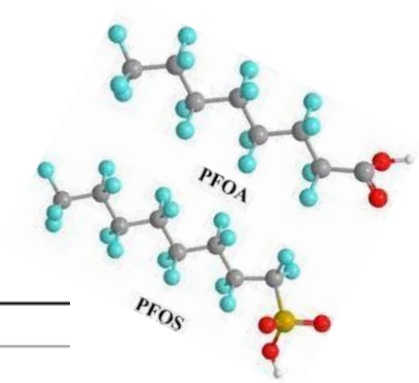
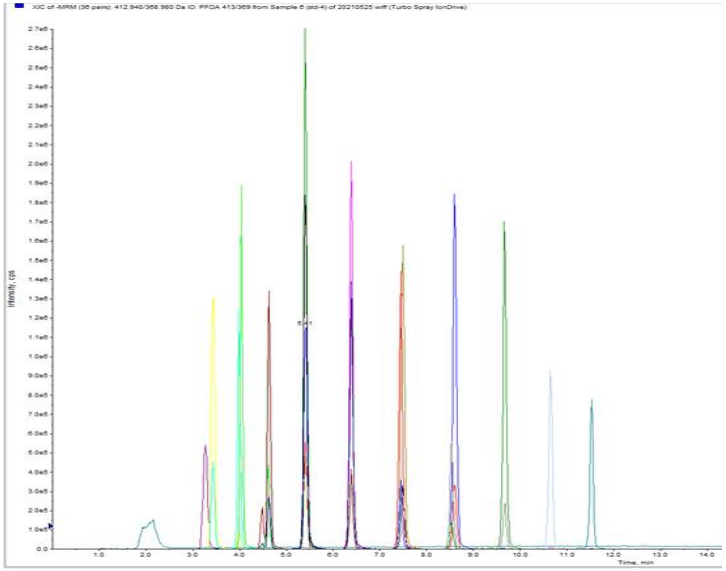


- SIST ISO 25101:2010
- Karboksilne kisline C4-C14
- Sulfonske C4-C10

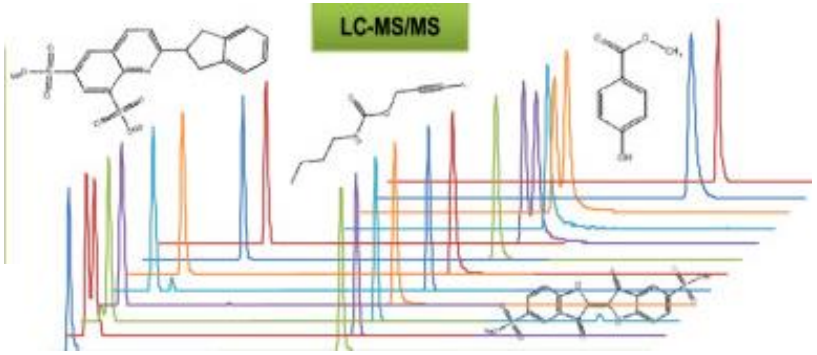


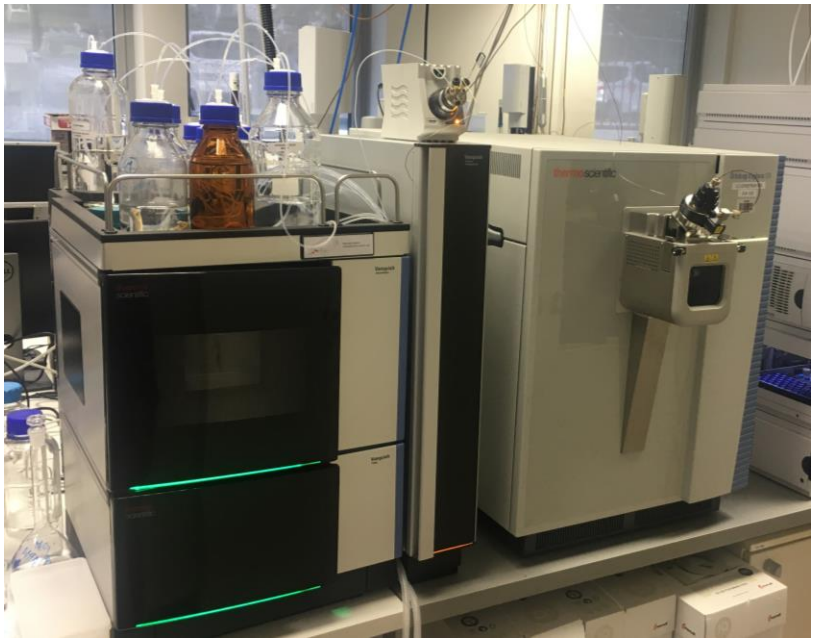
Carboxlyic acids (-COO^-) *PFCAs*	
PFBA	Perfluorobutanoic acid
PFPeA	Perfluoropentanoic acid
PFHxA	Perfluorohexanoic acid
PFHpA	Perfluoroheptanoic acid
PFOA	Perfluorooctanoic acid
PFNA	Perfluorononanoic acid
PFDA	Perfluorodecanoic acid
PFUnDA	Perfluoroundecanoic acid
PFDoDA	Perfluorododecanoic acid
PFTrDA	Perfluorotridecanoic acid
PFTeDA	Perfluorotetradecanoic acid
Sulfonic acids (-SO_3^-) *PFSAs*	
PFBS	Perfluorobutanesulfonic acid
PFPeS	Perfluoropentanesulfonic acid
PFHxS	Perfluorohexanesulfonic acid
PFHpS	Perfluoroheptanesulfonic acid
P6MHpS	Perfluoro-6-methylheptanesulfonate
PFOS	Perfluorooctanesulfonic acid
PFNS	Perfluorononanesulfonic acid
PFDS	Perfluorodecanesulfonic acid

