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Research Article

Tap versus Bottled Water in Kampala, Uganda: Analyses of Consumers' Perception alongside Bacteriological and Physicochemical Quality

Charles Onyutha, Josephine Taata Akobo, and Ambrose Mubialiwo

Department of Civil and Environmental Engineering, Kyambogo University, P.O. Box 1, Kyambogo, Kampala, Uganda

Correspondence should be addressed to Charles Onyutha; conyutha@kyu.ac.ug

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In Uganda, tap water is always ensured to be potable. However, people are not sure whether tap water is generally safe for drinking without being boiled. Conversely, bottled water consumption is on the increase in Uganda. The main problem lies in the cost of energy for boiling tap water or purchasing bottled water. This study analyzed results of laboratory tests and consumers' perception for comparison of tap and bottled water in Nakawa division, Kampala. Tap water was sampled at four representative locations. At least 16 different brands of bottled water were considered. The top four most consumer-preferred bottled water brands were selected for further analysis. In our study, 28.8%, 6.06%, and 13.64% of the 142 respondents indicated that bottled water had taste, color, and smell, respectively. However, 27.5%, 25.4%, and 34.5% of the respondents agreed that tap water had taste, color, and smell, respectively. Both tap and bottled water met the World Health Organization (WHO) guidelines for pH, total dissolved solids, chloride, copper, sodium, sulfate, and nitrate. However, a tap water sample was found to contain Coliform bacteria. In this line, affected communities need to thoroughly boil the raw tap water to kill the pathogens. All tap water samples yielded iron concentrations above the WHO recommended limit. Student's t-tests showed that tap and bottled water samples were significantly ($p < 0.05$) different with respect to total dissolved solids, pH, chloride, calcium, magnesium, iron, sodium, sulfate, and nitrate. We emphasize the need for routine maintenance of the water distribution system to check for leakages which can be potential source of contaminations.

1. Introduction

Up to 60% of a human body comprises water. Thus, it is commonly believed that water is life. Safe drinking water, human health, and well-being are interlinked; see, for example, [1] and World Health Organization [2, 3]. In the same line, Target 6 of the United Nations Sustainable Development Goals aims at ensuring availability and sustainable management of water and sanitation for all [4]. In a relevant development, the Government of Uganda (GoU) established the Uganda Vision 2040 framework in 2013 to improve the health, sanitation, and hygiene, as well as promoting commercial and low consumption industrial arrangements [5]. Eventually, the National Water and Sewerage Corporation (NWSC), a utility parastatal solely owned by the GoU, is committed to providing clean and safe water in almost all towns and urban centers across Uganda. The overall potable water service coverage by 2020 was at 74% (Ministry of Water and Environment MWE [6]) despite the NWSC's commitment in reaching the milestone of 100%. The extension of piped water supply system takes into consideration the urbanization strategy which the GoU is promoting over the Vision 2040 period. The NWSC's customer satisfaction index was 88% for the year 2015/16 but dropped to 77% in 2019/20 [6]. Water supply systems in urban areas need constant monitoring and repairs of leakage points to guide against pathogen intrusion which can contaminate the drinking water. In Kampala (the capital city