SPRINT

PRIJELAZ NA ODRŽIVU ZAŠTITU BILJA

Horizon 2020, projekt SPRINT i studija slučaja u Hrvatskoj

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CILJ EUROPSKE KOMISIJE

Strategija Od farme do stola - 2030

- 50% smanjenje upotrebe pesticida
- 20% smanjenje potrošnje gnojiva
- Povećanje obujma organske poljoprivrede s 8% na 25%

Strategija za bioraznolikost - 2030

- Nadopunjuje strategiju "Od farme do stola".
- Pretvoriti 10% poljoprivrednog zemljišta u krajolike s visokom bioraznolikošću
- Preokrenuti trend smanjenja genetske raznolikosti.

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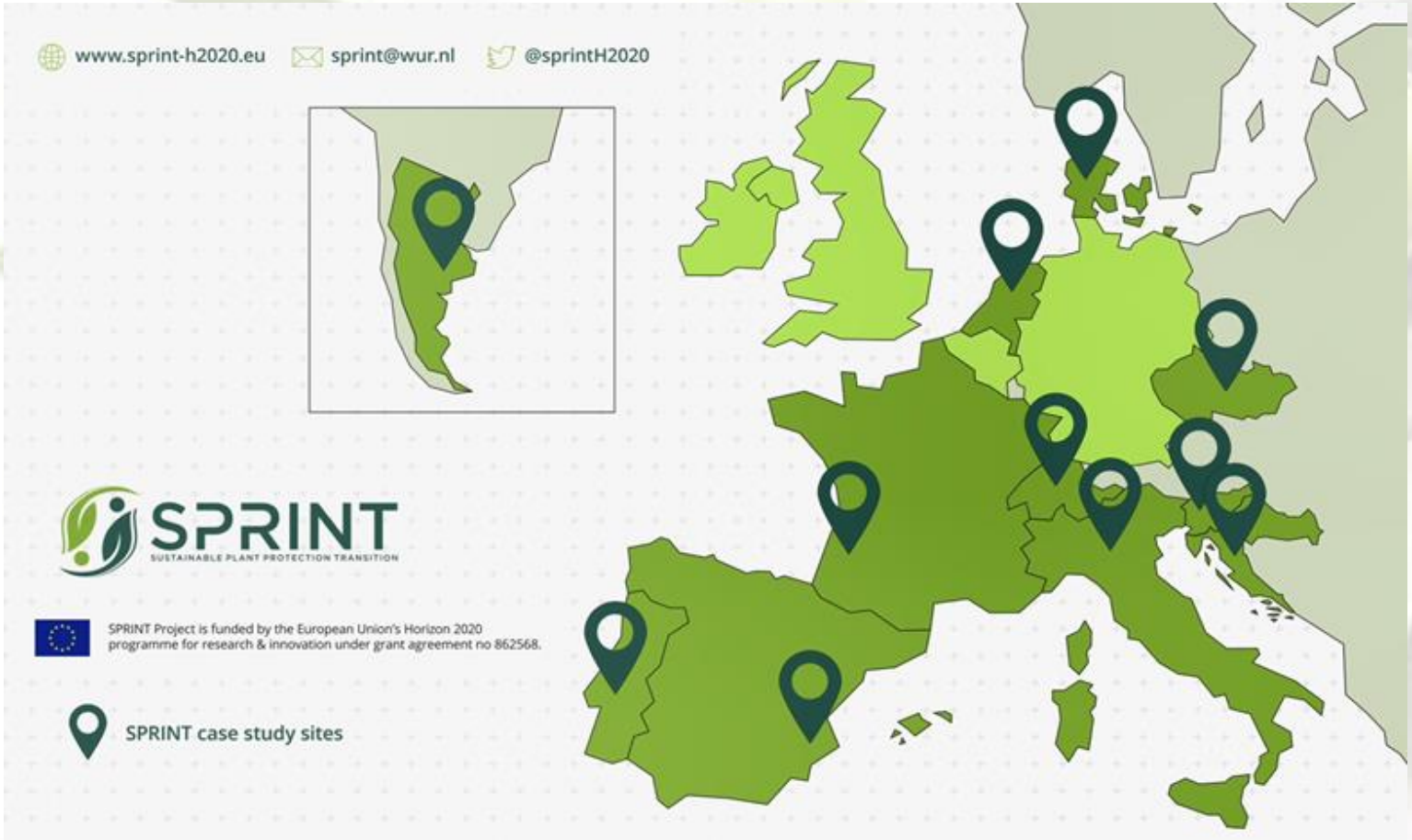
Trajanje projekta 9/2020 – 8/2025

