

Positive correlation between the concentrations of *Escherichia coli* and Coliforms in drinking water samples collected across different regions of Georgia

Saba Kobakhidze¹, Ekaterine Gabashvili¹, Giorgi Lomidze², Ketevan Dadiani^{1,3}, Marina Lashkhauri³, Manana Grdzlishvili³, George Lomtadze³, Leila Tabatadze¹, Tamar Chkhikvishvili¹ and Mamuka Kotetishvili^{1,3}

¹Division of Risk Assessment, Scientific-Research Center of Agriculture, 6 Marshal Gelovani ave. 0159, Tbilisi, Georgia

²Caucasus International University, 73, Chargali Str., 0141, Tbilisi, Georgia

³G. Natadze Scientific-Research Institute of Sanitation, Hygiene and Medical Ecology, 78 D. Uznadze St. 0102, Tbilisi, Georgia

Total coliforms and *Escherichia coli* are the important indicators of microbial contamination of drinking water worldwide. Public health risk assessment studies (Environ Sci Technol. 2015 Aug 18;49(16):10019-27), focusing on microbial contamination of drinking water, demonstrated the tendency of estimated risk reaching nearly zero, and vice versa, nearly tripling when changing the *E. coli*-to-total coliform ratios to their lower 2.5th versus 97.5th percentiles respectively. As part of the risk assessment study, in this regard, we determined and assessed the ratios of colony forming units (CFUs) of *E. coli* and total coliforms in tap water samples (a total of 250 samples) collected during 2017-2019 in Georgia. The non-parametric Spearman's rho coefficient was applied to detect the correlation between the CFU counts of *E. coli* and those of total coliforms per each water sample (100 mL), with a probability of less than 0.05 considered as statistically significant. The above calculations were performed using SPSS (Version 23.0, Armonk, NY). These analyses revealed a statistically significant positive correlation between the CFU/100 mL counts of the above organisms (Spearman's rho 0.733; $p < 0.001$), indicating that the total coliforms concentration can be a predictive variable for up to 54% of the concentration variations of *E. coli* in drinking water. While for validation purposes a significantly larger number of samples need to be analyzed, the statistical data, obtained in this pilot study, can be useful for predictive modeling in quantitative microbial risk assessments associated with tap water contamination in Georgia.

Biography

Saba Kobakhidze has completed his Master Degree at the age of 27 years from the Tbilisi Medical State University. He is the senior Public Health specialist in the Risk Assessment Division of the Scientific-Research Center of Agriculture, conducting actively risk assessment in the areas of food safety. His PhD research is focused on the molecular epidemiology of some important foodborne pathogens. In addition, as a former specialist of the National Food Agency, he provides the G.Natadze Scientific-Research Institute of Sanitary, Hygiene and Medical Ecology with expertise in food safety testing and other practices.