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***Title:***

**Microbiological quality of river water used for irrigation of ready-to-eat (RTE) fresh produce by local smallholder farmers in Pietermaritzburg, South Africa**


***Abstract:***

The modern diet emphasizes the consumption of ready-to-eat (RTE) or minimally processed fruits and vegetables essential for a healthy lifestyle. Ensuring the microbiological safety of these produce items is crucial given the highly susceptible Young, Old, Pregnant, and Immuno-compromised (YOPI) citizens. Contamination of fresh produce can occur through various activities from farm to fork, such as using contaminated water for overhead irrigation. This study investigated the suitability of the uMsunduzi River water over the different seasons for overhead irrigation of RTE fresh produce by local smallholder farmers. The microbial burden of river water samples was analyzed, and selected hygiene indicators were determined, including aerobic plate counts, total coliforms, fecal coliforms, *Escherichia coli*, *Enterococcus* spp., and the common foodborne pathogen *Salmonella* spp. The results were concerning, as the river water exceeded the safe irrigation limit of 1000 MPN/100ml *E. coli* stipulated by the World Health Organization on all sampling occasions. The river water samples analyzed over the four seasons were generally of unsatisfactory quality, with aerobic plate counts reaching up to 6.18 $\log_{10}$ cfu/ml. In addition, total and fecal coliform and *E. coli* levels of up to 5.81 $\log_{10}$, 5.66 $\log_{10}$, and 5.23 $\log_{10}$ MPN/100ml were recorded, respectively. Furthermore, high counts of fecal enterococci were regularly present, while presumptive *Salmonella* spp. were often detected. Based on these findings, it is evident that the uMsunduzi river water is unsuitable for overhead irrigation of produce that is typically consumed raw, highlighting potential risks to food safety when such water is used for overhead irrigation.