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OPTIMIZATION OF A PLANT FOR TREATMENT OF INDUSTRIAL WASTE SOLUTIONS: EXPERIMENTAL AND PROCESS ANALYSIS

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Highlights

- The paper deals with the optimization of a waste solution treatment plant.
- Fenton process was applied in order to reduce the load to the distillation column.
- The best process parameters were 0.65 g L⁻¹ of H₂O₂ and 0.42 g L⁻¹ of FeSO₄·7H₂O.
- The water amount in the distilled fraction was <5% vol.
- It is possible to save around 420000 € per year because of fuel reduction.

Abstract

The present paper deals with the optimization of an industrial plant that treats waste solutions coming from different manufacturing processes. In particular, an extensive experimental work was carried out to understand whether some streams could be diverted from the distillation column in order to recover solvents, suitable as secondary fuel. Experimental tests, including four full factorial designs, optimized the consumption of reagents in the Fenton process: the specific consumptions were 0.65 g L⁻¹ of H₂O₂ and 0.42 g L⁻¹ of FeSO₄·7H₂O, when treating the evaporated fractions from multiple-effect evaporator, concentrator and dryer, diverted from the distillation column. The

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