



**To DG Environment and DG GROW (Fertilisers)** - 11 February 2020

## **Comments on the “AMEC” study 8/2/2019 commissioned by DG Environment:**

*“Digestate and compost as fertilisers: Risk assessment and risk management options. Final Report”*

*Ramboll – Peter Fisk – WOOD (ref. 40039CL00313, 8<sup>th</sup> February 2019*

<https://etendering.ted.europa.eu/cft/cft-document.html?docId=57674>

The comments below have been discussed with and are shared by the principal concerned organisations involved with composts and digestates: European Compost Network, European Biogas Association, Growing Media Europe, EUREAU.

### **Introduction**

We support ensuring safety to health and to the environment of all fertilising products and used in food production, and the long-term protection of the soil environment. We also recognise that ‘conservative’ safety requirements for such recycled materials are important to maintain confidence of farmers, growers, the food industry and distributors and of consumers.

However, safety requirements should be based on science and data, because unjustified limitations can limit or prevent nutrient recycling and return of organic carbon to soil and can also contribute to irrational rejection of secondary materials recycling to farming and growing.

Wherever contaminants are identified as problematic for organics and nutrient recycling, these should be addressed firstly by reduction at source. This is particularly the case for consumer/industrial chemicals such as flagged in this study (PFAS, nonylphenol). Heavy metals in sewage biosolids can and should be further reduced by both limitations of uses (e.g. cadmium in artists paints) and by improved separation of industrial discharges from municipal sewerage. Actions can and should also be taken to reduce pharmaceuticals (separation of hospital discharges, rationalisation of use where possible) and to limit possible toxicity of microplastics (limits to additives).

A key aspect of separation at source is the “source separation” of organics in municipal solid waste. This is clearly advocated in both the 2019 update of the EU Waste Framework Directive (2008/98/EC amended by Directive (EU) 2018/851) and in the EU Fertilising Products Regulation.

The study provides no cost-benefit analysis, and no analysis of the impacts of proposed measures on the environment as a consequence of constraints on nutrient and organic carbon recycling.

The study does not provide a definition of “compost” or “digestate”, leading to lack of clarity as to what is being considered (co-treated materials, MBT, dredgings ... – see comments below).

There is no list of base data used to underpin assumptions and conclusions. The report is based on the EUSES model (with ECHA assumptions) but states that other equations have been used for input material, without analysing how this impacts the EUSES conclusions. The sensitivity analysis provided only looks at some elements, whereas the limits seem to be based on accumulated “worst case” scenarios.

We therefore support research and science-based risk assessment, based on up-to-date data concerning the possible risks of contaminants in composts, digestates and other secondary fertilising products, depending on the specific materials used as inputs, the processing undergone and the final product uses.

We underline that any European contaminant limits for composts and digestates should be coherent with those already agreed by Council and Parliament for CE Mark products under the EU Fertilising Products Regulation (June 2019) and should be coherent for use in gardens, on fields or in growing media.

### **Request for actions by the European Commission**

We consider that the conclusions of this study and the “Risk Reduction” measures proposed are not justified by the content of the report. **We request that the European Commission accompany the publication of the study with a statement to this effect, or that the Commission submit the study to SCHER (Scientific Committee on Health and the Environment) requesting an Opinion on the validity of the study conclusions.**

**We also request that this study should not be considered as a possible basis for proposing risk reduction measures until such a reassessment of its conclusions has been made** (e.g. not used as a basis for requesting risk reduction measure proposals from ECHA).

Similarly, **this study should not be transmitted without the above provisos to the consultants carrying out the second study tendered by DG ENVI** (see [here](#)), which the tender states will look at contaminants in all fertilisers, both organic and mineral fertilisers and both “national” fertilisers and CE-Mark fertilisers.

#### **Detailed comments:**

This is a desk study, apparently based on questionnaire answers received from five stakeholder organisations only, four industry organisations (EBA, ECN, Italian compost consortium, BDE Germany) and one company (Germany), and on a literature search (50 publications assessed see pages 4 and 37).

#### **Failure to consider reduction at source**

Even if the context of the study is assessment of possible REACH restrictions on composts and digestates, it is regrettable that reduction of pollutants at source is not considered.

