Kmetijski inštitut Slovenije

STROKOVNE NALOGE S PODROČJA OKOLJA ZA MOP V LETU 2017

za vsebine, ki se nanašajo na izvajanje nitratne direktive, varstva tal ter zmanjšanje izpustov onesnaževal v zrak iz kmetijstva

Predstavitev programa strokovnih nalog

Trajanje: 8. 9. 2017 – 15. 6. 2018

Janez SUŠIN

KIS, Ljubljana, 6. 6. 2018

Program strokovnih nalog za leto 2017

Poglavje	Vsebina	Predavatelj
2	Varstvo voda pred onesnaževanjem z nitrati iz kmetijskih virov (Nitratna direktiva)	
2.1	Bilančni presežek dušika v kmetijstvu	Janez Sušin, dr. Jože Verbič
2.2	Bilančni presežek dušika na ravni kmetijskega zemljišča	Janez Bergant
2.3	Bilančni presežek fosforja v kmetijstvu	Janez Sušin, dr. Jože Verbič
2.4	Strokovna pomoč pri izvajanju Uredbe o varstvu voda pred onesnaževanjem z nitrati iz kmetijskih virov v praksi	-
2.5	Strokovna pomoč pri oblikovanju stališč, mnenj in informacij Republike Slovenije v povezavi z aktivnostmi nitratnega odbora in ekspertne delovne skupine pri Evropski komisiji	-
2.6	Ugotavljanje izpiranja dušika zaradi zimskega gnojenja s hlevskim gnojem	dr. Robert Leskovšek
2.7	Ugotavljanje izpiranja dušika zaradi zgodnjega pomladanskega gnojenja sejanega travinja s tekočimi organskimi gnojili	dr. Branko Lukač
2.8	Testiranje metodologije izpiranja dušika med odlaganjem hlevskega gnoja na kmetijskih zemljiščih	dr. Tomaž Žnidaršič
3	Krepitev zavedanj o pomenu varovanja tal in njihovih funkcij v okolju	dr. Borut Vrščaj
4	Nova direktiva NEC in ukrepi za zmanjšanje izpustov onesnaževal v zrak iz kmetijstva	-

Strokovna pomoč pri izvajanju Uredbe o varstvu voda pred onesnaževanjem z nitrati iz kmetijskih virov (1/3)

Usposabljanje KSS s področja navzkrižne skladnosti v povezavi z Uredbo

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA KMETIJSTVO, GOZDARSTVO IN PREHRANO
Dunajska cesta 22, 1000 Ljubljana
T: 01 478 90 00
F: 01 478 90 21
E: gp.mkgp@gov.si
www.mkgp.gov.si

Kmetijski inštitut Slovenije

Gospodinjska 6, 1000 Ljubljana
T: 01 513 66 00
F: 01 513 66 50
E: kgzs@kgzs.si
www.kgzs.si

Datum: 30.08. 2017

Spoštovani,

vljudno vas vabim, da se udeležite usposabljanja za kmetijske svetovalce s področja navzkrižne skladnosti z naslovom:

Praktična uporaba smernic za izvajanje zahtev varstva voda pred onesnaževanjem z nitrati iz kmetijskih virov

Usposabljanje bo izvedeno v četrtek, 7. Septembra
med 9.30 in 15 uro
na kmetiji Kastelic, Žabja vas 9, Novo mesto
http://kmetija-kastelic.com/

Program:

Uvod v program	Anton Jagodic	9:30
Kršitve standarda navzkrižne skladnosti PZR 1: Varstvo voda pred onesnaženjem z nitrati iz kmetijskih virov v obdobju 2015-2017 in sistem sankcij s poudarkom na PZR 1	Masa Kerstein, AKTRSKP	9:45
Navodila za ogled kmetije in delo po skupinah	Anton Jagodic	10:15
Odmor		
Ogled kmetije s pregledom izpolnjevana zahtev PZR 1 na kmetiji (delo po skupinah), razgovor z lastnikom, delo s pripravljenim gradivom		10:30
Odmor za malico, http://www.kz-krka.si/restavracija-znc.html Plača vsak udeleženec sam		11:40
Poročanje skupin o ugotovitvah in razprava o stanju PZR 1 na kmetiji		12:10
Praktična uporaba smernic za izvajanje zahtev varstva voda pred onesnaževanjem z nitrati iz kmetijskih virov svetovanje kmetom v praksi	Janez Sušin, KIS dr. Jože Verbič, KIS	12:30
Vprašanja svetovalcev in odgovori.		
Zaključek		15:00

Pripravili Janez Sušin in dr. Jože Verbič-KIS, Maša Kerstein -ARSKTRP, MKGP, Anton Jagodic

KMETIJSKO GOZDARSKA ZBORNICA SLOVENIJE * LJUBLJANA 1

Strokovna pomoč pri izvajanju Uredbe o varstvu voda pred onesnaževanjem z nitrati iz kmetijskih virov (2/3)

Pregled

Smernic za ravnanje in uporabo stranskih produktov oljkarstva za namen gnojenja

Smernice so bile pripravljene v okviru delovne skupine, ki jo imenovalo MKGP, in v okviru CRPV4-1621: Možnosti uporabe ostankov proizvodnje v oljkarstvu.

