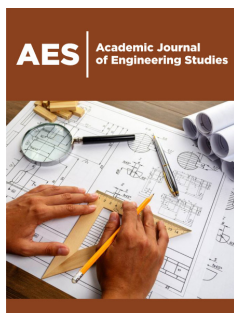


Wastewater Treatment Plants and Superpathogens: Is Really Human Health at Risk?

Rafael Marín Galvín*

Department of Inorganic Chemistry and Chemical Engineering, University of Córdoba, Spain

ISSN: 2694-4421



***Corresponding author:** Rafael Marín Galvín, Department of Inorganic Chemistry and Chemical Engineering, Municipal Water Company of Córdoba, University of Córdoba, Córdoba, Spain

Submission:  September 01, 2023

Published:  September 06, 2023

Volume 3 - Issue 2

How to cite this article: Rafael Marín Galvín*. Wastewater Treatment Plants and Superpathogens: Is Really Human Health at Risk?. Academic J Eng Stud. 3(3). AES.000565. 2023.
DOI: [10.31031/AES.2023.03.000565](https://doi.org/10.31031/AES.2023.03.000565)

Copyright@ Rafael Marín Galvín, This article is distributed under the terms of the Creative Commons Attribution 4.0 International License, which permits unrestricted use and redistribution provided that the original author and source are credited.

Abstract

A recent study alert us about the presence of named by authors as “superpathogens”, microorganisms detected in Wastewater Treatment Plants operated by biological technologies. These bacteria should provoke healthy problems by our society forgotten the undoubted benefits obtained from the biological treatment of urban wastewater and sending to citizen confusing messages. This article of opinion wants to make several reflections about this subject: biological treatment of urban wastewater is a safe technology and the first system to obtain a sustainable environment. Moreover, healthy benefits associated to biological treatment of urban wastewater exceeds always hypothetical disadvantages.

Keywords: Wastewater; Wastewater Treatment Plant (WWTP); Biological treatment; Pathogens in wastewater; Reclaimed wastewater

Introduction

In a recent article [1] we can find an interesting article about the generation in our wastewater treatment plants of microorganisms called by the authors as “superpathogens”. These microbial agents are probably produced by different mutation ways in the Wastewater Treatment Plants operated by biological mechanisms.

In the other hand -says paper-, this fact converts these facilities in a source of infection for humans, not considered to date, questioning in parallel the work of our WWTPs in the health of the population, according to that indicated by authors of paper above cited. Moreover, the paper indicates also that Wastewater treatment plants powered by environmental technologies use microbes to economically degrade pollutants.

In this way, in paper authors affirm that superpathogens from WWTP can be transferred to humans mainly through accidental contact with the use of reclaimed water (identifying treated wastewater with reclaimed water, something that is not true) and with bioaerosols (Water microparticles that pass into the air due to bubbles and the movement of the same waters) as well from bio-solids generated in these plants which after can be used in agronomy as fertilizers.

Paper ends calling on governments to recognize the public health threat posed by superpathogens from treatment plants and recommending macrophyte-assisted vermifiltration, which can effectively treat wastewater as worms can consume and kill pathogens. Or implement sustainable disinfection processes, for example eBeam (use of electrons as disinfectant) as well as nanobubble technologies, both processes being very expensive.

After to read these affirmations, we think that could be interesting make several qualifications to what was said because there have been made ideas lacking in scientific rigor and technical lucidity. About the biological treatment of wastewater: an activity safe and irreplaceable

After stopped reading of above paper I want to express several questions about the above one, since there they formulate various assertions devoid of objectivity.

A. Wastewater Treatment Plants are the most effective barrier to prevent contamination of the environment in general, and specifically in the aquatic environment. They are the main and first system to limit sanitary infections in our cities. Biological treatment of wastewater is a technology sounded and extended along the developed world [2] being used this treatment scheme by environmental and efficiency aspects, no by economical aspects. All the statistics from the last 50-60 years found a very positive relation between biological treatment of urban wastewater and increase of safety of population. Generation of doubts about this practice is at least risky and opportunistic. Moreover, it could encourage wastewater treatment industry deniers.