- 11 različitih lokacija, 10 u Europi



Cilj projekta

- Razviti Globalni set alata za procjenu zdravstvenih rizika utjecaja proizvoda za zaštitu bilja (PPP - Plant Protection Products) na zdravlje ekosustava, biljaka, životinja i ljudi (EPAH)
- Predložiti nekoliko mogućnosti za prijelaz na održivu zaštitu bilja

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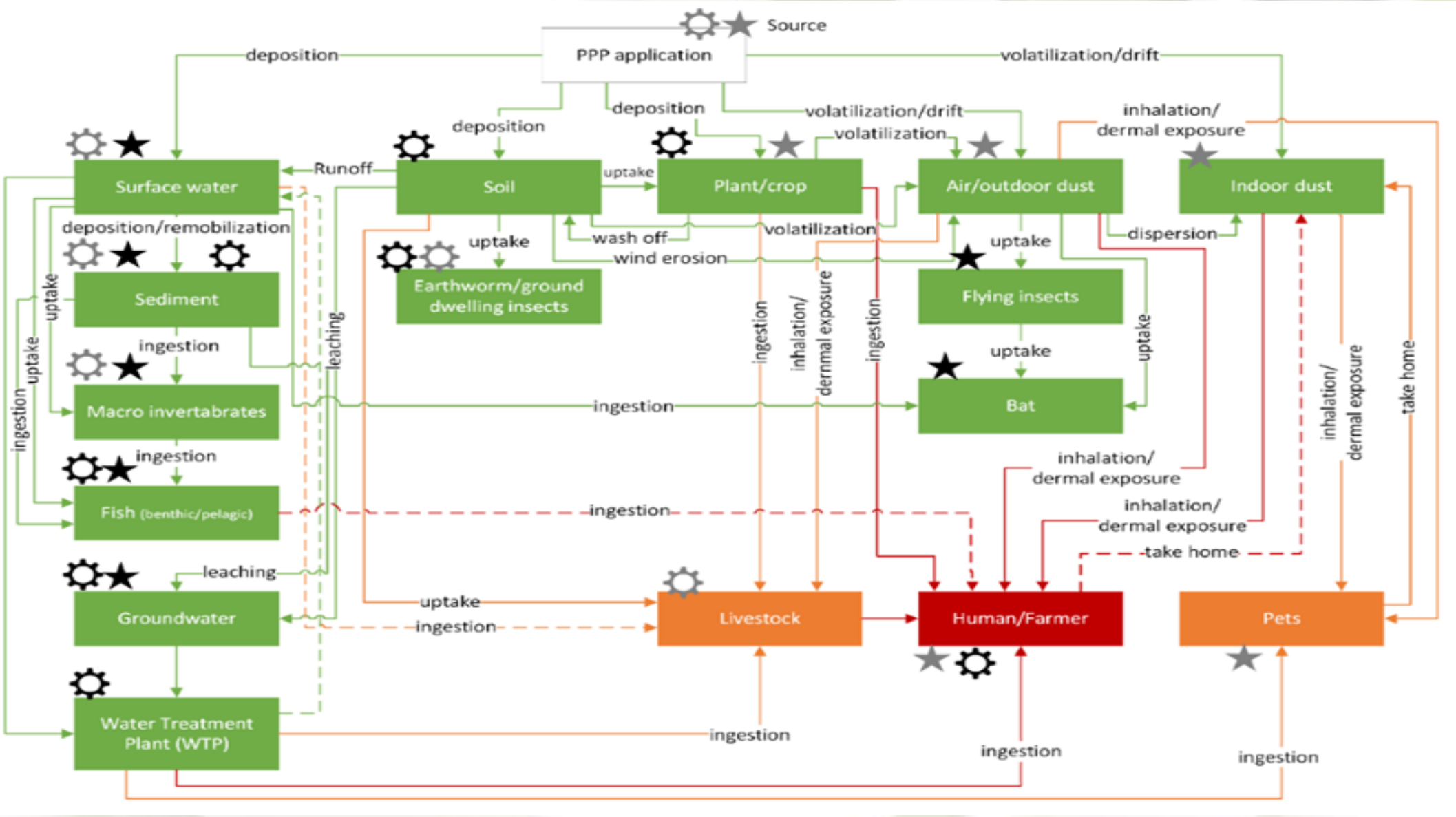
SUSTAINABLE PLANT PROTECTION TRANSITION

H2020 Projekt
2020-2025

28 partnera


Source
PPP application
deposition
volatilization/drift
deposition
deposition
volatilization/drift
volatilization
inhalation/
dermal exposure
Surface water
Runoff
Soil
uptake
Plant/crop
Air/outdoor dust
Indoor dust
deposition/remobilization
uptake
wash off
wind erosion
volatilization
dispersion
uptake
Sediment
Earthworm/ground
dwelling insects
Flying insects
uptake
ingestion
leaching
ingestion
inhalation/
dermal exposure
ingestion
uptake
uptake
ingestion
Macro invertabrates
Bat
uptake
ingestion
inhalation/
dermal exposure
Fish (benthic/pelagic)
ingestion
inhalation/
dermal exposure
take home
leaching
Groundwater
uptake
ingestion
Livestock
Human/Farmer
Pets
Water Treatment
Plant (WTP)
ingestion
ingestion
ingestion