For four of the seven substances identified in the study conclusions as priorities for risk reduction measures, reduction at source would be effective: (some) heavy metals (e.g. nickel, mercury), Nonylphenol, PFAs (PFOA, PFOS), Cadmium

#### **Microplastics and pharmaceuticals**

This process identified pharmaceuticals as being in the lowest priority group of contaminants (category 3), including 17 $\alpha$ -ethinylestradiol (synthetic hormones used in female contraceptive pills), page 39. Microplastics were not identified at all it seems from the literature data.

On pages 65-66, it is clear that there is very little data on the effects and behaviour of 17 $\alpha$ -ethinylestradiol in soil ecosystems, that it is highly mobile in water, and that input to surface waters from compost/digestate is very low compared to aquatic discharge from sewage works. It is stated “The local total daily intake is well below the therapeutic pharmaceutical dose even when the exposure model assumes relatively conservative concentrations in the compost/digestate”.

Yet, in the study conclusions, 17 $\alpha$ -ethinylestradiol appears as one of seven substances/groups prioritised for risk management measures. And on page 9, is one of the substances cited to justify banning sewage sludge as an input material for composts and digestates.

This appears to be based only on the following, page 43: “Following consultations with an expert, 17 $\alpha$ -ethinylestradiol has been selected for further risk assessment on the basis that it is listed in the Water Framework Directive, shows a high mobility in water, and poses major risks for human health and for the environment.”

So overall: 17 $\alpha$ -ethinylestradiol (synthetic contraceptive hormone) seems to be the only pharmaceutical considered, and it is included in the seven substances prioritised for risk management on the basis of opinion of just one expert, despite the statements in the study that levels in compost/digestate are low, that most exposure is from water, etc.

#### **Justification of proposed ban of sewage sludge as input to composts and digestates**

Existing data and reviews on contaminants in sewage sludge and on their risk assessment, nor research into the fate of contaminants in sewage sludge after application to land, do not seem to be taken into account. Eureau was not consulted during the development of this report, so was not able to input to address these gaps.

For example:

- JRC study – 2012 report published in 2013 JRC study – 2012 report published in 2013 “*The report presents the result of the screening, concluding that the monitored concentrations did not justify the introduction of new limit values for the considered parameters in the present Directive, as no measurable risk has been identified from the organic compounds in sewage sludge.*” This report concludes that monitoring of POPs is unnecessary for the agricultural use of sewage sludge.  
<https://ec.europa.eu/jrc/en/news/jrc-study-calls-need-monitor-novel-pollutants-sewage-sludge-9688> and [https://ec.europa.eu/jrc/sites/jrcsh/files/jrc76111\\_lb\\_na\\_25598\\_en\\_n.pdf](https://ec.europa.eu/jrc/sites/jrcsh/files/jrc76111_lb_na_25598_en_n.pdf)
- Millieu/WRC/RPA study for the EC “*significant environment or health risks linked to the use of sewage sludge on land have not been documented in scientific literature since the Directive took effect*”. Millieu/WRC/RPA report for EC on ‘Environmental, economic and social impacts of the use of sewage sludge on land’ - Part i and Part ii and the consultation report

[https://ec.europa.eu/environment/archives/waste/sludge/pdf/part\\_i\\_report.pdf](https://ec.europa.eu/environment/archives/waste/sludge/pdf/part_i_report.pdf)

[https://ec.europa.eu/environment/archives/waste/sludge/pdf/part\\_ii\\_report.pdf](https://ec.europa.eu/environment/archives/waste/sludge/pdf/part_ii_report.pdf)

- Indeed, to reiterate the conclusion of the JRC, the routine monitoring of POPs is unnecessary for the agricultural use of sewage sludge.

On page 9, this proposed ban is justified by the following substance: Copper, Zinc, Mercury, 17 $\alpha$ -ethinylestradiol, dioxins and furans, PFAS, PAH16.

Of these:

- 17 $\alpha$ -ethinylestradiol is discussed above: not justified.
- mercury and PFAS should be addressed by reduction at source. This is already largely “done” for mercury, and mercury levels in sewage sludge are already and will continue to significantly decrease because nearly all uses and emissions have now been stopped or strongly reduced. PFAS is a recognised chemical contamination problem in sewage biosolids and elsewhere (e.g. household dust) and should be addressed at source.
- dioxins, furans (and PAH16) – as for mercury, levels in sewage sewage are falling, as environmental emissions are reduced by gas cleaning obligations on industrial sites
- copper and zinc: these are micronutrients, so that presence in compost or digestate can be beneficial, if used appropriately. Analysis is simple and standard practice. These should be addressed by labelling requirements and use limitations, not by banning input materials.

