

Extended Abstract

Clean Technologies Combining Phytoremediation with Biofuel Production—Part 1 [†]

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One of the major problems that has been faced by the oil upstream industry is related to soil contamination caused by oilfield water pollution [1]. An efficient method of saline soil decontamination is phytoremediation. Halophytes (salt-tolerant plants) are ideal candidates for the phytoextraction of salt from soil [2]. The evaluation of the efficiency of the phytoremediation process was performed by monitoring the salinity of the soil during the life cycle of plants [3].

Initially, the contamination of the soil with reservoir water was evaluated in terms of salinity and hydrocarbon content. For this purpose, samples were collected using the grid method from the entire surface of the land, roughly 2000 m², on three depths (0–30 cm, 30–60 cm, 60–90 cm). The chloride concentration in the soil was determined using ion chromatography.

Depending on the distribution of the chloride concentration in the soil, in the next stage, the land was divided into six lots from which average soil samples were taken from a 0–60 cm depth.

From analyses initially carried out on soil samples taken from the entire surface of the land, the results showed that the soil was contaminated only with salt water, not with hydrocarbons. Based on the results obtained the modeling of chloride concentration distribution on the soil surface was undertaken. This is shown in Figure 1.

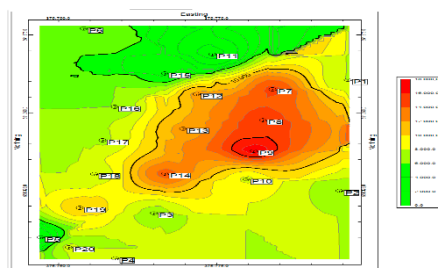


Figure 1. Modeling of the chloride concentration distribution on the soil surface.

Based on the analysis of soil samples taken from the six lots, a 3D graphic representation of the chloride concentration is presented as shown in Figure 2.

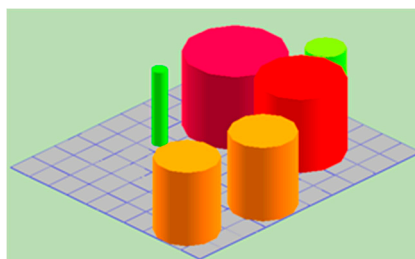


Figure 2. A 3D model of chloride concentration distribution on the six lots.

These lots are periodically monitored to determine the efficiency of phytoremediation using different types of plants. Both soil samples and plants grown on the selected six lots will be analyzed.

The efficiency of the phytoremediation process of a strongly salted soil is monitored, during the life cycle of the plants, by analyzing the average soil samples taken from the selected six lots.

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