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Hydrology and Earth System Sciences
Discussions

Interactive comment on "HESS Opinions: Agricultural irrigation with effluent – Pharmaceutical residues that we should worried about" *by* Dror Avisar and Gefen Ronen-Eliraz

Anonymous Referee #1

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The manuscript by Avisar and Ronen-Eliraz raises few points for consideration regarding the need to monitor, regulate and treat drugs and their residuals from wastewater. The manuscript base the augments on the following statements: (i) The trends ofa wastewater generation and fresh water consumption is constantly growing leading to large amount of wastewater requiring treatment and shortage in fresh water resources in many parts of the world. (ii) Israel is the country with the highest rate of treated wastewater reuse and therefore can be considered a test case for treated wastewater reuse; and (iii) Drugs and their residues are persistent and are not degraded in conventual wastewater treatment facilities. After establishing this background the manuscript goes to several different directions including detection of drugs and their residues in

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Discussion paper

water resource and treatment of concentrated effluents. However there are few fundamental problems with this manuscript.

(1) The topic of this manuscript has been discussed at all levels for more than 2 decades now and the amount of work that has been published on each and every point that is reported in this manuscript is overwhelming. However, A reader without previous knowledge could understand that the drug residue in wastewater is a problem mainly in Israel and that most of the work has been done by two groups (20 out of 47 references or 38 scientific peer-reviewed publications) come from two group with the authors self-citing 14 of their his own publication).

(2) The manuscript does not bring any new perspective and many arguments are not fully supported. For example drug residues are considered contaminant of soil, water and sludge however it is also stated that their concentration are very low and that no proven health implication was reported to date. There are logical gaps and jumps between hot spots with high contamination that can be dealt by AOPs and low-level board contamination of soil and water that are not suitable for this type of treatment. Moreover, sometime the manuscript refer to drug and drug residues in other cases to pharmaceuticals and in other parts to organic micro-pollutants, which is much larger group. Finally the manuscript state that many of the pharmaceutical metabolites/transformation products are unknown and on the other hand calls for consideration of regulation these compounds.

(3) Relevant literature is missing for example: Mensingh J., Thurston C. 2015 PPCPs: Preparing For An Uncertain Regulatory Future. Water on line https://www.wateronline.com/doc/ppcps-preparing-for-an-uncertain-regulatory-future-0001 Boxall et al. 2012 Pharmaceuticals and Personal Care Products in the Environment: What Are the Big Questions? Environ Health Perspect. Sep; 120(9): 1221–1229. Ortiz de García, et al. 2013 Ranking of concern, based on environmental indexes, for pharmaceutical and personal care products: an application to the Spanish case. J Environ Manage.;129:384-97. doi:

10.1016/j.jenvman.2013.06.035. Epub 2013 Aug 28. Lamastra L, Balderacchi M, Trevisan M. 2016 Inclusion of emerging organic contaminants in groundwater monitoring plans.MethodsX. 2016 May 25;3:459-76. doi: 10.1016/j.mex.2016.05.008. eCollection 2016. EPA https://www.epa.gov/wqc/contaminants-emerging-concern-including-pharmaceuticals-and-personal-care-products G. Eckstein, 2012Comment: Emerging EPA Regulation of Pharmaceuticals in the Environment, 42 Envtl. L. Rep. 11105. (4) When one consider regulation a clear target and method must be suggested too. In this work no priority substance are suggested and it is noted twice in the text that to date the no toxicity at environmental levels was found. Moreover the detection methodology is very complex at best and often if one want to consider many metabolites the analytical methods are a subject for research and not routine analysis.

To conclude this manuscript is very limited in presenting the current literature (other than the authors own work) and instead provide a long list of clichés that are summarized by the "need for more research". No new perspective on the subject is provided. This is not enough to recommend publication.

Some specific comments:

Page 1 lines 26-27 - This is related mostly to biological contamination and waterborne diseases which are not really the subject of this work. This makes this statement a bit misleading. Page 3 fig 2 The amount of water resource will grow between 2010 and 2040 by ∼1400 Mcm/year and the reuse by only ∼500? Also is this original data/figure or should be credited to Bar-Eli, 2017 or someone else?

Page 5 lines 19-20 what were the measured ADP3 concentrations in that experiment?

Page 8 lines 4-5 This is very important point and should be discussed in details maybe even as a separated section. Please provide proofs for toxic effects and contamination of soil and water resources.

Page 8 lines 8-10 This is a problematic statement - the drug residues identity is often

unknown based on section 2 and concentrations of known active compounds are very low at ug/L or below with no proof that they cause health problem. Does these facts justify legislation that require very expensive and labor intensive analysis?

Page 8 section 4 In this section there is a mixture of point sources or hot spots like hospitals or manufacturing facilities with concentration effluents which are very different from contamination of groundwater, soils or municipal/domestic wastewater or even agricultural wastewater that were mentioned earlier.

Page 9 lines 7-8 You need to prove that the OMP residuals harmful and which specific elements are the problematic not the other way around.

Throughout the text: authors use OMP, drugs and pharmaceuticals referring to the same group of materials – please unify the terms. Check sub and super scripts.

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