SPRINT lista PPP/METABOLITA planiranih za analizu

LC-MS/MS ESI pos	Acetamiprid	Dimoxystrobin	Haloxyfop	Metolachlor (S)	Propamocarb	Spirotetramat
	Acetamiprid-N-desmethyl	Dinotefuran	Imazalil	Metrafenone	Propaquizafop	*Spirotetramat-enol*
	Ametoctradin	Diuron	Imidacloprid	Metribuzin	Propiconazole	*Spirotetramat-enol-glucoside*
	Atrazine	Emamectin	*Imidacloprid (5-hydroxy)*	Metsulfuron-methyl	Propoxur	*Spirotetramat-keto-hydroxy*
	Azoxystrobin	Epoxiconazole	*Imidacloprid (desnitro-)*	Myclobutanil	Propyzamide	*Spirotetramat-mono-hydroxy*
	Azoxystrobin-O-demethyl	Ethofumesate	Indoxacarb	Napropamide (M)	Prosulfocarb	Spiroxamine
	Bixafen	Famoxadone	iprovalicarb	Nicosulfuron	*Prothioconazole desthio*	Tebuconazole
	Boscalid	Fenbuconazole	Isoproturon	Oryzalin	Pymetrozine	Terbuthylazine
	Carbendazim	Fenhexamid	Isoxaben	Oxadixyl	Pyraclostrobin	*Terbuthylazine-desethyl*
	Chlorantraniliprole	Fenoxycarb	Isoxaflutole	Oxyfluorfen	Pyraflufen-ethyl	Terbutryn
	Chlorotoluron	Fenpropidin	Lenacil	Penconazole	Pyrethrin I	Tetraconazole
	Clomazone	Fenpropimorph	Linuron	Pencycuron	Pyrethrin II	Thiabendazole
	Clothianidin	Flazasulfuron	Mandipropamid	Pendimethalin	Pyrimethanil	Thiacloprid
	Cyantraniliprole	Flonicamid	Metalaxyl (M)	penoxulam	*Pyrimethanil_M605F002*	Thiamethoxam
	Cyflufenamide	Florasulam	*Metalaxyl CGA 62826*	Phosmet	Pyriofenone	Thiencarbazone-methyl
	cymoxanil	Flufenacet	Metamitron	*Phosmet oxon*	Pyriproxyfen	Thiophanate-methyl
	Cyproconazole	Fluopicolide	*Metamitron-desamino*	Phoxim	Pyroxsulam	*Tolylfluanid DMST*
	Cyprodinil	Fluopyram	Metazachlor	Piperonyl butoxide	Quinoxyfen	Tri-allate
	Cyprodinil CGA304075	*Fluopyram benzamide*	Metconazole	Pirimicarb	Quizalofop	Tricyclazole
	Difenoconazole	Fluoxastrobin	Methabenzthiazuron	Pirimiphos-methyl	Rimsulfuron	Trifloxystrobin
	Diflufenican	Flupyradifurone	Methiocarb	*Pirimiphos-methyl DEAMPY*	Sedaxane	*Trifloxystrobin CGA 321113*
	Diflufenican AE-B107137	Flusilazole	*Methiocarb sulfon*	*Pirimiphos-methyl-N-desethyl*	Spinetoram	zoxamid
	Dimethenamid (P)	Flutolanil	*Methiocarb sulfoxide*	Prochloraz	Spinosyn A	
	Dimethoate	Fluxapyroxad	Methoxyfenozide	*Prochloraz BTS 44596*	Spinosyn D	
	Dimethomorph	Foramsulfuron	Metobromuron	Prometryn		
LC-MS/MS ESI neg	2,4-D (free)	*Chlorothalonil 4-OH*	Fipronil	Fludioxonil	Meptyldinocap	*Pirimicarb desmethyl-*
	Bentazone	*Chlorpyrifos/-methyl: TCPy*	*Fipronil sulfone*	Fluroxypyr	*Meptyldinocap phenol*	*Pirimiphos-methyl-desmethyl*
	Bixafen desmethyl	*chlorpyrifos-methyl-desmethyl*	Fluazifop	MCPA	*Metolachlor ESA*	
	Bromoxynil		Fluazinam	Mecoprop	*Metolachlor OA*	
GC-MS/MS	bifenthrin	Cyfluthrin (beta-cyfluthrin)	DDE, o,p'	Dieldrin	lambda-Cyhalothrin	
	captan THPI (1,2,3,6-tetrahyd	Cypermethrin	DDT o,p'	Esfenvalerate	Lindane (gamma-HCH)	
	Chlorpropham	DDD o,p'	DDT p,p'	Fenvalerate	Permethrin	
	Chlorpyrifos	DDD p,p'	Deltamethrin	folpet PHI (Phthalimide, CAS: 85-4	tau-Fluvalinate	
	Chlorpyrifos-methyl	DDE p,p'	Dicloran	Hexachlorobenzene	Tetramethrin	
SRM	glyphosate	*AMPA*				