Strokovna pomoč pri izvajanju Uredbe o varstvu voda pred onesnaževanjem z nitrati iz kmetijskih virov (3/3)

Posodobitev Smernic 2018

Vrsta gnojila		September	Oktober	November	December	Januar	Februar	Marec
Tekoča organska gnojila	Splošna časovna prepoved			**15. november - 1. marec**				
	Izjema: priprava zemljišč za setev jarih žit, trav in TDM ter dognojevanje ozimin in sejanega travinja			**15. november - 15. februar**				
Hlevski gnoj, kompost, digestat (> 20 % ss)	Splošna časovna prepoved				**1. december - 15. februar**			
	Zaščiteni prostori (rastlinjaki)	Ni prepovedi						
Mineralna gnojila, ki vsebujejo dušik	Splošna časovna prepoved	**Dovoljeno največ 40 kg N/ha**		**15. oktober - 1. marec**				
	Izjema: gnojenje ozimin (vključno s sejanim travinjem)				**1. december - 15. februar**			
	Zaščiteni prostori (rastlinjaki)	Ni prepovedi						

Kmetijski inštitut Slovenije

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA OKOLJE IN PROSTOR

SMERNICE ZA IZVAJANJE ZAHTEV
VARSTVA VODA PRED ONESNAŽEVANJEM
Z NITRATI IZ KMETIJSKIH VIROV

Janez SUŠIN
Jože VERBIČ
Helena MATOZ

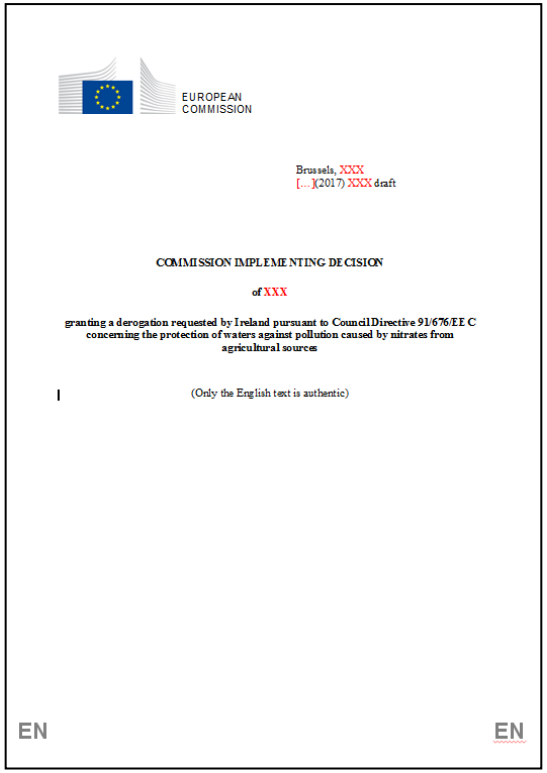
Ljubljana, julij 2016, posodobljeno julij 2017 in julij 2018

Strokovna pomoč pri oblikovanju stališč, mnenj in informacij Republike Slovenije v povezavi z aktivnostmi Nitratnega odbora in ekspertne delovne skupine pri Evropski komisiji (1/6)

Priprava **strokovnih mnenj** h gradivom, ki jih pripravijo države članice Evropske unije kot strokovno utemeljitev, kadar želijo uveljaviti odstopanje od zahtev nitratne direktive v skladu z določbo odstavka 2(b) Priloge III in člena 9. Direktive Sveta 91/676/EGS o varstvu voda pred onesnaževanjem z nitrati iz kmetijskih virov.

Primer:

1. Mnenje k gradivu Evropske komisije v zvezi s predlogom za dopustitev odstopanja **Irske** od zahtev Nitratne direktive 91/676/EEC (odstopanje od 170 kg N/ha na 250 kg N/ha)
2. Mnenje k gradivu Evropske komisije v zvezi s predlogom za dopustitev odstopanja **Nizozemske** od zahtev Nitratne direktive 91/676/EEC (odstopanje od 170 kg N/ha na 230 oz. 250 kg N/ha)


EUROPEAN COMMISSION

Brussels, XXX
[...](2017) XXX draft

COMMISSION IMPLEMENTING DECISION

of XXX

granting a derogation requested by Ireland pursuant to Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources

(Only the English text is authentic)

