

## **ABSTRACT**

Two of the challenges facing Africa in the 21<sup>st</sup> Century are effective use of restricted water resources and ensuring food security especially for poor communities. In line with these aims, the eThekweni municipality has introduced a multi-tier system of water supply ranging from full pressure reticulated systems along with flush toilets to standpipes and dry toilet systems. In the latter case, it was soon recognized that the disposal of greywater presented a problem. Bearing in mind that South Africa is already a water scarce region, research was initiated into finding means of using this water as a resource rather than as a waste. Initial on-site trials using the greywater to irrigate crops proved popular and it was then regarded as necessary to test the possible health effects on the communities of such a system.

A controlled field trial using pot plantings of a selected range of edible vegetables was initiated at the University of KwaZulu-Natal. Crops were tested both internally and externally for a range of indicator and potentially pathogenic organisms. Quantitative Microbial Risk Assessment (QMRA) techniques were used to assess the health risk to communities from growing and eating the greywater- irrigated vegetables. Although there was a health risk related to most of the activities, especially the handling of the greywater itself, the risks could be brought within the World Health Organisation guidelines of less than one case of disease per 10 000 people per year by the implementation of simple barrier interventions. The greywater irrigated crops themselves, did not present a statistically higher risk of infection than the crops irrigated with either hydroponic solution or tap water. These findings show the importance of applying QMRA to each case to determine health risk. This would allow the productive use of greywater and other water sources in the correct circumstances, thus providing food sustainability for people who currently do not have access to the levels of high purity water currently recommended for agriculture.