We note that it is indicated page 38 that the highest levels of heavy metals were in MBT (mechanical biological treatment municipal solid wastes) not in sewage sludge.

There is no cost-benefit analysis of the proposed exclusion on sewage sludge. For example, the replacement of metal piping by plastic is indicated p159 as susceptible to reduce levels of “*Heavy metals (Cu, Zn, Cd, Hg, Ni, Pb) ... (in) Sewage sludge (and dredgings from inland waters)*”. Not only does it seem improbable that this measure would impact significantly Hg, Ni or Cd, nor would it impact “dredgings”, but the cost would be considerable. No costing (nor environmental impact analysis) of the sludge incineration capacity necessary to substitute agricultural valorisation is provided.

The study does state page 117: “*Sewage sludge would then require alternative waste management, which would likely lead to additional environmental risks and could contradict environmental policy objectives.*”

The study states that exclusion of sewage biosolids from compost and digestate products, should lead also to a general ban on agricultural application of sewage sludge. This is apparently for reasons of regulatory coherence (despite the contradictions with such coherence elsewhere, see comments) but without and scientific basis (indeed, ignoring the extensive existing data, reviews and report on this question, see comments).

### Contaminant limits

The study identifies, according to a logic which is not justified, the following contaminants as potentially posing risks to human health or the environment when compost or digestate is used (a) on agricultural land or (b) as a growing medium (container crop growing): heavy metals (Nickel (Ni), Lead (Pb), Copper (Cu), Zinc (Zn), Mercury (Hg)), 17 $\alpha$ -ethinylestradiol, PCBs (PCB28), dioxins and furans (TCDD, PCDF), nonylphenol, PFAs (PFOA, PFOS). Lower priority risks are identified for Cadmium and PAH16 substances, and “further monitoring” is suggested for microplastics.

Possible EU limits are proposed for all of these substances (except cadmium and microplastics). In some cases, the limits proposed for use as growing media are lower, in one case however they are higher: this seems incoherent).

The methodology for calculation of the proposed limits is not clear, indeed in sector 4.1 it is stated that for the approach of assessing the risk for heavy metals the ‘*natural background and active accumulation mechanisms present a challenge*’. For container growing, it is not clear whether the safe limits are based on phytotoxic effects on the grown plants, or environmental issues related to soil application after the used growing media is applied to soil.

The relative significance of other anthropogenic inputs (such as aerial deposition) for some contaminants is not taken into account.

The proposed limits for Nickel (7.9 mg Ni / kg dry weight) and Zinc (70 mg Zn /kg dry weight) for the use of compost in ‘container growing’ as well for Mercury (0.2 mg Hg/kg dry weight) for the agricultural use of compost and digestate on land are questionable and unrealistic.

The calculation of safe limits should take into account application rates, which seems to not be the case in this study. See for example, the VITO Study (2013) “*Towards risk-based draft limit values for the use of secondary raw materials as fertilizer or soil conditioner*” (in table below) which uses a dynamic model calculating the maximum allowable concentrations of pollutants in the soil conditioner/fertiliser on the basis of the maximum permitted enrichment of the upper soil layer over a period of 100 years, taking into account all possible input-

output fluxes and soil processes. This results in a final set of limits (translated into Flemish legislation for sustainable recycling of biowaste VLAREMA see table below) significantly different from those suggested, without such justification, in this AMEC study.

#### Cost / Benefit

There are references to circular economy included in the report, but these are not explored fully, and no there is cost-benefit analysis of the proposed options. For example, replacement of all metal pipework (to reduce heavy metal loads) is cited as an economically feasible option. There are no estimates of the financial or environmental consequences of the sludge ban and how long it might take for alternative (presumably incineration / thermal destruction) options to be developed.

#### Coherence with previous studies

This new study does not make clear why such a desk study based on literature and a very limited stakeholder and expert consultation should justify limits which are lower than those resulting from previous studies, in particular the detailed work undertaken in the JRC End of Waste study for composts and digestates 2014 (based on the JRC FATE COMES Study 2013 for which numerous samples of compost and digestate were analysed) or the widely consulted values agreed in the EU Fertilising Products Regulation 2019.

