

ABSTRACT

Background: Some microorganisms can adhere to food handling surfaces forming biofilms that pose a safety challenge. This study was done to evaluate bacterial biofilm formation in milking equipments in Lilongwe, Malawi.

Methods: Pooled milk (n=54) and water (n=60) samples were collected from households and milk bulking groups in Lilongwe, Malawi. Swabbing (n=46) and rinsing (n=16) were done on milk handling containers after cleaning. Biofilm determination on the containers was done by detecting biofilm indicator bacteria, including *Bacillus* spp., *Salmonella* spp., and *Pseudomonas* spp. The strength of biofilm was determined by the tube method. Data were analyzed by SAS software version 9.1.3.

Results: Prevalence rates of Gram-negative rods were significantly ($p<0.05$) higher than the Gram-positive rods and the Gram-positive cocci. Of the 176 cases, contamination rates were 36 (20.4%), 32 (18.2%), and 18 (10.2%) for *Salmonella* spp., *Bacillus* spp., and *Pseudomonas* spp., respectively. The biofilm indicator organisms were significantly ($p<0.05$) more prevalent in dairy farmer households compared with the milk bulking centers. Fourteen out of 86 (16.3%) microbial isolates formed strong/high biofilms, whereas 18 out of 86 (20.93%) of isolates did not form any biofilm. The rate of isolates forming strong/high biofilms in households (17.6%) was significantly ($p<0.05$) higher than that of milk bulking centers (11.1%).

Conclusion: Biofilm formation on milk handling container surfaces in Lilongwe, Malawi could serve as a source of microbial pathogens and spoilage organisms.

Keywords: Biofilms Bacteria Milk Equipment and Supplies Food Safety Malawi