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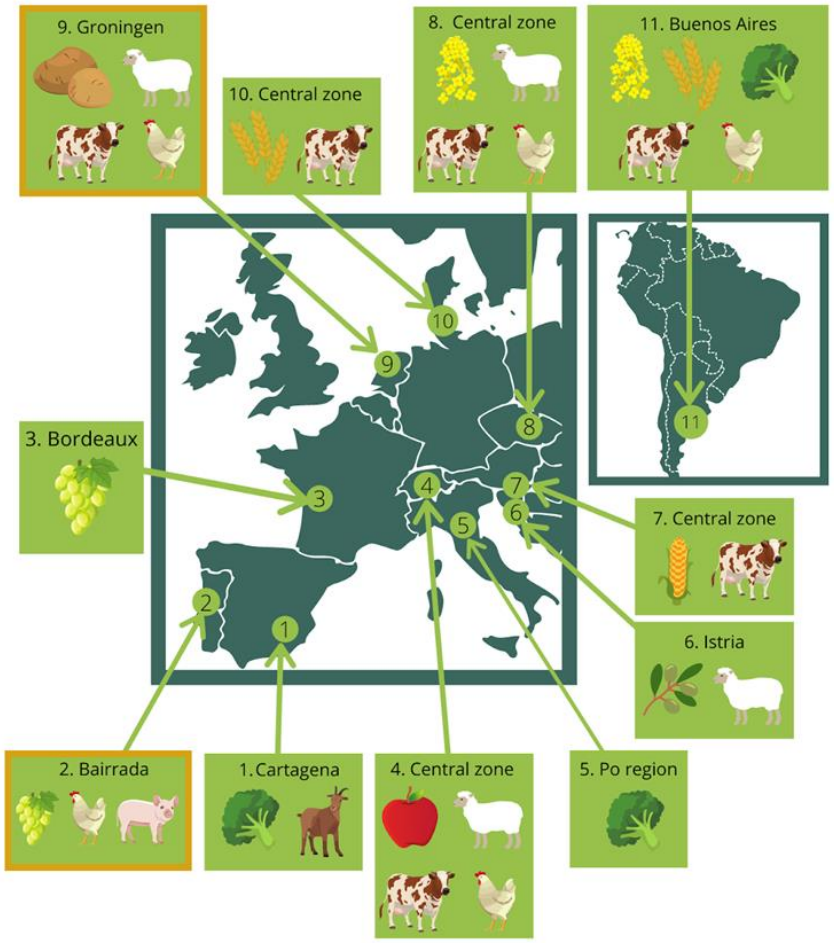
SPRINT PRISTUP



Monitoring plan: Silva et al. 2021

Environmental samples: 10 x conventional, 10 x organic fields (from 12-20 farms) per case study site

- Soil samples - 1 per field (20/CSS)
- Water samples - 3-6 per CSS
- Plant samples - 1 per field (20/CSS)
- Sediment samples - 3-6 per CSS
- House dust samples - 1 per farmer household (12-20/CSS)
- Outdoor dust samples - 2 per CSS
- Fish samples - 3-6 per CSS
- Macroinvertebrate samples - 3 per CSS
- Earthworm samples (10 per field) - 200 per CSS
- Insect traps (3 repetitions in 10 farms) = 30 per CSS
- Bat faecal samples 3-5 per CSS
- Flying insects (3 repetitions in 10 farms) = 30 per CSS

Biological samples: 6 x conventional, 6 x organic fields (from 12-20 farms) per case study site

Sheep, cattle, dairy or goats:

- Urine samples - 3 per farm
- Faecal samples - 3 per farm
- Blood samples - 3 per farm
- Wristbands - 3 per farm
- Feed samples - 1 per farm
- Milk samples - 1 per farm

Chicken

- Urine/faeces/blood samples - 3 per farm
- Wristbands - 3 per farm
- Feed samples - 1 per farm

Cats

- Faecal samples - 1 per farm
- Blood samples - 1 per farm
- Wristbands - 1 per farm = 4

