



Effect of organic and inorganic matters on the oxidation of Fe(II) in raw water from Ömerli Dam

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ABSTRACT

In Turkey, particularly in Istanbul, almost all of the surface and underground water sources contain ferrous iron [Fe(II)] at high concentration levels, which generate serious problems in use of water for industrial processes and at drinking water treatment plants. Ferric iron [Fe(III)] on the other hand precipitates as Fe(OH)₃ and blocks the filters installed at water treatment plants, decreasing efficiency. Also, the period for re-wash of filters shortens which increases the cost. In natural waters, high iron concentrations are found together with natural organic and inorganic substances. Humic substances found in underground water sources prevent the oxidation of Fe(II). It was shown in recent studies that oxidation of Fe(II) was decreased dramatically by organic compounds found in humic substances. Although atmospheric oxidation of Fe(II) is a well known method in practice over decades, effects of organic and inorganic substances on the oxidation rate have only recently been investigated. Literature review showed that the research in the area of effect of organic and inorganic substances over the oxidation of Fe(II) was not satisfactory. Since high concentrations of Fe(II) exist in the surface and underground water and it is critically important for the purpose of drinking and industrial use, it will lead to research and development regarding the methods for treatment of Fe(II). An experimental study was carried out by aeration at constant pH, temperature, alkalinity, and mixing conditions in a laboratory scale batch reactor system, which was fed with raw water obtained from entrance of Ömerli Dam Treatment Plant and deionized water. Oxidation was performed for different concentrations of Fe(II). Effects of additional organic and inorganic materials on the oxidation mechanism of Fe(II) were investigated. Potassium hydrogen phthalate (KHP) as organic material and Mn(II), Zn(II), and Ni(II) as inorganic materials were used.

Keywords: Ferrous iron; Oxidation; Organic and inorganic materials; Potassium hydrogen phthalate; Catalytic effect.

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