

ACRONYM: Gene-gas

Title: Wastewater treatment plants as critical reservoirs for resistance genes

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Abstract:

Multiresistant bacteria are a severe problem to modern healthcare. The problem is increasing and development of novel technologies to cope with this critical situation is a necessity. Solutions include novel antibiotic drugs as well as reducing the spread of resistance genes in the environment.

Wastewater treatment plants (WWTP) are nodal points where much of the contaminated material is passing. When processing the sludge, biogas is produced, followed by a residue, biofertilizer. Sanitation of biofertilizer is usually performed via treatment at 70°C for 1 hour. However, other strategies need to be developed to assure that the frequency of resistance genes in the sludge is drastically reduced. So far, very few reports are present on the abundance of resistance genes, and even less information is available concerning possible treatments to reduce the content.

The present program addresses both of these aspects, the frequency and means to reduce resistance genes by e.g. converting the nucleic acids into biogas. The project involves monitoring of the fate of resistance genes, both in the conventional processing in WWTPs and in subsequent anaerobic digestion. An organism carrying a reporter gene will be added to a model of a WWTP, and the "survival" of that gene will be monitored.

Based on the results obtained, a model will be developed concerning the effect of new treatment methods and their impact on spreading of resistance genes. Both bacteria and bacteriophages are carrying resistance genes, and will be monitored to evaluate the effect of different treatments.