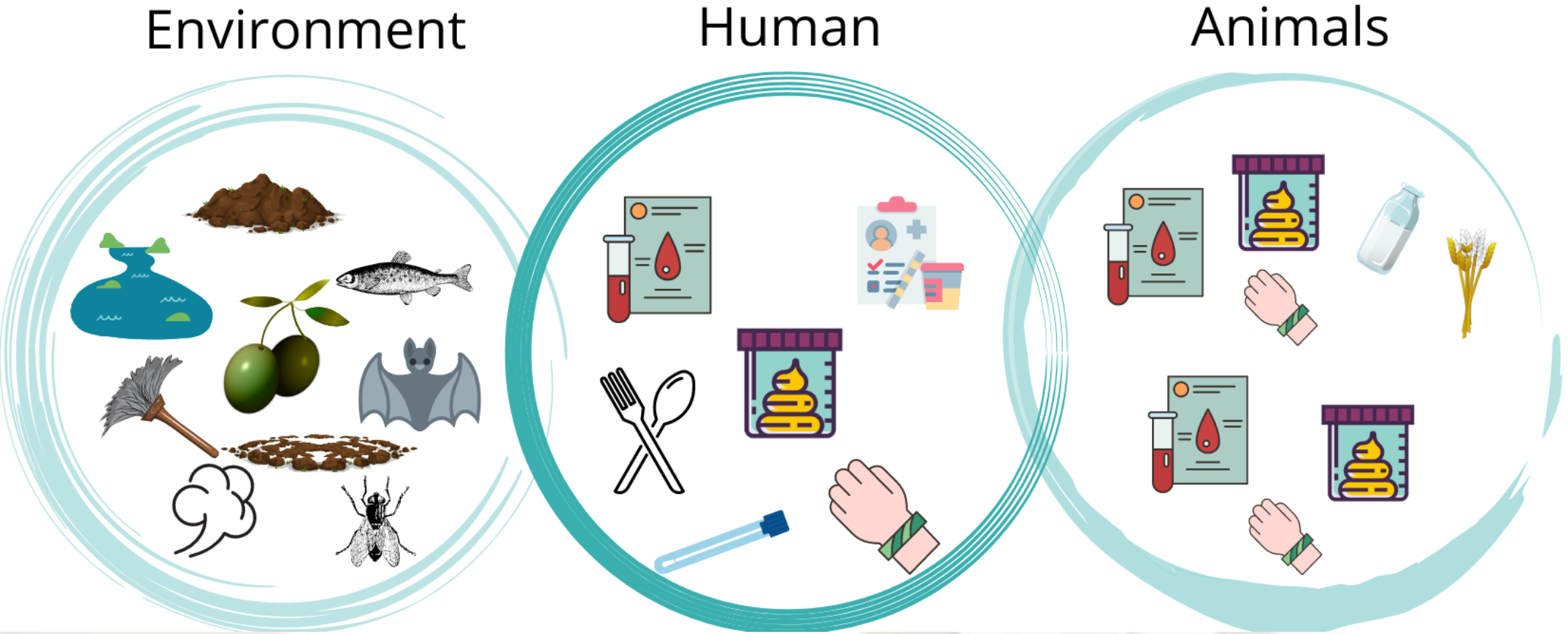
Human subjects:
Farmers: 12 conventional, 12 organic
Neighbours: 12 conventional, 12 organic
Consumers: 12 conventional, 12 organic