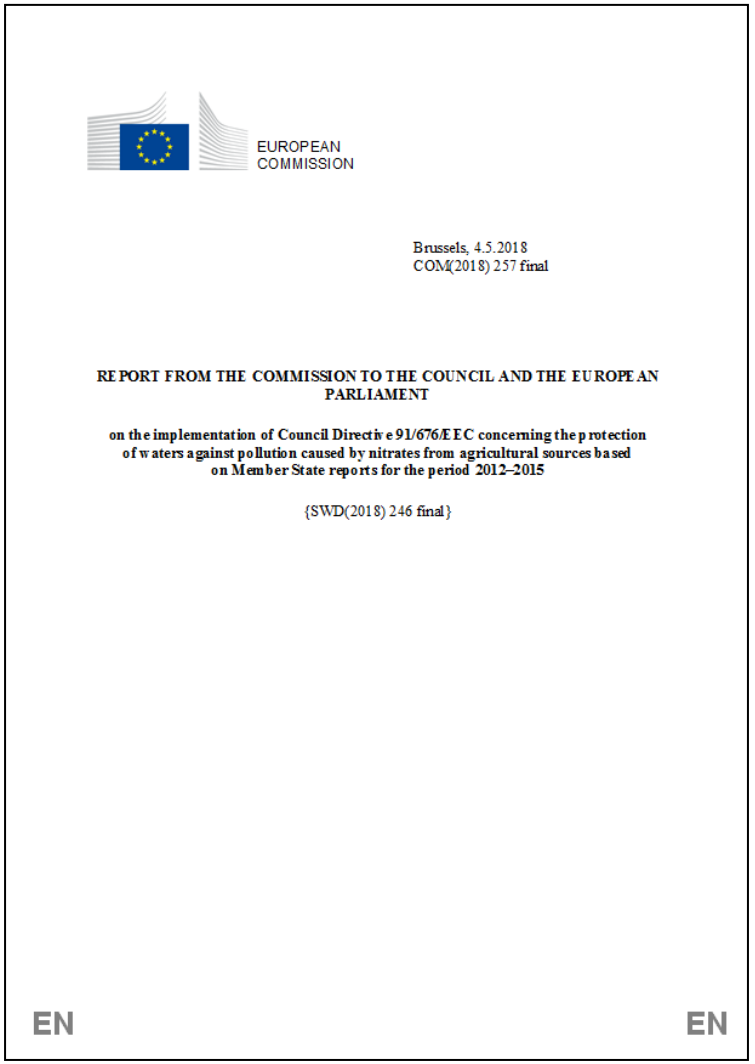
EN EN

Kmetijski inštitut Slovenije

Strokovna pomoč pri oblikovanju stališč, mnenj in informacij Republike Slovenije v povezavi z aktivnostmi Nitratnega odbora in ekspertne delovne skupine pri Evropski komisiji (2/6)

Pregled

Poročila o izvajanju nitratne direktive v obdobju 2012-2015



EUROPEAN COMMISSION

Brussels, 4.5.2018
COM(2018) 257 final

REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

on the implementation of Council Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources based on Member State reports for the period 2012–2015

{SWD(2018) 246 final}

EN EN

Kmetijski inštitut Slovenije

Strokovna pomoč pri oblikovanju stališč, mnenj in informacij Republike Slovenije v povezavi z aktivnostmi Nitratnega odbora in ekspertne delovne skupine pri Evropski komisiji (3/6)

