

DESIGN OF A PILOT PLANT FOR TREATMENT OF AN INDUSTRIAL LEACHATE

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ABSTRACT

During last decades, various types of treatment systems have been used in purification of household and municipal wastewaters, leachate from municipal or industrial landfills and wastewater from industrial processes. However, the suitability of a treatment system should be tested in each individual case due to different composition of polluted water, climatic and geological conditions, economic sources and limit values for effluents. The technology and operational parameters must be confirmed through several development steps on different scales: batch, column and pilot tests.

A filter bed technique has been selected as a treatment method for purification of a leachate from an industrial landfill. The landfill contains residues from the recycling industry, residues from car wrecking and discarded electrical and electronic equipment (cable scrap, rubber, foam, plastics, textiles, etc). A pilot-scale experiment was conducted in Halmstad, Sweden. The pilot plant consisted of three treatment steps: aeration, sedimentation and filtration. The leachate was collected to the retention pond and pumped into the aeration tanks and then led to sedimentation stage. Finally, the leachate was distributed over the surface of two geo-filters (1 m³ each), one located indoors and the other outdoors. The mixture of peat and carbon-rich ash, previously investigated in the batch and column experiments, was used for filling the filter-bed tanks. Determination of heavy metals, nitrogen, TOC, DOC and phenolic compounds in the influent and the effluent of the pilot plant were made. The results showed that a significant reduction of the pollutants in the leachate was achieved in the pilot plant. It is important to conduct the pilot plant experiment in order to obtain valuable information of the design, the operational parameters, the scale effects, climatic effects, system maintenance requirements and the lifetime of the filter-beds. Experience from the pilot-scale experiment gave valuable information for a construction and optimization of a full scale treatment plant.