The following table shows differences between values derived in previous studies and this new desk study:

Criteria	JRC end of waste 2014	EU Fertilising Products Regulation 2019	Flemish Materials Decree (VLAREMA)		ECN-QAS	"AMEC" 2019 desk study
Mg/kgDM	Compost/ digestate	Organic soil improver	Safety limits based on dynamic model	Compost all applications	Compost all applications	Compost/ digestate
Cd	1.5	2	5	2	1.3	-
Cr-total	100	2 (CrVI)	200	70	60	-
Hg	1	1	1	7	0.45	0.2
Ni	50	50	100	30	40	-
Pb	120	120	300	150	130	100/150
Cu	200	300	800	150	300	-
As	40	40	20	20	-	-
PAH 16	6	6	-	(individual PAH)	-	3/10
PCB 7	-	-	0.8	0.8	-	0.15/0.8

#### References:

- Towards risk-based draft limit values for the use of secondary raw materials as fertilizer or soil conditioner, VITO, 2013
- End-of-waste criteria for biodegradable waste subjected to biological treatment (compost & digestate): Technical proposals, JRC, 2014
- Occurrence and levels of selected compounds in European compost and digestate samples: Results of a Pan European Screening exercise FATE-COMES, JRC, 2013
- ECN-QAS the European Quality Assurance Scheme for Compost and Digestate <https://www.compostnetwork.info/ecn-qas/>

### Assumptions and Definitions

The report does not set out definitions for Digestate or Compost. A wide view is taken of the component materials, and includes co-treated materials. Given the precision of other EU-legislation on input materials (e.g. under waste legislation), this report seems wide and shallow in approach.

There is no mention of corroborating environmental data to verify the assumptions that underpin the report.

Sludge used under SSD is presented as different to digested sludge, leading to the conclusion that SSD would need to align. This does raise the question of what data has been used to derive the risks for C/D SS?

The report refers to a 'realistic' worst case. This seems highly unlikely. It appears that each worst-case scenario forms the basis of the next – conclusions are therefore based on a series of assumptions that are not adequately evidenced. There are limited attempts at sensitivity analysis but these address only small elements of uncertainty.

There is no clear outline of base data to underpin the assumptions and conclusions drawn.

The report is based on the EUSES model (with ECHA assumptions) – whilst it admits that other equations have been used to provide input material, it is not clear how far it departs from EUSES, or the robustness and whether the equations used have been subject to external review.

### Regulatory coherence

The limits proposed are generally significantly lower than those fixed by the EU Fertilising Products Regulation (FPR), e.g. nickel for growing media: 7.9 compared to 50 mg/kgDW, or mercury in organic fertiliser: 0.2 compared to 1 mg/kgDW.

The EU FPR limits were adopted by Parliament – Council co-decision (although the Commission has delegation to modify certain aspects of the FPR annexes ????) does this include contaminant levels ?????). To what extent, could an ECHA / Commission REACH Restriction decision effectively modify the FPR limits by imposing lower limits (applicable to all composts and digestates, both "national" and "CE" products)?

We note the statement page 9 that "The direct application of sewage sludge to agricultural land would have to be restricted to be coherent with the restriction of sewage sludge C/D.". What the consultant presumably means is the application of sewage sludge, untreated, limed, composted or digested or otherwise under waste status (which would not be impacted by REACH Restrictions). This could (only) be achieved by an update of the EU Sewage Sludge Directive 86/278/EEC, which would be a completely different process.

Legal options discussed include "Restrictions" on all composts and digestates (using REACH), modifications of the EU Fertilising Products Regulation annexes (would only impact CE-Mark composts and digestates), modification of the EU Sewage Sludge Directive or EU Waste Water Treatment Directive. It is ESPP's understanding that a 'Restriction' under REACH could for example prevent the placing on the market in Europe (that is sale or use by any party other than the producer, other than under "waste" regulation) of any compost or digestate containing contaminants above specified limits and/or containing excluded input materials (e.g. proposed exclusion of sewage sludge and/or mechanically separated household organic waste MBT).

### Two-stage anaerobic digestion

It is suggested to oblige two-stage anaerobic digestion for input materials sewage sludge and MBT municipal solid wastes and it is stated page 9 that two-stage anaerobic digestion can reduce levels of two-stage AD: Nickel, Lead, Copper, Zinc, Cadmium, PAH16. We do not see how additional digestion can "remove" heavy metals: these are simply transferred into a separate "sludge" stream. It also seems that the claim that 2-stage AD would improve elimination of complex organic compounds is not supported by the cited literature.