

الاستهلال

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سورة النحل

الاية ﴿٨٠﴾

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Dedication

To the soul of my dear sister Somia, altogether I missing her always
To my parents, whose loving, care and encouragement tended me through
.....my carrer

.I dedicate this work

I wholeheartedly dedicate this thesis to my uncle Ali for his unflinching
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List of Abbreviations

Alum		aluminum sulphate
ANOVA	One-way analysis of variance	

APHA	American Public Health Association
AWWA	American Water Works Association
BOD	Biochemical Oxygen Demand
CEPS	chemically enhanced primary sedimentation
COD	Chemical Oxygen Demand
DWAF	Department of Water Affairs and Forestry
ECHO	Educational Concerns for Hunger Organization
EEPA	Educational Evaluation and Policy Analysis
EPA	Environmental Protection Agency
ESCWA	Economic and Social Commission for Western Asia
FAO	Food and Agriculture Organization
KSWC	Khartoum State Water Corporation
LSD	least significant difference
MO	Moringa Oleifera
MOAE	Moringa oleifera seeds after oil extraction
MOPE	Ministry of Population and Environment
NEQS	National Environmental Quality Standards
NTU	Nephelometric Turbidity Units
PACE	Pan Arab Consulting Engineers
Rpm	rotation per minute
SD	standard deviation
SPSS	Statistical Program for Social Sciences
SSMO	Sudanese Standards and Metrology Organization
TSS	Total Suspended Solids
TWW	tannery wastewater
USEPA	United States Environmental Protection Agency
WHO	World Health Organization

Abstract

Moringa Oleifera. Lam belongs to Moringaceae family and it is well adapted to and a semiarid condition, in Sudan research information about this plant is rare. The Moringa seeds harvested from Elsamrab farm, the Using Moringa oleifera seeds after oil extraction as natural coagulant for tannery effluent treatment. Tannery wastewater is one of the most .pollution sources so considering to wastewater treatment is too important Awareness of environmental problems has increased considerably and during recent years protecting environment has become a global issue. The peak time of collection is during the Muslim Festival of animal

sacrifice, the Eid-ul-Adha. This dissertation concerns the study of the treatment of Tannery wastewater (soaking solution), using dry Seed of *M. Oleifera*. The objective of this study was to evaluate the suitability and develop a treatment system that can effectively reduce the concentration of pollutants in tannery wastewater (TWW) to acceptable levels. Wastewater treatment plants management is an important issue in the water and wastewater industry; so proper design and operation of wastewater treatment plant is necessary.

Moringa oleifera Lam (MO) is a pan tropical; whose seeds contain high quality edible oil in this study about 28.5% by weight, moisture and ash contents were 1.8%, and 3.6%, respectively.

Materials and Methods Various doses of *Moringa* seed powder viz. 4, 5 and 6 mg were taken; Parameters of quality of the wastewaters (soaking water) were measured before and after the treatment to evaluate the removal efficiency on the major pollutants of concern in wastewater treatment, such pH, Turbidity, TSS, BOD, and COD were obtained.

Untreated wastewater was used, collected before entering the treatment plants of tannery, Seeds were removed from the pod and crushed. 6 liters of wastewater from the tannery (Elnasr). One control and three treatments were used. One-way ANOVA was performed on experimental data to evaluate the statistical significance; the data obtained were statistically analyzed by the SPSS software.

The results indicate a significant ($p < 0.05$) All parameters were reduced with increasing dose of seed powder, This study has shown that the MO seeds are highly effective in the treatment of Tannery wastewater, and provide useful information for tannery wastewater treatment, The best results were obtained, The results demonstrated that the tannery effluent had high concentrations of TSS, COD, BOD, PH, and turbidity , percentage removal efficiency for turbidity 72.56%, TSS 58.86%,

COD60% 27.94% PH, and 38.03%BOD All parameters were high, emphasizing the need of secondary treatment for the tannery effluent. Treated water left to settle for one hour. Treatment of Tannery wastewater Samples were higher than the WHO guideline values. But the results .were satisfactory

In conclusion MO was available natural coagulants, suitable, easier and environment friendly options for Tannery waste water treatment, moringa has potential to be commercialized in wastewater treatment because it is safe and have many advantages. The data demonstrated that the M. oleifera coagulant was efficient in the treatment of Tannery waste water (TWW), We conclude that the MO has the potential to be used in the Tannery wastewater treatment in an efficient way. Very good complement to Moringa water treatment in developing countries. Finding of this research lend support to earlier works recommending the use of Moringa for wastewater treatment. In this study Output of the waste water .treatment does not comply with Environmental standards and regulations .Any treatment processes have own its advantages and disadvantage

