

# Effect of pre-oxidation with permanganate on powdered activated carbon adsorption for removing geosmin and 2- methylisoborneol in drinking water supply

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## Abstract

Adsorption by powdered activated carbon (PAC) is the most widely used for removing geosmin and 2- methylisoborneol (2-MIB) causing a strong musty-earthly taste and odour in drinking water supplies. Permanganate is a strong oxidising agent capable of destroying organic compounds and micro-organisms. It has been also used for water treatment in the United States and Europe. But permanganate reacts with activated carbon and consequently, adsorption capacity of activated carbon is reduced.

In this study, to investigate the effect of pre-oxidation with permanganate on powdered activated carbon adsorption for removing geosmin and 2- MIB, a series of experiments were carried out to show the effect of permanganate dose and permanganate contact time before PAC addition on the ability of PAC to absorb geosmin and 2- MIB, and the effect of the properties (particle size and pore size distribution) of the PAC used with permanganate on absorption of geosmin and 2- MIB.

As results of the experiment, permanganate dose increased correspondingly decreased the absorbing capacity of PAC for geosmin and 2- MIB. Residual permanganate inhibited to absorb geosmin and 2- MIB by PAC. Consequently, delaying the contact time of permanganate was more beneficial than simultaneous adding permanganate with PAC. For the properties of PAC, the PAC with small average pore size was effective to geosmin and 2- MIB. However, particle size of PAC showed different absorbing characteristics between geosmin and 2- MIB.

**Keywords:** Powdered activated carbon, Permanganate; Geosmin; 2- methylisoborneol, Drinking water supply