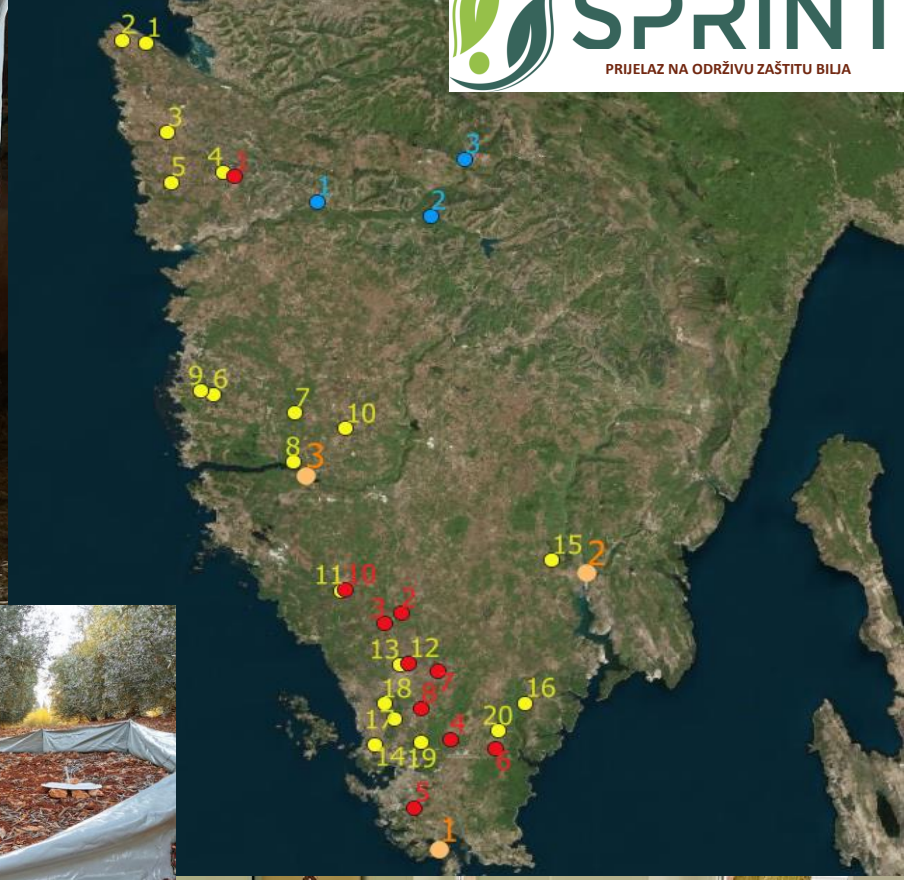
- Nasal swab - 1 per participant
- Blood samples - 1 per participant
- Urine samples - 1 per participant
- Stool samples - 1 per participant
- Food and drink sample - 1 per participant
- Wristbands - 1 per participant

+ Socio-ekonomski podaci

Hrvatska – CSS6 - ISTRA

Beskralježnjaci
Kukci
Ljudi
Mačke
Masline
Ovce
Prašina
Ribe
Sediment
Šišmiši
Tlo
Voda

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PRIJELAZ NA ODRŽIVU ZAŠTITU BILJA

PRELIMINARNI REZULTATI – TLO – EUROPA

201 uzoraka (EUROPA):

- 208 PPP/metab. analizirano
- 105 PPP/metab. pronađeno

Najviše prosječne koncentracije (mediana in det.fr>10%)

PPP	det.fr. (%)	median µg/kg
captan THPI	95%	120
AMPA	41%	91
DDT p,p'	25%	59
Glyphosate	24%	54
Metolachlor OA	10%	30
Boscalid	24%	24
Tebuconazole	16%	23
Metalaxyl (M)	14%	21
Fluopicolide	11%	20
Epoxiconazole	10%	17
Azoxystrobin	16%	10

Top 10 po pojavljivanju:

PPP	det.fr. (%)	median µg/kg
DDE p,p'	96%	4.0
captan THPI	95%	119.9
Hexachlorobenzene	44%	4.0
AMPA	41%	91.0
Chlorpyrifos	39%	1.4
DDT p,p'	25%	58.9
Boscalid	24%	23.7
Glyphosate	24%	54.4
DDT o,p'	18%	5.0
DDD p,p'	16%	3.3
Azoxystrobin	16%	10.2
Tebuconazole	16%	23.4
Difenoconazole	15%	4.7
Metalaxyl (M)	14%	21.3
Fluopyram	13%	7.1
lambda-Cyhalothrin	13%	5.5

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PRIJELAZ NA ODRŽIVU ZAŠTITU BILJA

PRELIMINARNI REZULTATI – TLO – HRVATSKA

20 uzoraka:

- 208 PPP/metab. analizirano
- 20 PPP/metab. pronađeno

	organic		conventional	
	frequency	median (ug/kg)	frequency	median (ug/kg)
DDE p,p'	100%	1.0	80%	1.6
captan THPI	90%	88.2	70%	98.0
Glyphosate	10%	14.7	50%	62.7
AMPA	20%	35.2	40%	503.2
Chlorpyrifos	20%	0.3	40%	5.1
Tebuconazole	0%		30%	74.9
Boscalid	0%		20%	133.9
Difenoconazole	0%		20%	2.9
Acetamiprid	0%		10%	10.3
DDD p,p'	0%		10%	3.4
DDE, o,p'	0%		10%	0.8
DDT o,p'	0%		10%	3.5
DDT p,p'	10%	7.6	10%	58.8
Deltamethrin	0%		10%	35.5
Dimethoate	0%		10%	5.0
Dimethomorph	0%		10%	6.1
Hexachlorobenzene	30%	0.3	10%	0.4
Phosmet	0%		10%	5.9
Trifloxystrobin	0%		10%	10.2
meptyldinocap	30%	2.1	0%	