Tekočinska kromatografija v povezavi z masno spektrometrijo-LC/MS

- LC-qTOF/MS,
- LC/HRMS (orbitrap)

  - Ciljane in neciljane analize





NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

Laboratoriji za anorganske analize:

- Induktivno sklopljena plazma z masno spektrometrijo (ICP/MS)
- Težke kovin (Pb, As, Cd, Cr)

- AAS, DMA (Termična razgradnja, amalgamacija in AAS določitev)
- Hg

Monitoring…

https://www.gov.si/assets/organi-v-sestavi/ARSO/Vode/Stanje-voda/Program-monitoringa-voda-2022-do-2027.pdf

ARSO OKOLJE

Program monitoringa kemijskega in ekološkega stanja voda

Program za obdobje 2022 do 2027

https://www.arso.gov.si/

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Monitoring…

arso.gov.si/vode/podatki/arhiv/kakovost_arhiv2021.html

ARSO > vode > podatki > arhiv

- Opozorila
- Napovedi
- Podatki
- Morje
- Reke
- Jezera
- Podzemne vode
- Kopalne vode
- Poročila in publikacije
- Vprašanja in odgovori
- Povezave

VODE

PODATKI O KAKOVOSTI VODA - 2021

Podatki, objavljeni na spletni strani so zbrani v okviru imisijskega monitoringa kakovosti voda na Agenciji RS za okolje.

Podatki so rezultat kontroliranih meritev v mreži za spremljanje kakovosti voda .

Izpisi podatkov na tej spletni strani so oblikovani do meje določljivosti. Analitske metode so dostopne v poročilih v naši knjižnici ali naši spletni strani. Tu so na voljo tudi opisi merilnih mest.

Podatki, objavljeni na spletni strani so javni in na voljo za ponovno uporabo skladno z Uredbo o posredovanju in ponovni uporabi informacij javnega značaja (Ul. RS št. 76 z dne 12.8.2005). V skladu s 26. členom navedene uredbe je obvezna navedba vira informacij: "vir: Agencija Republike Slovenije za okolje".

MORJE – izpisi podatkov po merilnih mestih za leto 2021

- Podatki - morje 2021 - voda, organizmi [xlsx, 109.9 KB]

REKE – izpisi podatkov po merilnih mestih za leto 2021

- REKE – izpis podatkov za leto 2021 [xlsx, 587.7 KB]

JEZERA IN ZADRŽEVALNIKI – izpisi podatkov po jezerih za leto 2021

- Podatki - jezera 2021 – voda in sediment [xlsx, 105.5 KB]

PODZEMNA VODA – izpisi podatkov za leto 2021

- Izpis podatkov za podzemno vodo za leto 2021 [xlsx, 263.4 KB]

POVRŠINSKE VODE, KI SE ODVZEMAJO ZA OSKRBO S PITNO VODO - izpisi podatkov za leto 2021

