

Quality levels of microbiology and heavy metals of unlicensed water vending machine in the state of Kelantan

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ABSTRACT

Introduction: The use of a Water Vending Machine (WVM) has become one of the initiatives for users to obtain clean water supplies for urban and rural areas. Based on the Food Regulations 1985 oblige that all WVMs must be licensed before starting its operation and must use sources from public water supply. However, there are still applications for WVM license that operate using sources other than public water supply such as tube well, open well and Gravity Feed System (GFS). This study was conducted to determine the level of microbiological quality and the content of heavy metals Lead (Pb) and Cadmium (Cd) in WVM water by which WVM was operated using sources other than public water supply. **Materials and Methods:** A cross-sectional study was conducted in 10 districts of Kelantan state. Water samples were taken from Bachok, Gua Musang, Jeli, Kota Bharu, Kuala Krai, Machang, Pasir Puteh, Pasir Mas, Tanah Merah and Tumpat. The three main water sources for the WVM are tube well water, open well water and Gravity Feed System (GFS) water. A total of 83 WVM water samples were taken from various sources, namely 64 samples (77.10%) from tube wells, 6 samples (7.23%) from open wells and 13 samples (15.67%) from GFS. All samples were collected using random sampling and sent to Kelantan Food Safety and Quality Laboratory for analysis and quantifying the presence of coliform, *E.coli*, plumbum(pb) and cadmium (cd). **Results:** The results were compared with the requirements of Table 25, Subregulation 360(3), PPM 1985. The percentage of sample compliance showed coliform (62.65%), *E. coli* (73.49%) and 100% for Pb and Cd. 64 samples from the tube well showed that 42 samples (65.63%) were not detected with the presence of coliform and 22 samples (34.37) were detected with the presence of coliform. 4 samples (66.67%) from open well were not detected with coliform while 2 samples (33.33%) were detected with coliform. 6 samples (46.15%) from GFS were not detected with coliform and 7 samples (53.85%) were detected. *E. coli* was detected in 16 tube well samples (25%) and 48 tube well samples (75%) were not detected with *e.coli*. 5 open well samples (83.33) were not detected with *E.coli* but 1 sample (16.67%) was detected. 8 GFS samples (61.54%) were not detected with *E.coli* and 5 samples (38.46%) were detected. All 83 samples consisting of GFS, open well and tube well were not detected with plumbum and cadmium. **Conclusion:** WVM that operated using sources of water from other public supply was found to be microbiological hazardous for direct consumption. Enforcement must be emphasized to detect and seal those unlicensed WVMs to avoid public usage and prevent water-borne diseases. Health education needs to be continuous to increase public awareness in choosing a licensed and safer WVM.