Mnenje o Sloveniji

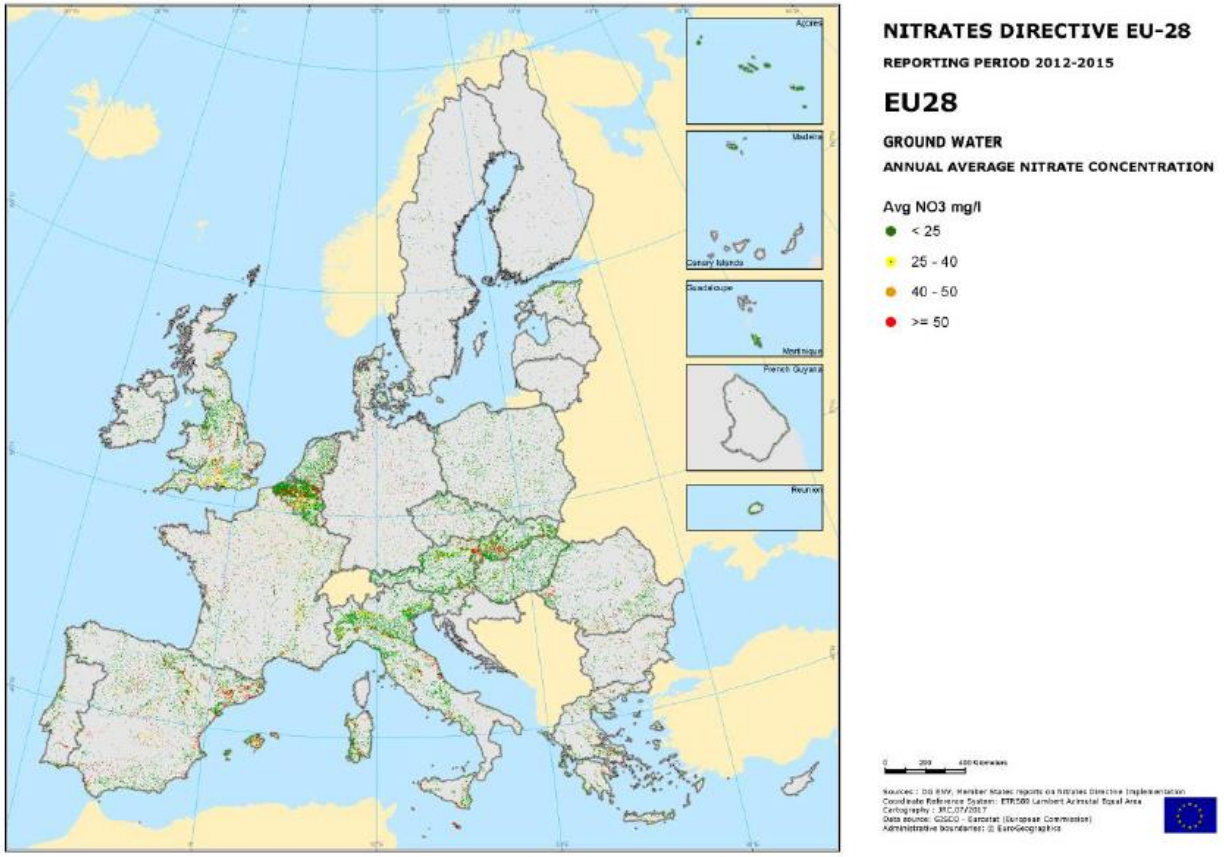
Pressure from agriculture

Overall, the trends in the agriculture were fairly stable. The total agricultural area remained stable (+1%). The area of permanent pasture decreased with 4%, while the area of perennial crops increased with 3%. Cattle numbers did not change, but their nitrogen excretion increased by 9%. The number of poultry increased by 10% while, pigs number decreased by 27%, and consequently their excretion changed by -32% and +2%, respectively. As the calculation method for excretion changed, the comparison between current and previous periods should be assessed with caution. Overall the organic nitrogen applied to agricultural land did not change, and neither did the use of mineral nitrogen.

The gross nitrogen balance (OECD) was 57 kg/ha for the 2012-2014 period, which represents a slight increase as compared to 49 kg/ha in the period 2008-2011. However, the long term trend from 1992 onwards shows a small decrease.

Strokovna pomoč pri oblikovanju stališč, mnenj in informacij Republike Slovenije v povezavi z aktivnostmi Nitratnega odbora in ekspertne delovne skupine pri Evropski komisiji (4/6)

Poročilo o izvajanju nitratne direktive v obdobju 2012-2015

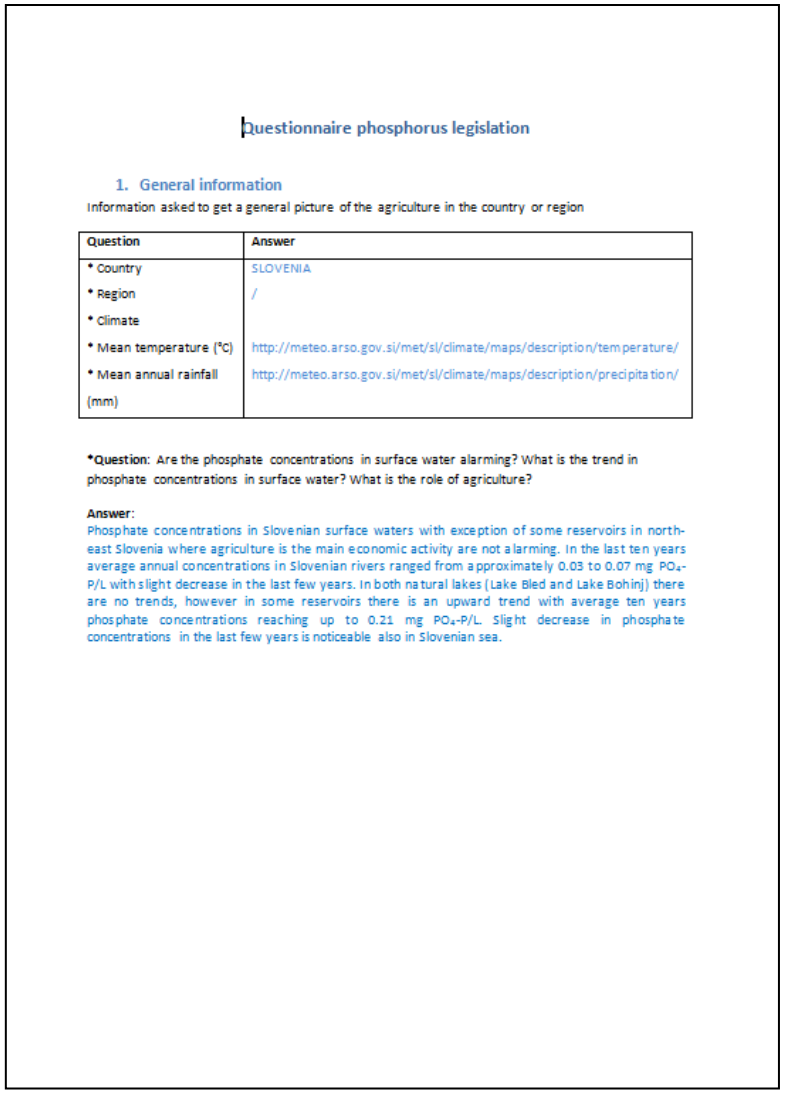


Map 1. Annual average nitrate concentrations in 1groundwater for the reporting period 2012-2015.

