

# The genetic relatedness of *E. coli* associated with post-collection drinking water contamination in rural households

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## Abstract

Rural households are often dependent on rivers, springs, boreholes or standpipes some distance from their homes for their daily water requirements. Water for drinking and domestic use is consequently stored in containers in-house which are prone to post-collection contamination. The objective of the study was to determine the most likely origin or place of introduction of *E. coli* associated with post-collection contamination in rural households, by assessing the degree of genetic relatedness of *E. coli* present in the stored water and other environmental samples. *E. coli* isolates were obtained using either mFC agar with confirmation of indole production (44 isolates) or Colilert®-18 (52 isolates). Amplified fragment length polymorphism (AFLP) fingerprinting was applied to determine the genetic relatedness of *E. coli* isolated from in-house storage containers, drinking cups, hand-swab samples, cattle dung and from the source water (spring water). DNA fingerprints of *E. coli* produced a number of clusters (>85% similarity scores calculated with the cosine coefficient). Identical *E. coli* genetic patterns were observed at closely linked points within the domestic pathway of water handling, such as between hand-swab and drinking-cup samples, between storage container and source isolates, and between drinking cups, source water and storage containers. The results indicated that AFLP fingerprinting could be applied to determine the genetic relatedness of *E. coli* isolated from closely linked points within the domestic pathway of water use within a household. However, the high genetic diversity observed for *E. coli* bacteria isolated from the different water and environmental samples tested in this study, hampered the identification of post collection points of contamination.

**Keywords:** typing, fingerprinting, amplified fragment length polymorphism, *E. coli*, water quality, genetic relatedness, AFLP