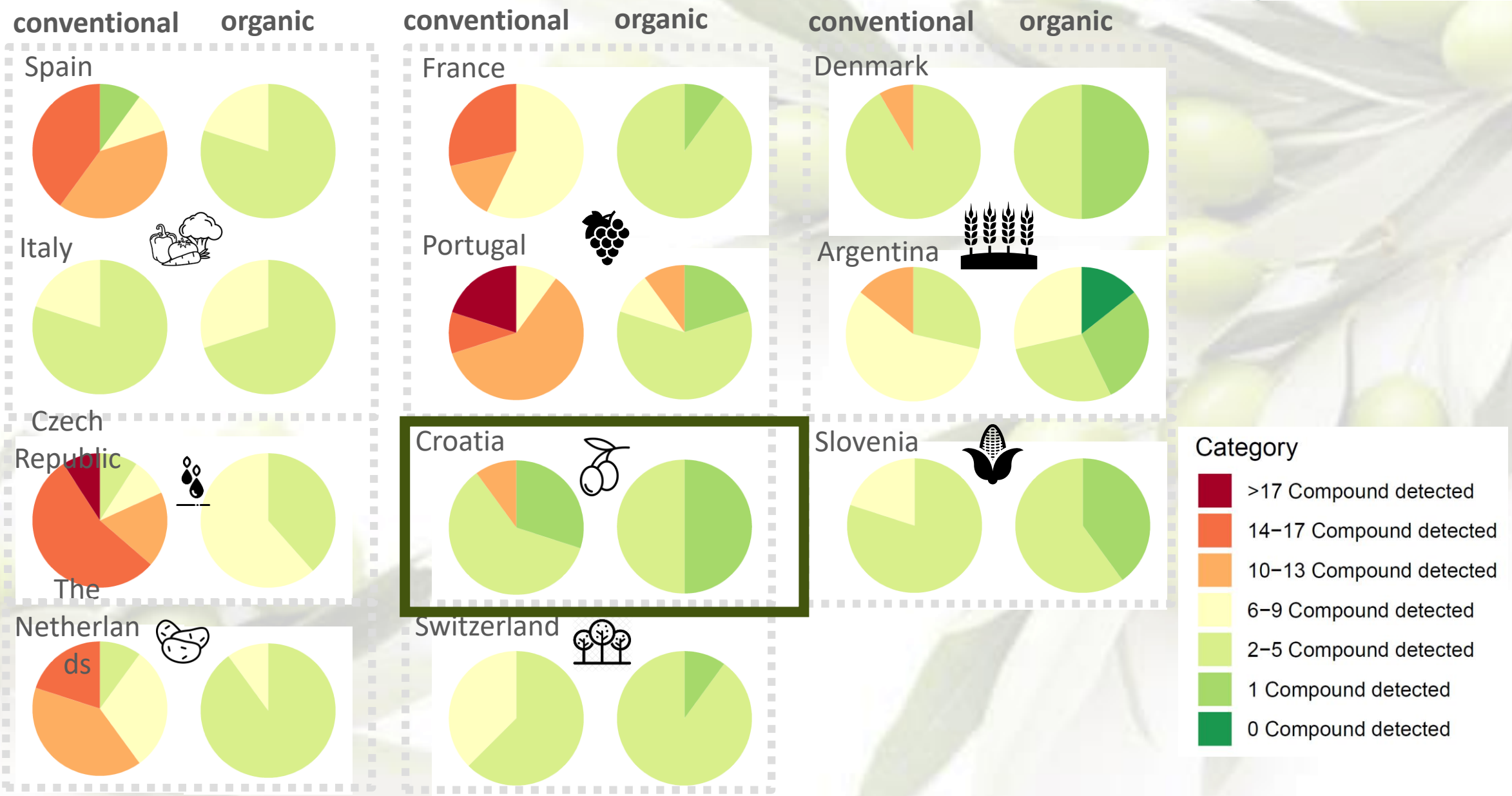
Top 10 po pojavljivanju:

compound	frequency	median (ug/kg)
DDE p,p'	90%	1.2
captan THPI	80%	89.5
AMPA	30%	269.1
Glyphosate	30%	42.0
Chlorpyrifos	30%	2.5
Hexachlorobenze	20%	0.3
Tebuconazole	15%	74.9
meptyldinocap	15%	2.1
Boscalid	10%	133.9
DDT p,p'	10%	33.2
Difenoconazole	10%	2.9

Najviše prosječne koncentracije (mediana in det.fr>10%)

compound	frequency	median (ug/kg)
AMPA	30%	269.1
Boscalid	10%	133.9
captan THPI	80%	89.5
Tebuconazole	15%	74.9
Glyphosate	30%	42.0
Deltamethrin	5%	35.5
DDT p,p'	10%	33.2
Acetamiprid	5%	10.3
Trifloxystrobin	5%	10.2
Dimethomorph	5%	6.1
Phosmet	5%	5.9