Strokovna pomoč pri oblikovanju stališč, mnenj in informacij Republike Slovenije v povezavi z aktivnostmi Nitratnega odbora in ekspertne delovne skupine pri Evropski komisiji (5/6)

Izpolnitev vprašalnika

Questionnaire phosphorus legislation



Questionnaire phosphorus legislation

1. General information

Information asked to get a general picture of the agriculture in the country or region

Question	Answer
* Country	SLOVENIA
* Region	/
* Climate	
* Mean temperature (°C)	http://meteo.arso.gov.si/met/sl/climate/maps/description/temperature/
* Mean annual rainfall (mm)	http://meteo.arso.gov.si/met/sl/climate/maps/description/precipitation/

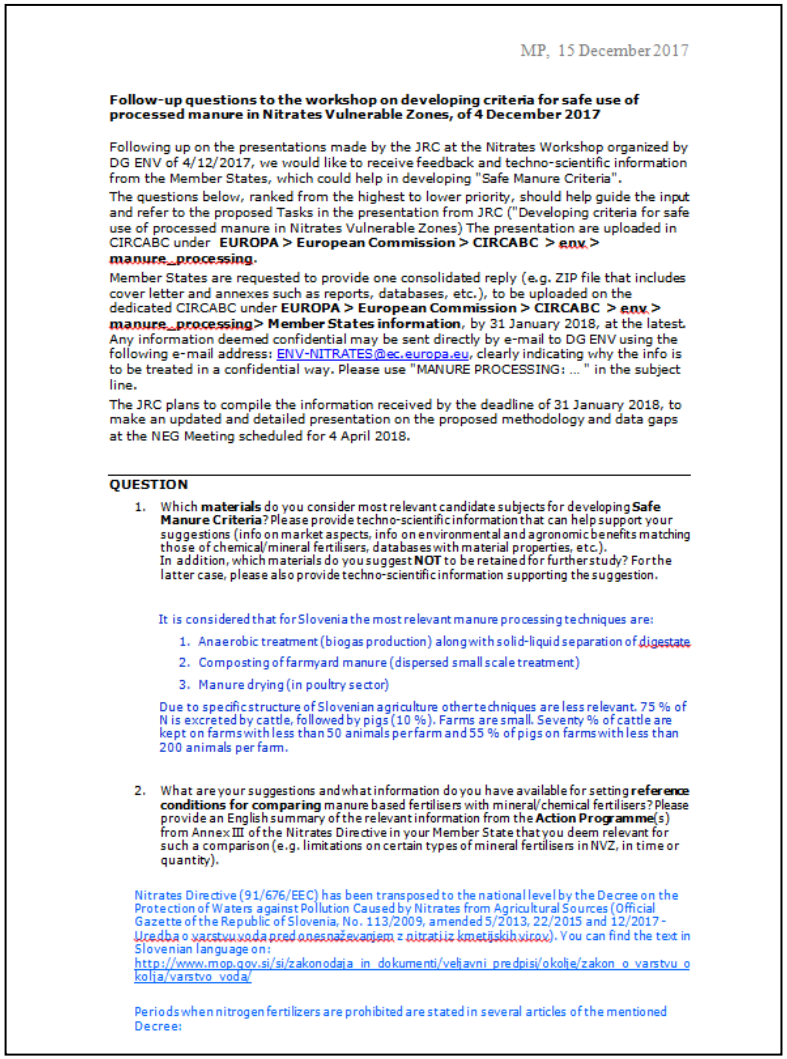
*Question: Are the phosphate concentrations in surface water alarming? What is the trend in phosphate concentrations in surface water? What is the role of agriculture?

Answer:
Phosphate concentrations in Slovenian surface waters with exception of some reservoirs in north-east Slovenia where agriculture is the main economic activity are not alarming. In the last ten years average annual concentrations in Slovenian rivers ranged from approximately 0.03 to 0.07 mg PO_4-P/L with slight decrease in the last few years. In both natural lakes (Lake Bled and Lake Bohinj) there are no trends, however in some reservoirs there is an upward trend with average ten years phosphate concentrations reaching up to 0.21 mg PO_4-P/L. Slight decrease in phosphate concentrations in the last few years is noticeable also in Slovenian sea.

Strokovna pomoč pri oblikovanju stališč, mnenj in informacij Republike Slovenije v povezavi z aktivnostmi Nitratnega odbora in ekspertne delovne skupine pri Evropski komisiji (6/6)

Izpolnitev vprašalnika

Questions to the workshop on developing criteria for safe use of processed manure in Nitrates Vulnerable Zones



MP, 15 December 2017

Follow-up questions to the workshop on developing criteria for safe use of processed manure in Nitrates Vulnerable Zones, of 4 December 2017

Following up on the presentations made by the JRC at the Nitrates Workshop organized by DG ENV of 4/12/2017, we would like to receive feedback and techno-scientific information from the Member States, which could help in developing "Safe Manure Criteria".

The questions below, ranked from the highest to lower priority, should help guide the input and refer to the proposed Tasks in the presentation from JRC ("Developing criteria for safe use of processed manure in Nitrates Vulnerable Zones) The presentation are uploaded in CIRCABC under **EUROPA > European Commission > CIRCABC > env > manure_processing**.

Member States are requested to provide one consolidated reply (e.g. ZIP file that includes cover letter and annexes such as reports, databases, etc.), to be uploaded on the dedicated CIRCABC under **EUROPA > European Commission > CIRCABC > env > manure_processing> Member States information**, by 31 January 2018, at the latest. Any information deemed confidential may be sent directly by e-mail to DG ENV using the following e-mail address: ENV-NITRATES@ec.europa.eu, clearly indicating why the info is to be treated in a confidential way. Please use "MANURE PROCESSING: ... " in the subject line.

The JRC plans to compile the information received by the deadline of 31 January 2018, to make an updated and detailed presentation on the proposed methodology and data gaps at the NEG Meeting scheduled for 4 April 2018.