B. Direct infectivity due to contact between urban wastewater and human beings is certainly minimal, since the water sector is in charge of applying work routines that, fortunately, are the envy of many other industrial sectors.

C. Otherwise, treated wastewater generated in the WWTP never are used as reclaimed water directly: it is not true. The treated wastewater must be after treated in other plants to obtain reclaimed disinfected water intended to reuse in agriculture. Used of reclaimed water, at least in the European Union is under normative ad hoc. Authors have forgotten his question.

D. The use of microbial technologies [2] is the most sustainable of the currently available technologies to treat urban wastewater since it literally "copies" what nature has been doing for hundreds or billions of years. It is a real environmentally clean activity. Aerobic technologies used bacteria that metabolize carbon compounds (i.e., pseudomonas) while anaerobic technologies used other bacteria that metabolize nitrogen and else phosphorous compounds (i.e., Nitrosomonas, Nitrobacter, Nitrospira). Development of these microorganism are obtained in the WWTP by means natural adaptation to internal environment.

E. In both, aerobic treatment and anaerobic treatment, microorganisms used are the existing in nature, specially those present in original urban wastewater generated in our cities; we do not modified microorganism by means some method of engineering genetics in our WWTP.

F. Reduction of original amount microbial load of urban wastewater along biological treatment in WWTP is usually higher than 5log or even 6log. Potential appearance of superpathogens can made possible to a great extent, if not the majority, by the abuse of antibiotics and pharmaceutical

products in our current society. Perhaps, the control at origin of these products should be one of the main ways of tackling the problem at hand. This has not been considered in the commented paper.

G. The reference to SARS-Cov-2 in paper is surprising as it is a viral pathogen whose non-infective traces have reached the urban wastewater caused by external elements whose source would be good if it were clarified once and for all by the scientists of the country where it comes from.

H. And something else about it: infectivity rates in water cycle workers have been among the lowest in the current pandemic of Covid-19, compared to other activities.

I. Everything that implies improvement in the processes applied in the WWTP must be taken into account, credited their performance and promoted. Everything must be studied, evaluated and its balance of pros and cons quantified. It does not seem too objective to mark trends towards a potential solution only with the evidence provided in paper.

In this way, for example, reference to disinfection by means electronic technologies which are very expensive having been very few tested to date; as well as the nanobubbles technologies which are very few efficient as disinfection method in urban wastewater.

As summarizing, biological treatment of urban wastewater is safe, being undoubtedly the main source of potential sanitary risk in our urban wastewater the great lots of antibiotics and pharmaceutical products used by people in our cities: this must be matter of concern nowadays. Formulation of messages questioning the usefulness of current Wastewater Treatment Plants is irresponsible and lacks the prevailing technical reality.

Conclusion

Biological treatment of urban wastewater is safe being a technology environmentally clean: in biological WWTP can be obtained reduction of up to 5log to 6log with respect to original microbial load of urban wastewater. Use or reclaimed water is also safe being under normative at least in the European Union. The main source of potential sanitary risk in our urban wastewater is the great lots of antibiotics and pharmaceutical products used by people in our cities: this must be matter of concern nowadays. Formulation of messages questioning the usefulness of current biological Wastewater Treatment Plants is irresponsible and lacks the prevailing technical reality.

References

1. Xiao Y, Zhao F, Peñuelas J, Huang Q, Zhu YG (2021) Super pathogens from environmental biotechnologies threaten global health. *Natl Sci Rev* 8(9): nwab110.
2. Metcalf y Eddy Inc. (2003) *Wastewater engineering. Treatment and reuse 4th (edn)*, McGraw-Hill, New York, USA.