ملخص الدراسة

المورينغا اوليفيرا تنتمي لعائلة Moringaceae وتكيفت تماما لحالة المناطق شبه القاحلة، المعلومات البحثية حول هذا النبات في السودان أمر نادر الحدوث. بذور المورينغا حصدت من مزرعة السامرأب، باستخدام بذور المورينغا اوليفيرا بعد استخراج الزيت كتجلط طبيعي لمعالجة النفايات السائلة في المدبغة. مياه الصرف الصحي هي واحدة من أهم مصادر التلوث اذا نظرنا بعين الاعتبار إلى معالجة مياه الصرف الصحي أمر مهم للغاية. وقد زاد الوعي بالمشاكل البيئية وإلى حد كبير خلال السنوات الأخيرة أصبح حماية البيئة قضية عالمية. وقت الذروة من جمع خلال مهرجان التضحية الحيوانية للمسلم، وعيد الأضحى. هذه الأطروحة تتعلق بدراسة معالجة مياه الصرف الصحي (سوائل البالي)، وذلك باستخدام بذور المورينغا اوليفيرا الجافة وكان الهدف من هذه الدراسة هو تقييم مدى ملاءمة وتطوير نظام المعالجة التي يمكن أن تقلل بشكل فعال من تركيز الملوثات من مياه الصرف الصحي في المدابغ (TWW) إلى مستويات مقبولة.

إدارة محطات معالجة مياه الصرف الصحي مسألة هامة للمياه والصرف الصحي الصناعي، لذا التصميم السليم وتشغيل محطة لمعالجة مياه الصرف الصحي أمر ضروري. المورينغا عموماً لستوائية تحتوي بذورها على زيت صالح للأكل عالي الجودة في هذه الدراسة حوالي 28.5% من حيث الوزن و كانت الرطوبة والرماد 1.8 ٪ و ، 3.6٪، على التوالي. المواد وطرق. أخذت جرعات مختلفة من مسحوق بذور المورينغا لي 4 و 5 و 6 جرام ؛ القياسات النوعية لمياه الصرف الصحي (مياه البلل) قيست قبل وبعد المعالجة لتقييم كفاءة إزالة الملوثات الرئيسية في ما يتعلق بمعالجة مياه الصرف الصحي، مثل الاس الهيدروجيني ، العكارة، المواد الصلبة الكلية ، الاوكسجين الكيميائي و الاوكسجين الحيواني تم الحصول عليها. استخدمت مياه الصرف الصحي غير المعالجة، والتي جمعت قبل دخول محطات معالجة للمدبغ.

إزيلت البذور من جرابها وسحقت، 6 لترات من مياه الصرف الصحي من المدبغة (النصر). واستخدمت ثلاثة معالجات ووحدة للتحكم . تم تحليل البيانات بواسطة اختبار الانوفا على بيانات تجريبية لتقييم دلالة إحصائية، البيانات التي تم الحصول عليها تم تحليلها إحصائياً بواسطة برنامج SPSS. وتشير النتائج إلى انخفاض جميع القياسات بنسبة كبيرة عند مستوى معنوي ($0.05 >$) مع زيادة الجرعة من مسحوق البذور، وقد أظهرت هذه الدراسة أن بذور المورينغا فعالة للغاية في معالج مياه الصرف الصحي للمدبغة ، ووفرت معلومات مفيدة لمعالجة مياه الصرف الصحي للمدبغة، و تم الحصول على أفضل النتائج، و أثبتت النتائج أن النفايات السائلة تحتوي تركيزاً عالية من الاوكسجين الكيميائي ، المواد الصلبة الكلية ،الاس الهيدروجيني، الاوكسجين الحيواني، والتعكر، والنسبة المئوية لكفاءة إزالة العكارة 72.56٪، 58.86٪، المواد الصلبة الكلية، 60٪ الاوكسجين الكيميائي، 27.94٪ الاس الهيدروجيني، و 38.03٪ الاوكسجين الحيواني وكانت جميع القياسات عالية، مؤكداً على ضرورة معالجة ثانوية لمياه صرف المدبغ. ترك المياه المعالجة لمدة ساعة واحدة لتترسب. وكانت عينات مياه الصرف الصحي المعالجة من المدبغة أعلى من القيم المرجعية لمنظمة الصحة العالمية. ولكن كانت النتائج مرضية. وفي الختام المورينغا كانت متاحة للتخثر الطبيعي ، ومناسبة، أسهل وخيارات صديقة للبيئة لمعالجة مياه الصرف الصحي للمدبغ، المورينغا لديها امكانيات ليتم تسويقها في معالجة مياه الصرف الصحي لأنها آمنة و لها العديد من المزايا. أظهرت البيانات أن تخثر المورينغا اليفيرا على درجة من الكفاءة في معالجة مياه النفايات للمدبغ (TWW)، فإننا نستنتج أن المورينغا اليفيرا وسيلة فعالة لديها القدرة على أن تستخدم في معالجة مياه الصرف الصحي في المدبغ. في البلدان النامية المورينغا مكمل جيد جداً لمعالجة المياه. ما وجد في هذا البحث يكون ملائماً لتأييد التوصية للأعمال في وقت سابق باستخدام المورينغا لمعالجة مياه الصرف الصحي. نتاج هذا الدراسة معالجة مياه الصرف الصحي لا يتوافق مع المعايير والأنظمة

البيئية.

أى عمليات معالجة قد تملك مزايا وعيوب.