QUESTION

1. Which **materials** do you consider most relevant candidate subjects for developing **Safe Manure Criteria**? Please provide techno-scientific information that can help support your suggestions (info on market aspects, info on environmental and agronomic benefits matching those of chemical/mineral fertilisers, databases with material properties, etc.).
   In addition, which materials do you suggest **NOT** to be retained for further study? For the latter case, please also provide techno-scientific information supporting the suggestion.

   It is considered that for Slovenia the most relevant manure processing techniques are:

   1. Anaerobic treatment (biogas production) along with solid-liquid separation of digestate
   2. Composting of farmyard manure (dispersed small scale treatment)
   3. Manure drying (in poultry sector)

   Due to specific structure of Slovenian agriculture other techniques are less relevant. 75 % of N is excreted by cattle, followed by pigs (10 %). Farms are small. Seventy % of cattle are kept on farms with less than 50 animals per farm and 55 % of pigs on farms with less than 200 animals per farm.

2. What are your suggestions and what information do you have available for setting **reference conditions for comparing** manure based fertilisers with mineral/chemical fertilisers? Please provide an English summary of the relevant information from the **Action Programme**(s) from Annex III of the Nitrates Directive in your Member State that you deem relevant for such a comparison (e.g. limitations on certain types of mineral fertilisers in NVZ, in time or quantity).

   Nitrates Directive (91/676/EEC) has been transposed to the national level by the Decree on the Protection of Waters against Pollution Caused by Nitrates from Agricultural Sources (Official Gazette of the Republic of Slovenia, No. 113/2009, amended 5/2013, 22/2015 and 12/2017 - Uredba o varstvu voda pred onesnaževanjem z nitrati iz kmetijskih virov). You can find the text in Slovenian language on:
   http://www.mop.gov.si/si/zakonodaja_in_dokumenti/veljavni_predpisi/okolje/zakon_o_varstvu_okolja/varstvo_voda/

   Periods when nitrogen fertilizers are prohibited are stated in several articles of the mentioned Decree:

Kmetijski inštitut Slovenije

Udeležba na delavnici v Bruslju 30. 5. 2018

Fertilising products based on animal manure under the Nitrates Directive and Circular Economy

SYSTEMIC – AGROCYCLE POLICY-SCIENCE WORKSHOP

Fertilising products based on animal manure under the Nitrates Directive and Circular Economy.

When: *Wednesday, 30th May 2018, 09:00-12:40*
Where: *Renewable Energy House, Rue d'Arlon 63, 1040 Bruxelles*

AGENDA

08:30 – 09:00	**Registration and coffee**		
09:00 – 09:15	**Introduction and context**	*Dr Oscar Schoumans*, Coordinator of SYSTEMIC	
09:15 - 10:55	**3 parallel sessions**	30 mins each on the following topics (each group will join each of the sessions by rotation)	
	Product quality *Session 1*	**Agronomic aspect** *Session 2*	**Environmental aspects** *Session 3*
	Moderator *Prof. Erik Meers*, SYSTEMIC, University of Gent Rapporteur *Emilie Snauwaert*, SYSTEMIC, VCM	Moderator *Prof. Stefaan De Neve*, AGROCYCLE, University of Gent Rapporteur *Phillip Ehlert*, SYSTEMIC, Wageningen University	Moderator *Dr Gerard Velthof*, Wageningen University Rapporteur *Dr Elisabet Nadeu*, SYSTEMIC, RISE Foundation
09:15 – 09:45	**Group 1**	**Group 3**	**Group 2**
09:50 – 10:20	**Group 2**	**Group 1**	**Group 3**
10:25 – 10:55	**Group 3**	**Group 2**	**Group 1**
10:55 – 11:25	**Coffee Break**		
	Plenary session		
11:25 – 11:55	**Feedback from parallel sessions**	10 mins per session The Rapporteur from each session will provide a summary of the discussion and up to three statements for debate	
11:55 –12:05	**European Commission**	An overview of the ongoing study, the timings and key moments during the study and their priorities, and information needed. *Wim de Beuckelaere, European Commission, DG Environment Policy Officer Nitrate Directive*	
12:05 – 12:35	**Discussion**	Moderator *Dr Gerard Velthof*	
12:35– 12:40	**Closing of the workshop**	*Dr Oscar Schoumans*	
12:40 – 14:00	**Light Lunch**		

Background information of SYSTEMIC and AgroCycle

SYSTEMIC is a project funded under the EU Framework Programme for Research and Innovation H2020 for the period 2017-2021 and includes 15 partners from 7 EU member states. The SYSTEMIC project is working with 5 demonstration plants and 10 outreach plants to show how recovering nutrients from organic waste sources can be economically viable and how it is possible to produce renewable fertilising products that can be cycled back to croplands and can replace current mineral fertiliser produced from non-renewable resources. The project will evidence how European animal manure, sewage sludge and bio-waste treatment can be taken to the next level by applying novel technologies to produce energy and recover nutrients, and through the application of knowledge gained at these plants, contribute to the expansion of nutrient recovery across the EU.

