

Dedication

I dedicate this work
and effort to the sole of
my parents and to my
grandmother, my
brothers and my
friends.

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CONTENTS

Content	Page
List of tables	vi
List of figures	viii
English abstract	x
Arabic abstract	xi

Chapter One - Introduction

No.	Title	Page
(1-1)	Definition of produced water	1
(1-2)	Produced Water Treatment Objectives	3
(1-2-1)	Oil and Grease Removal (De-oiling)	4

(1-2-2)	Soluble Organics Removal	9
(1-2-3)	Desalination	10
(1-2-4)	Disinfection	11
(1-2-5)	Miscellaneous Treatment	11
(1-3)	Produced Water Treatment Technologies	11
(1-3-1)	Decomposition in Constructed Wetland	12
(1-3-2)	Electrodialysis (ED) Technique	14
(1-3-3)	Electro-deionization (EDI)	16
(1-3-4)	Evaporation	18
(1-3-5)	NORM Treatment	19
(1-3-6)	Pressure Driven Membrane Separation Technologies	20
(1-4)	Bioremediation	21
(1-4-1)	How does bioremediation work?	25
(1-4-2)	PRINCIPLES OF BIOREMEDIATION	27
(1-4-3)	FACTORS OF BIOREMEDIATION.	28
(1-4-3-1)	ENVIRONMENTAL FACTORS.	29
(1-4-4)	Environmental requirements	31
(1-4-5)	Site Evaluation and Factors Affecting Contaminant Degradation	32
(1-4-6)	Metabolic Pathways for Oil Decomposition	38

(1-4-7)	BIOREMEDIATION STRATEGIES.	40
(1-4-7-1)	In situ bioremediation	40
(1-4-7-2)	Ex situ bioremediation	42
(1-5)	palouge Crude oil dehydration system	43
(1-6)	Palouge bioremediation system	44
(1-7)	Advantages & disadvantages of the bioremediation system	46
(1-7-1)	Advantages of bioremediation	46
(1-7-2)	Disadvantages of bioremediation	47

Chapter Two - Materials & Methods

No.	Title	Page
(2-1)	Materials.	50
(2-1-1)	Samples.	50
(2-1-2)	Instruments and apparatus.	50
(2-1-3)	Solvents and chemicals.	50
(2-1-4)	Reagents.	51
(2-3)	Procedures.	51
(2-3-1)	Procedures for the physical properties.	51
(2-3-2)	Procedures for the chemical properties.	52

Chapter Three -Results & discussion

No.	Title	Page
-----	-------	------

		e
(3-1)	Results of the physical properties of the produced water samples.	59
(3-2)	Results & discussion of the oil content in the produced water samples.	60
(3-3)	Results & discussion of the PH of the produced water samples.	61
(3-3-1)	Results & discussion of the electrical conductivity of the produced water samples.	62
(3-3-2)	Results & discussion of the TDS of the produced water samples.	63
(3-4-1)	Results of the chemical properties of the produced water samples.	64
(3-4-2)	Discussions of the chemical properties results of the produced water samples	64

No.	Title	Page
(3-3)	Discussion of chemical properties results.	62
(3-3-1)	Discussion of the cations concentration	62
(3-3-2)	Discussion of the sodium content	63
(3-3-3)	Discussion of salinity content	63

(3-3-4)	Discussion of the chloride amount	64
(3-3-5)	Discussion of the Dissolved Oxygen amount	64
(3-3-6)	Discussion of the BOD and COD(Biochemical and chemical oxygen demand) amount	65
(3-3-7)	Discussion of the phenol content	65
(3-3-8)	Discussion of the ammonia concentration	65
(3-3-9)	Discussion of the soil moisture content	66
(3-4)	Conclusions and Recommendations	67
(3-4-1)	Conclusion	67
(3-4-2)	Recommendations	68
(3-5)	References	69

List of tables

No.	Title	Page
(1-1)	Oil & grease removal technologies based on size removable particles.	5
(1-2)	Results obtained by using bio-treatment facility.	13
(1-3)	Average percentage removal of weakly ionized species using EDI.	17
(1-4)	Various applications of the pressure driven membrane technologies.	20
(1-5)	Composition of the microbial cell.	29

(1-6)	Environmental conditions affecting degradation.	30
(1-7)	Terminal acceptors used by microorganisms & their accompanied processes.	34
(1-8)	Environmental regulations in Sudan 2002 for the surface discharge of the produced water.	48
(2-1)	Calculations of alkalinity relationships.	51
(2-2)	Atomic absorption spectrometry settings.	56
(3-1)	Results of temperature of the inlet & outlet produced water samples.	57
(3-2)	Results of the Oil content in the inlet & outlet produced water in the bioremediation system.	58
(3-3)	Results of the PH values of the inlet & outlet produced water in the bioremediation system.	59
(3-4)	Results of Electrical conductivity of the inlet & outlet produced water in the bioremediation system.	60
(3-5)	Results of Total dissolved solids in the inlet & outlet produced water in the bioremediation system.	61
(3-6)	Results of chemical properties of the inlet (A) & outlet (B) produced waters.	62

(3-7)	Results of physical properties of the soil.	62
-------	---	----

List of figures

No.	Title	page
<u>Chapter 1</u>		
(1-1)	Corrugated Plate (CPI) packing separates oil and solids from produced water.	7
(1-2)	Induced gas floatation cell.	8
(1-3)	A vessel containing multiple hydrocyclones for de-oiling of produced water maximum capacity - 120,000 Barrels/day.	8
(1-4)	schematic of the constructed wetland	12
(1-5)	An ED (Electrodialysis) unit in operation	14
(1-6)	Schematic of an EDI (Electro deionization) cell	16
(1-7)	A vertical tube falling film vapor compression evaporator	18
(1-8)	X section of Phragmites reed bed	21
(1-9)	Root structure of reeds.	22
(1-10)	How does bioremediation work?	24