PRELIMINARNI REZULTATI – TLO – NA RAZINI PROJEKTA - EUROPA



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PRIJELAZ NA ODRŽIVU ZAŠTITU BILJA

PRELIMINARNI REZULTATI – PLODOVI – EUROPA - HRVATSKA

195 uzoraka EUROPA:

- 208 PPP/metab. analizirano
- 96 PPP/metab. pronađeno

20 uzoraka HRVATSKA:

- 208 PPP/metab. analizirano
- 17 PPP/metab. pronađeno

SVI pronađeni pesticidi u Hrvatskoj:

	organic		conventional	
	freq.	median (ug/kg)	freq.	median (ug/kg)
captan THPI	90%	1.43	100%	1.78
Chlorpyrifos-methyl	100%	5.72	100%	5.01
Deltamethrin	10%	0.18	70%	44.27
folpet PHI	70%	92.91	50%	347.54
lambda-Cyhalothrin	10%	4.00	50%	3.22
beta-cyfluthrin	30%	0.91	40%	1.12
Phosmet	0%		40%	177.25
Phosmet oxon	0%		30%	1.00
Chlorpyrifos	20%	0.24	20%	0.09
Tebuconazole	10%	4.05	20%	52.22
Trifloxystrobin	0%		20%	8.50
Acetamiprid	0%		10%	140.71
Acetamiprid-N-desmethyl	0%		10%	20.36
Cypermethrin	0%		10%	46.86
Diflufenican AE-B107137	0%		10%	2.66
Permethrin	10%	89.01	10%	64.15
Chlorpropham	10%	12.64	0%	

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PRELIMINARNI REZULTATI – KUĆNA PRAŠINA – EUROPA - HRVATSKA

167 uzoraka EUROPA:

- 208 PPP/metab. analizirano
- 197 PPP/metab. pronađeno

16 uzoraka HRVATSKA:

- 208 PPP/metab. analizirano
- 136 PPP/metab. pronađeno

Prisutni u 16 uzoraka:

Matrix	freq.	median
Acetamiprid	100%	5.12
Chlorpyrifos/-methyl: TCPy	100%	3.08
Fipronil	100%	2.64
Fludioxonil	100%	2.85
Hexachlorobenzene	100%	0.36
Imidacloprid	100%	88.13
Lindane (gamma-HCH)	100%	1.35
Mandipropamid	100%	3.16
Permethrin	100%	4344.62
Piperonyl butoxide	100%	997.04
2,4-D (free)	94%	20.55
Azoxystrobin	94%	14.92
Carbendazim	94%	29.50
DDE p,p'	94%	3.09
Dimethomorph	94%	6.45
Diuron	94%	3.99
Fipronil sulfone	94%	3.05
Metalaxyl (M)	94%	4.06
Phosmet	94%	236.35
Propamocarb (hydrochloride)	94%	1.17
Tebuconazole	94%	41.92
Tolylfluanid metabolite DMST	94%	1.06

TLO: DDE i Captan THPI najčešće su pronađeni spojevi u tlu u svim CSS studijama u Europi.
Osim za CSS 4 (ŠVI), 6 (HR) i 7 (SLO), DDE je utvrđen 100% u svim prikupljenim uzorcima.

PLODOVI CSS6: Captan i Klorpirifos, u izrazito malim koncentracijama pronađeni su gotovo na svim prikupljenim uzorcima, neovisno o sustavu uzgoja.

- **Općenito, u Europi, organske farme imaju manje otkrivenih spojeva u usporedbi s konvencionalnim/integriranim farmama.**
- **Svi sustavi uzgoja sadrže ostatke pesticida.**
- **Prema do sad dostupnim rezultatima ovog istraživanja, Hrvatska spada u red Europskih zemalja s manje ostataka pesticida u EPAHU.**

Kućna prašina sadrži daleko najviše aktivnih tvari – koliko smo sigurni kod kuće?

VIŠE INFORMACIJA

- Predstavljanje projekta: https://youtu.be/Ym0qL8lLiGE
- Struktura projekta: https://www.youtube.com/channel/UCW-g0RRBq50KJtpopkfvTCw
- Rad na terenu: https://sprint-h2020.eu/index.php/resources/interactive-monitoring-plan AND https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0259748
- Mrežna stranica - https://www.sprint-h2020.eu/
- Email: sprint@wur.nl; paskovic@iptpo.hr

Želite sudjelovati u radu SPRINT projekta te doznati među prvima konačne rezultate?

Postanite dionik http://eepurl.com/hxF2zD

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28.10.2022.

Hvala na pažnji

Pitanja?

European Commission

INSTITUT ZA POLJOPRIVREDU I TURIZAM
INSTITUTE OF AGRICULTURE AND TOURISM
1875.

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