AGROCYCLE is Horizon 2020 research and innovation project addressing the recycling and valorisation of waste from the agri-food sector. The consortium has 26 partners from 8 EU countries, two partners from mainland China, and one from Hong Kong. The project takes a holistic approach to understanding and addressing how to make best use of the full range of waste streams associated with the agri-food industry. It will deliver the AgroCycle Protocol, a blueprint for achieving sustainable agri-food waste valorisation. The resultant AgroCycle Protocol will deliver sustainable waste valorisation pathways addressing the European policy target of reducing food waste by 50% by 2030, as well contributing to the wave of change that is occurring in China in relation to sustainability. AgroCycle will undertake a holistic analysis of agri-food waste value chains, from farm-to-table, including livestock and crop production, food processing and the retail sector. It will address a wide range of valorisation pathways, including: bio-fuels, high value-added biopolymers, energy and microbial fuel cells.

Supported by

BIOREFINE

Projects focusing on nutrient recovery

Interreg North-West Europe Phos4You
Interreg North-West Europe ReNu2Farm
Interreg North-West Europe ALG-AD
SABANA
Newfert
VIsom
lifedop
INEMAD

Udeležba na delavnici v Bruslju 30. 5. 2018

Fertilising products based on animal manure under the Nitrates Directive and Circular Economy

Kmetijski inštitut Slovenije

Udeležba na delavnici v Bruslju 30. 5. 2018

Fertilising products based on animal manure under the Nitrates Directive and Circular Economy

SYSTEMIC

Struvite

Technology description

Struvite (magnesium ammonium phosphate) is a phosphate mineral with formula $NH_4MgPO_4.6H_2O$. Struvite is therefore a co-precipitate when magnesium, ammonium and ortho-phosphate are present in concentrations above the solubility constant. Struvite results from a coordinated precipitation process from the liquid phase of manure. In general this precipitation process follows the equation:

$NH_4^+ Mg^{2+} + H_nPO_4^{n-3} + 6H_2O \rightarrow NH_4MgPO_4.6H_2O$ (struvite) + nH^+

Ammonium (NH_4^+) can be substituted by potassium leading to a potassium struvite ($MgKPO_4.6H_2O$). In the liquid phase of manure several reactions can occur simultaneously which leads to the formation of other crystal minerals such as $MgNH_4PO_4.H_2O$ (Dittmarite), $MgHPO_4.3H_2O$ (Newberyite) and a wide range of calcium phosphates. Struvite is one of the processes to recover phosphorus from wastes, animal manure and digestate. Full scale technologies for recovering phosphorus have been implemented. More full scale technologies are in force. All depend on pH, composition (PO_4^{3-}, NH_4^+, Mg^{2+}, Ca^{2+}), operational mode and reactor type. Most struvite reactors recover phosphorus from waste waters, very few from manure.

Product characteristics

Product characteristics are well known in the public domain for struvites made from waste water. There is only limited data available on characteristics of struvite from manure from a full scale plant (Table 1).

Data available on struvite from different origins points to a lower content of nutrients (N, P, Mg and/or K) than is theoretically possible. Lower contents are caused by the presence of other minerals, organic matter and water. With current processing techniques it is not possible to obtain higher nutrient contents. Challenging new techniques and (costly) investments are needed to obtain purer struvite.

Table 1. Chemical composition of struvite from waste water and manure[1]

Origin	Parameter	N	P	K	Ca	Mg
Theoretical	Average	57	126			99
Waste water	Average	46	116	4	32	98
	Standard deviation	11	19	3	49	31
	Number of publications	28	38	10	13	24
Manure, K struvite	Average	8	59	48	15	80
	Standard deviation					
	Number of publications	1	1	1	1	1
Manure, struvite	Average	58	101	37		64
	Standard deviation					
	Number of publication	1	1	1	1	1

[1] Full references will be given in the report on these fertilising products which will be published on the Systemic website later this year.

Horizon 2020 The SYSTEMIC project has received funding from the European Union's Horizon 2020 Framework Programme for Research and Innovation under Grant Agreement no. 730400.

SYSTEMIC

Struvite

Current legal view on struvite

Relative to chemical fertilisers struvite has a similar agronomic effectivity as chemical phosphorus fertilisers. Relative to chemical nitrogen fertiliser several publications assume an similar effectivity but lack the data to support this assumption. At the end of this year JRC will publish the study on the end-of-waste criterions for precipitated P salts. It will then become clear if the agronomic or environmental effectivity of the ammoniacal-nitrogen is part of their recommendations for end-of-waste criterions.

Struvite recovered from waste water is always classified as a waste. However, EU countries differ in the legal status they give to manure surplus. Some Member States designate manure surplus as a fertilising product, others a waste. Consequently, struvite based on animal manure is sometimes acknowledged as fertilising product and sometimes as waste. If an end-of waste status is reached for struvite from manure identified as waste, its use as a fertilising product becomes possible within the framework of the new facultative European regulation on fertilising products.

Yet, although the chemical characteristics of struvites from waste water treatment plants and from processing manure are identical, their legal status is not. Manure is an animal by-product, and therefore struvite recovered from manure is classified as an animal by-product. Currently, it is not clear if an inclusion of struvite based on manure requires inclusion in CMC 11. In addition, struvite from animal manure is still regulated under article 2(g) of the Nitrates Directive. The Nitrates Directive defines this product as animal manure and the use of the product is treated with the same regulations as manure under the directive, and therefore has no financial value. In the Netherlands this situation has led to the closing of a full scale production plant. This is in contrast to struvite from waste water treatment plants which can be used as recovered phosphate salt. Struvite from designated production processes from processing waste water is acknowledged in some EU countries (e.g. UK), as regular mineral fertiliser.