(1-11)	Structure of some aromatic compounds.	38
(1-12)	Structure of some straight, branched &cyclic aliphatic compounds.	38
(1-13)	Schematic of palouge FPF crude dehydration system.	43
(1-14)	Schematic of the palouge bioremediation system.	44
<u>Chapter 3</u>		
(3-1)	plot of variation of temperature (Celsius degrees) in one week	57
(3-2)	Plot of the variation in oil content (ppm) in on e week.	58
(3-3)	Plot of the PH variation in one week.	59
(3-4)	Plot of the EC variation in one week.	60
(3-5)	Plot of the TDS variation in one week.	61

Abstract

This study aims to evaluate the efficiency of the palouge bioremediation system as biological method for the produced water treatment from the oil. The evaluation depends upon measuring of some properties of both the inlet to & outlet from the system & then compares them by the Environmental regulations in Sudan 2002. The study also aims to examine the availability of the optimum Environmental conditions necessary for the microbial growth (mainly bacteria).

From the results it has been found that the system has high efficiency according to the oil & phenol (toxic pollutant) content in the outlet which conform to the Environmental regulations in Sudan 2002 for the surface disposal of the waste water.

In accordance to the environmental conditions required for optimum microbial growth, it has been found that the average value of both temperature & pH were within the optimum range for the microbial growth, but for the dissolved oxygen value at the inlet sample conform the minimum value necessary for the oil biodegradation by the microbes, but for the dissolved oxygen value at the inlet sample conform the minimum value necessary for the oil biodegradation by the microbes, but for the outlet sample the dissolved oxygen value is very small so it is not enough for the biodegradation process in the front reed beds. BOD & COD values conform the environmental regulations in Sudan and also the decreasing manner in these values indicate the progressing of the treatment system. For the soil moisture content it has been found that the moisture content was within the optimum range for biodegradation. Also from the study it has been found that sodium content present in high quantities at the outlet sample which will cause in the long term bad effect to the soil structure. For the cations (Ca, Fe, and Mg)

all concentrations falls in the risk range which may cause in the long term defect to the system.

الخلاصة

تهدف الدراسة إلى تقييم نظام المعالجة الحيوية بحقل البترول بفلج و ذلك لمعالجة الماء المنتج مع البترول. يعتمد التقييم على قياس بعض الخصائص و ذلك لكل من الماء المنتج غير المعالج (قبل الدخول في نظام المعالجة الحيوية) و الماء المنتج المعالج (بعد الدخول إلى النظام) و من ثم مقارنة هذه الخصائص بالمقاييس و قوانين البيئة السودانية الصادر لعام 2002م, وتهدف الدراسة أيضا إلى إختبار الظروف البيئية المتوفرة ومدى توافقها مع تلك الظروف القياسية التي توافق أقصى نمو للبكتريا

من النتائج المتحصل عليها وجد أن النظام له كفاءة عالية و ذلك من ناحية معالجة محتوى الزيت و الفينول في الماء المنتج حيث وجد ان كمية الزيت في الماء المعالج توافق قانون البيئة السوداني لعام 2002م للتصريف السطحي للماء المنتج, وكذلك كمية الفينول(ملوث سام) تطابق قوانين البيئة السوداني وكذلك مقاييس وكالة المواد السامة و الأمراض المسجلة لعام 2003م

بالنسبة إلى إختبارات الظروف البيئية المناسبة لنمو البكتريا وجد أن متوسط قيم درجة الحرارة و الرقم الهيدروجيني تطابق نفس القيم اللازمة لأقصى نمو للبكتريا, لكن بالنسبة إلى كمية الأوكسجين الذائب في الماء الداخل إلى نظام المعالجة يطابق القيمة الدنيا اللازمة لعملية التكسير الحيوي بالتالي نتوقع أن تنقص كمية الأوكسجين الذائب كثيراً في الماء المعالج عند مخرج نظام المعالجة بالتالي نستنتج أن كمية الأوكسجين الذائب سوف لن تكون كافية لعملية التكسير الحيوي للملوثات كلما إتجهنا قدماً في النظام و من ثم يقل معدل التكسير الحيوي. أما بالنسبة إلى محتوى رطوبة التربة فقد وجد أنه يتوافق مع القيمة القياسية المقابلة لأقصى نمو للبكتريا

بالنسبة إلى قيمة كل من كمية الاوكسجين اللازم إستهلاكه بواسطة البكتريا و كمية الأوكسجين اللازم للتفاعل الكيميائي في الماء المعالج (مخرج النظام) تتوافق مع القيم المسرودة في قوانين البيئة السوداني

للتصريف السطحي للماء المنتج. كما يشير أيضاً النقص في القيم اعلاه في الماء المعالج (مخرج النظام) إلى .تقدم عملية المعالجة في النظام

وجد من الدراسة أن كمية الصوديوم سواء في الماء المعالج أو الغير معالج كبيرة مما سوف يؤثر تأثير سلبي على تركيب التربة.أيضاً من الدراسة وجد أن كمية كل من الكالسيوم,المغنيزيوم و الحديد تزداد عبر .نظام المعالجة مما سوف يشكل عبر مدة من الزمن خطراً لنظام المعالجة