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Purification of wastewater from chlorophosphate flame retardants production process

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ABSTRACT

The aim of the research was the removal of phosphorous excess in the wastewater from the chlorophosphate flame retardants production process, before transfer the wastewater stream to WWTP. The tested wastewater, contains 7 g/dm^3 of phosphorus (P) and COD level is 72–78 g O_2/dm^3. Removing phosphorus from wastewater was performed by precipitating insoluble iron(III) phosphate(V) with the use of iron(III) chloride. At pH < 2 and molar ratio Fe/P = 1.1 up to 65% phosphorus recovery was achieved; at pH > 3.0 the recovery rate increased up to 70%. The best results were obtained for pH~4.5 and Fe/P ratio about 2.0. The phosphorus removal process is connected with decrease of COD value in wastewater. The best results were obtained for Fe/P in the range 1.5–2.0 and pH ~4. The best results of purification process were obtained with the final COD value 13–23 g O_2/dm^3 and the total P concentration below 0.001 g/dm^3. The flow sheet of the purification wastewater process was proposed.

Keywords: Wastewater; Phosphorus removal; Precipitation; Recovery; Iron; Organophosphorus flame retardant

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