

Quality Management of Drinking Water Purification Process in the 15-Liter Container Using Design of Experiment and Process Capability Analysis

Authors : Chanchai Wimon, Polin Muangngam, Thannapat Nimsumram, Chanin Prombutra, Prasert Aengchuan, Perawat Boonpuek

Abstract : Cleaning water containers is essential for drinking water production to prevent contamination and residual chemicals from washing liquid. Water distribution divisions in Thailand are facing a critical problem with residual contamination in 15-liter drinking water containers due to dust and residual chemicals (TDS value > 200) after normal washing. A thorough washing process is required before filling the purified water into each container. Unfortunately, the washing procedure and frequency do not align with the work instructions provided by the health department. The measured Total Dissolved Solids (TDS) value of the remaining water was found to range between 195-202, exceeding the standard TDS for excellent drinking water (50-190 ppm). This research uses the design of experiment technique in statistics to improve the washing process and reduce such contamination. Statistical data from our survey of the cleaning process is collected to identify affecting factors. Washing time and water volume are varied to test the efficiency of the washing process in reducing residual sediment in the water. The result indicates that cleaning the 15-liter container with 2 liters of tap water mixed with 15 milliliters of dishwashing liquid for 3.12 minutes per container is optimal, as the resulting TDS reduces to 189.75, falling within the standard value for good drinking water. This study result would benefit the drinking water industry in implementing a statistically evaluated cleaning procedure without conducting multiple trials, thus saving time and production costs.

Keywords : design of experiment, drinking water purification, quality management, production process reliability

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