- Podatki – površinski viri pitne vode 2021 [xlsx, 49.2 KB]

https://www.arso.gov.si/

Monitoring, podatki…

PODZEMNA VODA – izpisi podatkov za leto 2021, PFOA, PFOS

Vodno telo	Merilno mesto	Šifra posta	Koordinata	Koordinata	Datum	PFOA	PFOS
						µg/L	µg/l
1001 Savska kotlina in Ljubljansko barje	MOSTE Most-1/18	P38190	117086	463771	21.06.2021	0,001	0,018
1001 Savska kotlina in Ljubljansko barje	DRAGOČAJNA D-0185	P38240	115180	455530	17.06.2021	0,0011	0,0098
1001 Savska kotlina in Ljubljansko barje	TRBOJE Trb-1/13	P38260	117163	455570	17.06.2021	0,0011	0,01
1001 Savska kotlina in Ljubljansko barje	MEJA 0320	P42360	116605	452230	22.06.2021	0,001	0,0014
1001 Savska kotlina in Ljubljansko barje	MEJA Mej-1/13	P42364	114690	452671	22.06.2021	0,0023	0,0013
1001 Savska kotlina in Ljubljansko barje	DRULOVKA Dru-1/14	P45122	119645	451723	22.06.2021	0,002	0,0021
1001 Savska kotlina in Ljubljansko barje	PODGORJE Pod-1/14	P50061	118515	468847	21.06.2021	0,0012	0,0021
1001 Savska kotlina in Ljubljansko barje	JARŠKI PROD (III) JA-3	P50420	105004	465716	16.06.2021	0,0018	0,0017
1001 Savska kotlina in Ljubljansko barje	MERCATOR V1	P54350	104846	459831	17.06.2021	0,0032	0,0053
1001 Savska kotlina in Ljubljansko barje	STOŽICE LV-0277	P54460	104761	462973	15.06.2021	0,0022	0,0015
1001 Savska kotlina in Ljubljansko barje	VOJKOVA Voj-1/14	P54570	102479	462627	21.06.2021	0,003	0,0055
1001 Savska kotlina in Ljubljansko barje	NAVJE-LIMNIGRAF	P54580	101914	462581	15.06.2021	0,0042	0,0049
1001 Savska kotlina in Ljubljansko barje	HRASTJE (I a) 0344	P54720	102944	466549	16.06.2021	0,002	0,0059
1001 Savska kotlina in Ljubljansko barje	KOTEKS-ZALOG 0371	P54900	102792	470260	17.06.2021	0,0018	0,0028
1003 Krška kotlina	SP.STARI GRAD NE-1177	P62120	87870	540900	01.06.2021	0,0039	0,087
1003 Krška kotlina	PB-20	P68020	85239	545180	03.06.2021	0,001	0,0023
3012 Dravska kotlina	VRBANSKI PLATO 16	P14030	158525	548450	07.06.2021	0,0027	0,0034
3012 Dravska kotlina	PREPOLJE, P-1	P18000	144992	559858	14.06.2021	0,0013	0,0091
3012 Dravska kotlina	STARŠE Sta-1/10	P18501	146841	558520	10.06.2021	0,0011	0,021

