

ANTIBIOTIC RESISTANT GENES IN AQUACULTURE: SOURCES, PATHWAYS, SINKS AND HOW TO AVOID THEM

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More than 250 million cases of gastroenteritis, respiratory diseases and more than 5 million cases of hepatitis are reported annually worldwide. This indicates that infectious diseases are on the rise. Reasons for this are an ever increasing world population and the ease of travelling that enhances the risk of disease spread. An unprecedented rise of antibiotic resistance of most pathogenic microbes and viruses provides another serious health risk. We show that the aquaculture environment with freshwater, brackish and seawater components provide a serious source of antibiotic resistant pathogens. Here, some pathogens even get more virulent than in their human host. This way environmental health as a branch of public health gets unexpected importance with several facets of the natural and man-made environment that affects human health. Three basic disciplines generally contribute to the area of aquaculture environmental health: environmental epidemiology, toxicology, and exposure science. Information from these three disciplines can be combined to conduct a risk assessment for specific physical, chemical, or biological hazards. Such risk factors, separate or in combination, determine whether an exposure poses significant risks to human health. This can in turn be used to develop and implement environmental health policies that regulate chemical emissions, or impose standards for proper sanitation in aquaculture. This way environmental health management can become a tool of preventive medicine. Preventive medicine as a branch of public health attempts to prevent diseases such as infectious diseases, as opposed to disease treatment. We will provide examples here from antibiotic resistance of human pathogenic bacteria that were transacted from life feed used in aquaculture facilities. These are posing threats to organisms raised in aquaculture themselves, to food and drinking water safety, and the healthy functioning of adjacent ecosystems and humans alike.

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