



The “Old-New” Challenges of Water, Sanitation and Bioremediation in Developing Countries

Roman Tandlich*

Environmental Health and Biotechnology Research Group, Division of Pharmaceutical Chemistry, Faculty of Pharmacy, Rhodes University, Grahamstown, South Africa

***Corresponding author:** Roman Tandlich, Environmental Health and Biotechnology Research Group, Division of Pharmaceutical Chemistry, Faculty of Pharmacy, Rhodes University, Grahamstown, South Africa, Tel: 00-27-46-603-8825; E-mail: roman.tandlich@gmail.com

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Editorial

Developing countries face challenges in the development of infrastructure and population growth. These lead to “side-effects” such as uncontrolled urbanization and the fact that basic services such as water and sanitation are lagging behind the actual needs on the ground. Historical challenges, lack of skilled staff and often lack of sustained funding are some of the reasons for the status quo. Extent of water and sanitation coverage often forces national and local governments to install the minimum-standard solutions, e.g. the ventilated improved pit latrines. This improves the public health status in the short-term, but causes problem in the long run due to the lack of regular maintenance such as through lack emptying of pits. Sometimes, construction of these facilities is of inferior standard. Pits are often built without lining or zero consideration is given to the local conditions in terms of soil properties, water table and the number of toilet users.

Combination of the above mentioned factors leads to compromised hygiene, deteriorating public health situation and potential for widespread environmental contamination. Environmental contamination results from percolation of the faecal matter down the soil profile into the groundwater. As faecal matter contains pathogens and groundwater is often used as source of potable water, e.g. 15% of consumption in South Africa comes from this source. Thus after percolation of faecal matter into it, e.g. during flooding informal settlements, can compromise public health through human consumption of water of inferior microbial standard. Further

problems, which have not received sufficient attention in the literature up to date, arise from the environmental contamination with anti-tuberculosis drugs (Rifampicin and Ethambutol) that originates from sanitation facilities. These active pharmaceutical ingredients are often excreted in faeces of the HIV-positive patients who often suffer from tuberculosis and are on con-current antiretroviral and anti-tuberculosis regimens.

If such patients reside in the informal or low-income areas of developing countries and use ventilated improved pit latrines as sanitation facilities, then the anti-tuberculosis drugs are excreted into the pits and can subsequently leach into the environment/groundwater. Given the fact that most water and sanitation service delivery lags behind the ever growing demand, new approaches to stabilization of the faecal sludge and bioremediation of the dilapidated facilities in developing countries are required. Many filter type systems have been published on and are being researched around the world. However, more focus on the low-cost systems which can be maintained and built by the population itself need to be studied. Examples include the mulch-tower filter systems and the recently developed fly-ash-lime filter tower. Such system have been used for on-site management of grey water in South Africa and characterized for the removal of inorganic chemical components, chemical oxygen demand and indicator microorganisms. However, new focus should be placed on the use of these systems in the treatment of faecal sludge and the removal for active pharmaceutical ingredients, such as anti-tuberculosis drugs.