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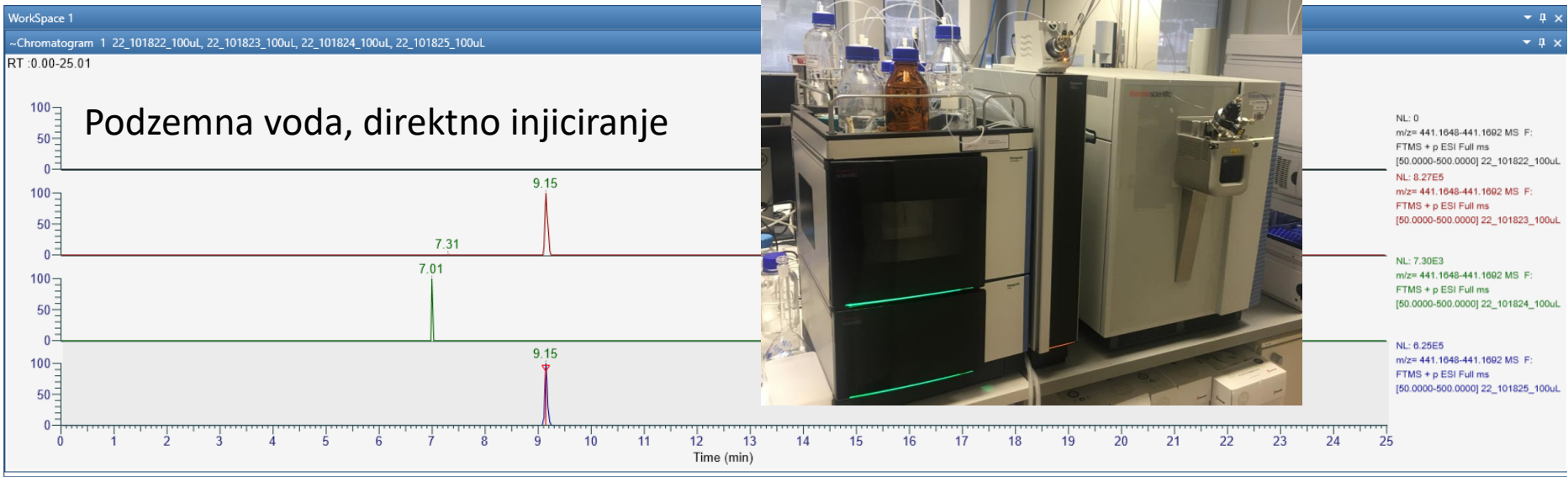
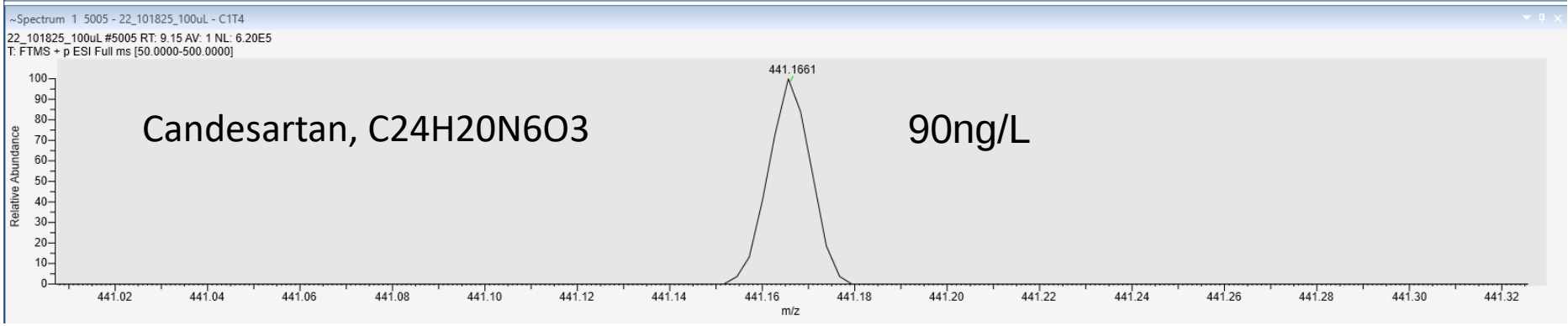
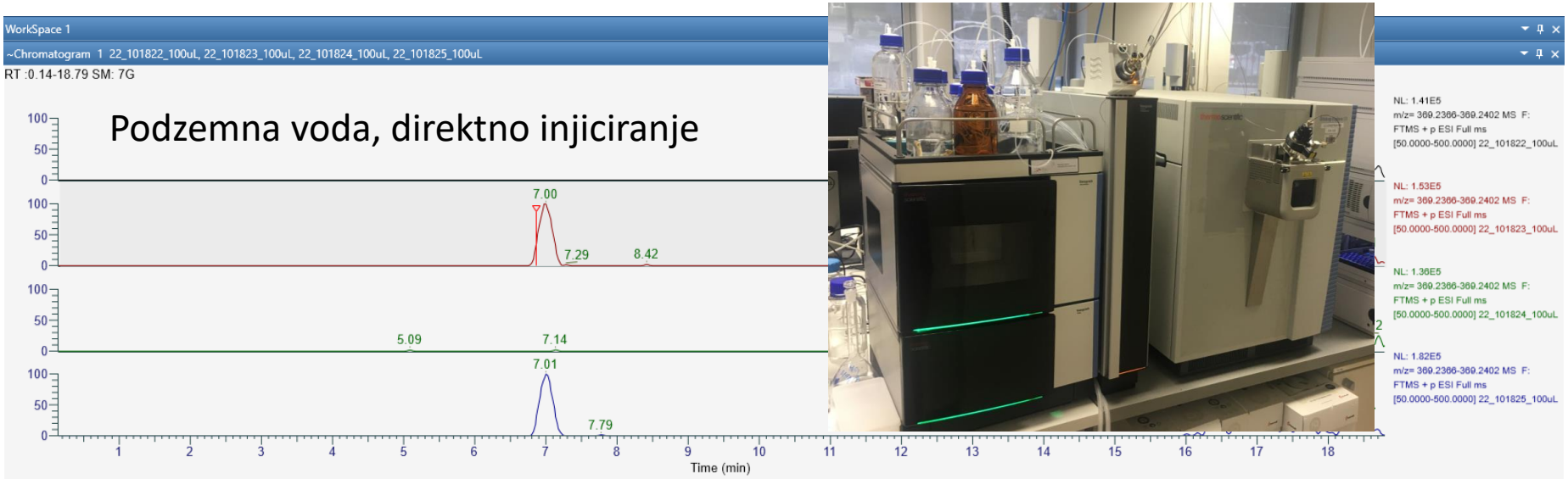
Sodobni pristopi, LC/HRMS (Orbitrap Exploris 120 LSMS sistem):

