Preservation and Storage of Water Samples

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ABSTRACT: Starting from the sampling up to the time of analysis, the content of water sample can be altered due to the chemical, physical, and biological reactions it undergoes. This article deals with the processes occurring in the water samples during their storage and with reasons of their occurrence. Special attention has been paid to the chemical and physicochemical reactions as well as to microbiological and photochemical degradation of the component of the sample. Techniques for the water sample preservation are also reviewed.

KEY WORDS: degradation, preservation, storage, samples.

I. INTRODUCTION

Within a period from sampling up to analysis, water properties, especially those of surface water and wastes, can change due to chemical, physical and biological reactions. The parameters being determined may therefore differ from those of the studied medium, which makes the results unrepresentative for an original sample. Due to variety of reactions the sample undergoes, no single universal method of preventing changes in sample composition can be adopted. Sample analysis cannot be always carried out immediately or within a short time after sampling; therefore, the sample preservation is necessary to inhibit the reactions in the sample until it is analyzed.

II. REASONS OF POTENTIAL CHANGES IN SAMPLE COMPOSITION

The sample components may undergo various chemical reactions[1] including oxidation;[2] reduction;[3] hydrolysis of chemical compounds and complexes;[4] chlorination if the sample contains free chlorine;[5] depolymerization or pH changing.[2] Physicochemical processes that samples may undergo during storage such as evaporation[2,6] and adsorption on the container walls or on the suspended solids[6–8] have the biggest influence on the change of sample composition. The sample