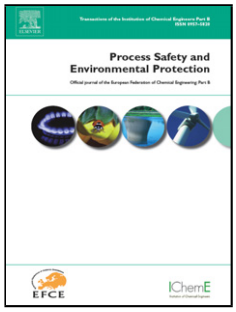

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DOUBLE FILTRATION AS AN EFFECTIVE SYSTEM FOR REMOVAL OF ARSENATE AND ARSENITE FROM DRINKING WATER THROUGH REVERSE OSMOSIS

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Highlights

- Effect of double filtration on complete As(III) removal from drinking water.
- After second filtration, As(III) removal efficiencies considerably increased.
- Arsenite physical structure probably changed after first filtration.
- Arsenic content after 2nd filtration lower than maximum legislated level (10 µgL^{-1}).
- Double filtration is an efficient method to treat arsenic contaminated water.

Abstract

Arsenic is one of the most dangerous inorganic pollutants present in drinking water, which is released both from certain human activities and naturally from the Earth's crust. Arsenic is usually present in water in two oxidation states, as arsenite (As(III)) or arsenate (As(V)). Arsenate is usually easier to remove than arsenite. Therefore, the goal of this study is to check the potential use of double filtration for improving As(III) removal and to investigate if something happens with membrane, with arsenic solution, or both, after first filtration of As(III). With this objective, reverse osmosis experiments under specific conditions were conducted to get information about As(III) and As(V) removal efficiencies. Concretely, it was studied the effect of double filtration of arsenic on membrane surface and solution. Moreover, it was investigated the possible competitiveness between arsenic species as well as the occurrence of oxidation and aging effects.

Results confirmed that double filtration is an efficient method to treat water that contains arsenite since filtration process might cause permanent changes on the physical structure of this specie, which led to an improvement of As(III) removal efficiency after 2nd filtration (removal efficiencies around 95%). Finally, total arsenic content of the treated water after 2nd filtration fulfilled with the maximum legislated level for drinking water (10 µg L^{-1}).