

[DOI: 10.20472/IAC.2019.052.005](https://doi.org/10.20472/IAC.2019.052.005)

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# **PHOSPHATE TREATMENT BY METAL BASED FILTRATION PROCESS**

### **Abstract:**

Excess phosphorus in natural water bodies is an unwanted situation due to its negative effect on aquatic life via causing eutrophication. Adequate phosphorus removal can not be possible by traditional water treatment methods in order to ensure the discharge limits. In this study, filtration through metal (iron) containing media was used in order to treat phosphorus from synthetic wastewater. It is aimed that to apply this cost-effective process as an option for advanced wastewater treatment. Lab-scale column operation was carried on in this study. Influent water including PO<sub>4</sub>-P solution was prepared artificially from KH<sub>2</sub>PO<sub>4</sub>. Within this scope, the present work focussed on adsorption of phosphate as well as investigation of effect of co-existing anions (e.g. silicate) for iron media. In addition, breakthrough prediction of iron media was assessed by using fixed bed columns. Columns were operated until breakthrough point. Samples were taken periodically for phosphate measurements. Iron concentrations were also measured for effluents. Total phosphate was analysed by a flow injection analyzer (FIAstar 5000 Analyzer, FOSS Analytical, Denmark). Breakthrough curves showed that iron filter could be used until its breakthrough point (500 bed volume). Iron media had a good performance for phosphate intake; effluent concentration to initial phosphate concentration ratio occurred nearly 80%. At the breakthrough point of the curves, the phosphate concentrations reached 20 µg/L for metal media. Iron concentrations in effluents are negligible for this material and it shows that not so much iron dissolution and it is good for effluent quality. It can be said that iron filter for phosphate containing water seems suitable and cost effective process.

### **Keywords:**

phosphate, iron, adsorption

**JEL Classification:** Q53