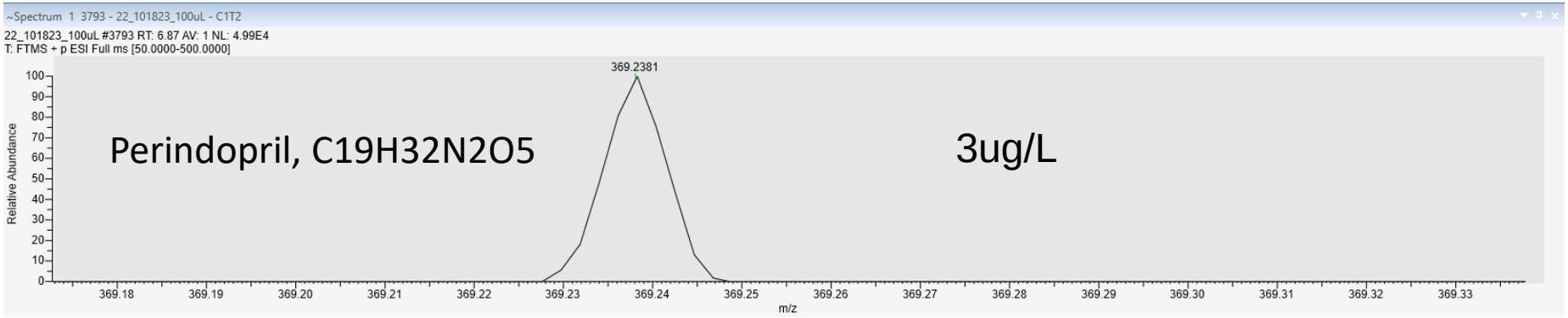




NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

Sodobni pristopi, LC/HRMS (Orbitrap Exploris 120 LSMS sistem):





NACIONALNI LABORATORIJ ZA ZDRAVJE, OKOLJE IN HRANO

Sodelovanje, mreženje..

NORMAN

Network of reference laboratories, research centres and related organisations for monitoring of emerging environmental substances

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Emerging substances

WHY DO WE NEED TO ADDRESS EMERGING SUBSTANCES?

Emerging environmental substances are not necessarily new chemicals. They are substances that have often long been present in the environment but whose presence and significance are only now being elucidated.

NORMAN has identified a list of the currently most frequently discussed emerging substances and emerging pollutants (see NORMAN Database System – Substance Database at **https://www.norman-network.com/nds/susdat/**).

These substances are contributed by members of the NORMAN network and external organisations via Substance List Exchange (**https://www.norman-network.com/nds/SLE/**) and then merged together in the Substance Database.

NORMAN systematically collects in the EMPODAT database monitoring data and information on effects and hazardous properties for these substances. On the basis of this information, the substances are assigned to priority action categories by the NORMAN Prioritisation Working Group.

"Emerging substances" can be defined as substances that have been detected in the environment, but which are currently not included in routine monitoring programmes at EU level and whose fate, behaviour and (eco)toxicological effects are not well understood.

"Emerging pollutants" can be defined as pollutants that are currently not included in routine monitoring programmes at the European level and which may be candidates for future regulation, depending on research on their (eco)toxicity, potential health effects and public perception and on monitoring data regarding their occurrence in the various environmental compartments.

Examples from the **LIST OF EMERGING SUBSTANCES** are surfactants, flame retardants, pharmaceuticals and personal care products, gazoline additives and their degradation products, biocides, polar pesticides and their degradation products and various proven or suspected endocrine disrupting compounds (EDCs). The NORMAN experts regularly revise the list of emerging substances

https://www.norman-network.net/

NACIONALNI LABORATORIJ ZA
ZDRAVJE, OKOLJE IN HRANO

Hvala za vašo pozornost!