



Tropentag, September 10-12, 2025, hybrid conference

“Reconcile land system changes
with planetary health”

Efficiency of common washing treatments in reducing microbial levels on lettuce in Mali

SANATA TRAORÉ¹, SALIMATOU SAMAKÉ², SOGNAN DAOU¹, DAOUDA DIABATÉ¹, MAMOUTOU BENGALY¹, ABOU KONÉ¹, FASSÉ SAMAKÉ², AMADOU HAMADOUN BABANA¹

¹ *Université des Sciences, des Techniques et des Technologies de Bamako, Fac. des Sciences et Techniques, Mali*

² *Université des Sciences, des Techniques et des Technologies de Bamako, Inst. des Sciences Appliquées, Mali*

Abstract

Lettuce is one of the most cultivated vegetables (eaten raw) in Mali with a percentage of 69.4 amongst leafy vegetables and 30.4 of all vegetables. Vegetables consumed raw, particularly lettuce, are sources of foodborne pathogens. This study was conducted to assess bacterial contamination of unwashed lettuce and the efficiency of disinfecting it with tap water and varying concentrations of some chemical disinfectants: bleach (0.00285, 0.00570 and 0.00855 ppm), potassium permanganate (170, 340 and 510 ppm), vinegar (0.00285, 0.00570 and 0.00855 ppm) and common salt (500, 1000 and 1500 ppm) based on the three consecutive washing protocol recommended for vegetables in Mali. Lettuce samples were randomly selected from farms irrigated with untreated river water within communities five and six in Bamako. Lettuce leaves were exposed to low concentration of the chemical disinfectants at 15 min, intermediate at 10 min and high at 5 min. A bleach (0.00285 ppm)/vinegar (0.00285 ppm) combination disinfection was also tested at 15 min. Tap water, bleach, potassium permanganate, vinegar and common salt reduced faecal coliform populations by 1.3–2.9, 1.5–3.0 and 1.9–3.5 log CFU/100 g, at 5, 10 and 15 min, respectively. Disinfection treatment using bleach (0.00285 ppm) was found to be more effective than other disinfectants at all contact times. All the disinfectants reduced *Escherichia coli* populations by 2.0–2.8 log CFU/100 g on lettuce and completely eliminated *Salmonella spp.* at all treatment contact times. Disinfection treatment using bleach/vinegar combination at 15 min also reduced faecal coliform populations on lettuce by 2.8 log CFU/100 g and completely eliminated *E. coli* and *Salmonella spp.* All chemical disinfectants including tap water at 15 min reduced faecal coliform populations below the undesirable ICMSF (2011) level (1000 CFU/100 g wet weight). These could contribute to reduce the health risk associated with the consumption of lettuce in Mali.

Keywords: Bacterial contamination, contact time, disinfectant concentration, lettuce, tap water