Reyed M Reyed, J Infect Dis Ther 2018, Volume 6
DOI: 10.4172/2332-0877-C7-056

The negative impact of sea water desalination and the potential exposure to the risk of antibiotic resistome: The transmission antibiotic resistance from the aquatic environment to humans

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Antibiotic-resistant bacteria most often are associated with hospitals and other health-care settings, but a new study indicates that sea water treatment plants and their water reuse also are hot spots of antibiotic resistance. The increase in antibiotic-resistant bacteria and antibiotic-resistant bacterial infections could be the result of a number of factors including the overuse and misuse of antibiotics in humans, antibiotic use in animal and crop agriculture, antimicrobial substances in personal care products, and the incomplete removal of biocides from wastewater treatment plants (WWTPs). Wastewater treatment plants and their water reuse areas ripe for bacteria to shuffle and share their resistance genes. These hot spots of potential resistance transmission included a modern wastewater treatment plant their water reuse in agriculture and food production that means it's relatively easy for disease-causing bacteria that are treatable with antibiotics to become resistant to those antibiotics quickly. If these bacteria happen to come into contact with other microbes that carry resistance genes, those genes can pop over in one step. Such gene-transfer events are generally rare, but they are more likely to occur in these hot spots if the water reuse are hot spots of resistance gene transfer, We speculated that bacteria present in wastewater treatment plants where human regularly receive antibiotics would see even more pressure to share resistance genes. We should concern about such bacteria getting into the food system. Further, the wastewater treatment facility may be hot spots of antibiotic resistance transmission regardless of their locations. Trace concentrations of antibiotic, such as those found in sewage outfalls, are enough to enable bacteria to keep antibiotic resistance. This explain why antibiotic resistance is so persistent in the environment. The nonexistence of a important overlap of antibiotic-resistant bacteria (ARB) and antibiotic resistome between the human microbiome and potential environ mental sources should not be interpreted as an indication of risk absence. Hence, screening of antibiotic resistome pools cannot be used as an accurate measure of the risk for transmission to humans. The risks of transmission of antibiotic resistance from the environment to humans must be assessed based on antibiotic-resistant bacteria (not only on antibiotic resistome) that are able to colonize and proliferate in the human body. The risk is a function of their fitness in the human body and the presence of resistance and virulence genes. Even at extremely low abundance in environmental sources. antibiotic-resistant bacteria may represent a high risk for human health. The limits of quantification of methods commonly used to screen for antibiotic-resistant bacteria in environmental samples may be too high to allow reliable risk assessments. The times of yore decade has eye witnessed a disintegrate of study regarding antibiotic resistance in the environment, mainly in areas under human activities, which they are now recognized. However, a key issue refers to the risk of transmission of resistance to humans, for which a quantitative model is urgently needed. A most important conclusion is that the risks of spread of antibiotic resistance from the environment to humans must be managed under the precautionary principle, because it may be too late to act if we wait until we have concrete risk values.

Biography

A one-decade technology developer and market builder in water Microbiology, Dr Reyed Human Gut Microecology & Microbiota Consultant; PhD "Probiotics Microbiology and researcher at Scientific Research and Technology Application city " SRTA- City" , has deep expertise in Probiotic Microbiology, Water microbiology and Water treatment technology application stemming from 25 years a Scientific Researcher over 10 years executive technical consultant for h2obioprocess of corporate Safibiowater in Alexandria, Egypt " Integrated Eco-solution" He contributes to European Desalination Society, International water association. Egyptian council society and Egyptian scientific syndicate. And participated in over 20 International and National Conferences.

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