Postharvest Handling Practices, Safety and Quality of Fish and Milk in Ethiopia

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ABSTRACT

Fisheries and dairying play a significant role in food security, livelihood, and source of income in developing countries. Although fish and dairy products are a healthy source of protein, they can also spread diseases caused by pathogenic micro-organisms they may contain. A cross-sectional study was conducted from October 2017 to May 2018with the aim of isolating and estimating the prevalence of *Escherichia coli* O157:H7*,* evaluating antimicrobial susceptibility pattern of isolates and assessing post-harvest loss associated with fish in selected Lakes of Northern Ethiopia. All the microbial identification and isolation procedures and Antimicrobial susceptibility test were conducted based on the standard procedures. Post-harvest losses assessments in fish were conducted based on FAO recommendations of qualitative and quantitative field assessment methods. From the total 410 fish samples examined, six (1.46%) of them were contaminated with Shiga toxin producing *Escherichia coli* O157: H7 strain. The antibiotic susceptibility test revealed that isolates were resistant to ampicillin and streptomycin. On the other hand, ciprofloxacin and nalidixic acid were found to be effective in inhibiting the growth of the isolates. Fishermen believed that high environmental temperature, absence or delayed marketing, harvesting immature fish, predators, and flood are the major causes of post-harvest loss of fish in the two Lakes. On the other hand, a cross-sectional study was also carried out from November 2017 to May 2018 to assess the handling and hygienic practices of milk and to assess the epidemiology, antimicrobial resistance pattern and critical control points of *E. coli* O157:H7 along the dairy supply chains in Akaki Kality sub-city of Addis Ababa, Bishoftu and Sululta towns of central Ethiopia. Accordingly, a total of 91 dairy farm owners, milk collection centers and cafeterias interviewed using structured questionnaire. The result indicated that, 13.8% of milking producers did not manage hygienic practices of udder and hand washing. Also, 57.7% of cafeterias used well water sources for routine sanitation practices. However, a total of 450 raw cow milk (294) and environmental (65 milkers' hand swab and 91 water) samples were collected from dairy farms, milk collection centers and cafeterias and processed according to the standards in order to isolate and identify *E. coli* O157:H7. Out of the total 450 samples, 6.0% were found to be contaminated by *E. coli* O157:H7. Accordingly, 9.89% of water, 9.23% of hand swab and 4.08% of raw cow milk samples were contaminated by the pathogen. In addition, the prevalence of *E. coli* O157:H7 was 7.79%, 6.21% and 3.97% in Akaki kality sub-city, Sululta and Bishoftu towns, respectively. The result of multivariable logistic regression analysis revealed that there was statistically significant difference observed ($p < 0.05$) between the occurrence of the pathogen in the milk and water samples with the sources of water. The study also revealed that, varying level of resistance of *E. coli* O157:H7 isolates against nine antimicrobial discs tested and 100% (n = 27) of the isolates showed multidrug-resistance comprising from two up to seven antimicrobial drugs. The result of critical control point assessment also revealed that, *E. coli* O157:H7 was isolated from nine milk samples collected from cafeterias and the level of occurrence of *E. coli* O157:H7 may seem lower but should be taken seriously because of its capabilities in causing severe disease. In conclusion, the occurrence of pathogenic organism and its multiple drug resistant profiles in milk and fish indicates the need for interventions because of the risk for public health and food safety. Therefore, proper hygienic practice from farms to fork and rational drug usage is recommended.

Keywords: Antibiotic susceptibility test; Epidemiology; *Escherichia coli* O157; Ethiopia; Fish*;* Lakes, Milk.

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Biography of Dr Fufa Abunna

Dr. Fufa Abunna Kurra, an Associate professor of Veterinary Epidemiology is a graduate of Addis Ababa University with the Degree of Master of Science (MSc) in Tropical Veterinary Epidemiology and Degree of Doctor of Veterinary Medicine (DVM). He is an author and co-author of more than 75 scientific articles on peer reviewed national and international journals. He is also the author of one book. He has presented scientific papers on several national and international workshops, participated and received several certificate on a number of national and international scientific workshops and trainings. He is also selected as a founding fellow of Ethiopian Young Academy of Sciences (EtYAS) for his an outstanding contribution in sciences. Currently, he is working on Post-harvest Handling Practices, Value Addition to Enhance Safety, Quality and Marketing of Fish, Dairy Products and Cereals in Ethiopia.

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