Main reference

Ganrot, Z., G. Dave en E. Nilsson, 2007. Recovery of N and P from human urine by freezing, struvite precipitation and adsorption to zeolite and active carbon. Bioresource Technology 98: 3112-3121.

Ganrot, Z., A. Slivka, G. Dave, 2008. Nutrient recovery from human urine using pre-treated zeolite and struvite precipitation in combination with freezing-thawing and plant availability tests on common wheat. CLEAN - Soil, Air, Water; 36 (1); 45-52.

González-Ponce, R., E.G. López-de-Sá en C. Plaza, 2009. Lettuce response to phosphorus fertilization with struvite recovered from municipal wastewater. HortScience; 44 (2): 426-430.

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SYSTEMIC

Struvite

Agronomic aspects

The agronomic effectivity of struvite originating from waste waters has been tested and published in 80 peer reviewed articles. Not surprisingly, the effectivity of phosphorus and not nitrogen is tested. The main general findings are:

- Struvite acts as a slow release fertiliser (Ganrot et al, 2007, 2008). Acting as a slow release lowers the environmental risk of leaching and can contribute to a higher efficiency;
- Struvite has an equal effectivity for phosphorus compared with regular mineral phosphorus fertilisers (Johnston and Richards (2003), Römer (2006), Gell et al (2011) or even better (González-Ponce et al. (2009)).

Nitrogen in struvite is not determining its use/usefulness. The ratio N/P of 0.45 prevents the use of struvite as a nitrogen fertiliser. The use of struvite as a phosphorus fertiliser leads to sub-optimal use of nitrogen, thus nitrogen from other nutrient sources is needed. An application of 30 kg P/ha leads to an application of 13 kg NH_4-N/ha.

The effectivity of nitrogen as such has not been tested and thus nitrogen fertiliser replacement values are not available in the public domain or peer reviewed articles.

Environmental aspects

An effect of struvite formation during composting is that the ammonia volatilisation is reduced as reported by several peer reviewed articles (e.g. Wang and Zeng, 2018). Environmental performance of struvite was tested on their effects to prevent leaching of phosphorus. Few peer reviewed articles address nitrate accumulation in soil or nitrate leaching. Ammonium nitrogen in struvite is considered as an advantage as nitrification is needed before leaching can occur. Struvite formation is considered as a conservation of nitrogen. As an example, data of Rahman et al. (2011) on nitrogen leaching is given in Figure 1. Nitrogen leaching was measured in columns packed with soil. Losses by leaching were low, those for struvite were lower than for urea.

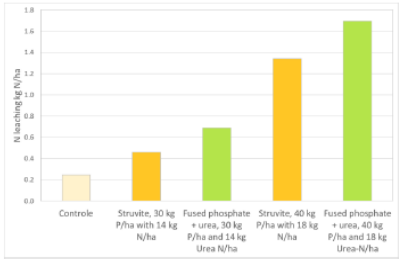

Figure 1. Comparison of the effect on nitrogen leaching from struvite and a fused phosphate fertiliser blended with urea for two phosphorus application rates leading to two nitrogen application rates (Rahmann et al, 2011).

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Kmetijski inštitut Slovenije

Udeležba na delavnici v Bruslju 30. 5. 2018

Fertilising products based on animal manure under the Nitrates Directive and Circular Economy

Poudarki z delavnice:

1. EK je na začetku obravnavanje te tematike.
2. Interes nekaterih držav članic EU po teh proizvodih je velik. Cilj: prodaja na trgu.
3. Članice EU pogrešajo jasno zakonodajno razmejitev med opredelitvami živinskih, mineralnih in drugih vrst proizvodov (gnojil), ki nastajajo s tehnološko predelavo živinskih gnojil.
4. Kakovost tovrstnih proizvodov je potrebno vrednotiti ne le s stališča agronomske uporabnosti temveč tudi s stališča onesnaženosti (težke kovine, antibiotiki, patogeni organizmi itd.).
5. Stališče EK: Tovrstni proizvodi so v okviru nitratne direktive še vedno opredeljeni kot živinska gnojila, saj je izvor N v teh proizvodih živinsko gnojilo.

Rešitve za zmanjšanje izpustov dušikovih spojin v zrak iz kmetijstva

Pomoč pri oblikovanju stališč, mnenj in informacij Republike Slovenije v povezavi z izvajanjem in sprejemanjem obveznosti ter pri oblikovanju ukrepov na področju izpustov dušikovih spojin v zrak za področje kmetijstva ter pomoč pri ozaveščanju javnosti o izpustih onesnaževal iz zraka.

- Z namenom vpogleda v dogajanja smo sledili stanju in trendom na področju izpustov v zrak.

	Prispevek kmetijstva k skupnim izpustom v Sloveniji
Amonijak	90,8 %
NMVOC	19,4 %
NO_X	9,7 %
PM_{10}	3,8 %
$PM_{2,5}$	1,0 %

- Za različne ciljne skupine (ministrstva, kmetje, strokovnjaki, prijavitelji projektov) smo pripravili 5 predavanj/predstavitev s področja izpustov v zrak.