

Chemical and Physical Indicators in Drinking Water and Water Sources of Boroujerd Using Principal Components Analysis

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Abstract

Background and Objective: Quality control of drinking water is important for maintaining health and safety of consumers, and the first step is to study the water quality variables. This study aimed to evaluate the chemical and physical indicators, water quality variables and qualitative classification of drinking water stations and water sources in Boroujerd.

Material and Methods: This descriptive-cross sectional study was conducted on 70 samples of drinking water and 10 samples from sources in 2011-2012. Nine Water quality variables were measured and coded using STATISTICA₁₀ Software. Principal component analysis (PCA) was performed for qualitative classification of water samples and determination of water quality variables.

Results: Based on PCA, chemical variables such as fluoride, nitrate, total hardness and iron, and physical variables such as pH and TDS were paramount importance to water quality. According to T-test, the average concentration of fluoride and iron, and the turbidity in all samples were significantly less than the standard. But other variables were up to standard.

Conclusion: For the large water quality data, the use of PCA to identify the main qualitative variables and to classify physical and chemical variables can be used as an effective way in water quality management.

Keywords: Physical and Chemical Indicators, Drinking Water and Sources, Boroujerd, Principal Component Analysis