Table of Contents

List of Figures VIII
List of Tables X
List Of Pictures XII
List of Abbreviations XIII
Chapter One :Introduction 1

1.1 Background 1
1.2 description of Talita Kumi Waste Stabilization Ponds 2
1.3 Aim and objective 2
1.4 relevance of the research 3
1.5 Methodology 3
   1.5.1 On –Site measurements 4
   1.5.2 Laboratory Analysis 4
1.6 Contents of the thesis report 5

Chapter Two: Literature Review 6

2.1 Introduction 6
2.2 Wastewater flowrate and composition 8
   2.2.1 Wastewater flowrate 8
   2.2.2 wastewater composition 9
2.3 Effluent Quality 11
2.4 Wastewater Stabilization ponds 12
   2.4.1 Types of WSP and their function 12
   2.4.2 WSP facilities 12
   2.4.3 Process analysis 15
2.5 Biological and chemical parameters 19
   2.5.1 Oxygen demand 19
   2.5.2 Pathogens 20
   2.5.3 Nutrients 23
2.6 Physical parameters 28
   2.6.1 Odor 28
   2.6.2 Color 31
   2.6.3 Solid Contents 32
2.7 Mixing in WSP 33
2.7.1 Mixing by wind 33
2.7.2 Thermal mixing 33
2.8 Start-up of waste stabilization ponds 34
2.9 Design of waste stabilization ponds 36
   2.9.1 Design parameters 36
   2.9.2 Design of anaerobic ponds 36
   2.9.3 Design of Facultative ponds 41
   2.9.4 Design of Maturation ponds 45
   2.9.5 Nutrients removal 46
Chapter 3: Materials and Methods

3.1 General
3.2 Site Measurements
3.3 Flow measurement
3.4 Ponds Dimensions
3.5 Sampling
  3.5.1 Type of samples
  3.5.2 Sampling program
  3.5.3 Laboratory analysis
  3.5.4 Accuracy measures
3.6 Odor Measurement

Chapter 4: Results and Discussions

4.1 Facility description
  4.1.1 Climate and location
  4.1.2 Inlet and outlet structures
  4.1.3 Ponds
4.2 Water consumption and wastewater production
  4.2.1 Water consumption
  4.2.2 Specific wastewater production
  4.2.3 Hourly wastewater flow flocculation
  4.2.4 Wastewater flowrate design values
4.3 Wastewater composition
4.4 Group I results from 11/03/2000 to 25/05/2000
  4.4.1 Onsite measurements
  4.4.2 Biological oxygen demand and chemical oxygen demand
  4.4.3 Fecal coliform
  4.4.4 Nitrogen
  4.4.5 Phosphate
  4.4.6 Total Suspended solids (TSS)
  4.4.7 Odor
  4.4.8 Color
4.5 Group II and III samples results (5/09 – 23/09/2000, 4/01-15/01/2001)
  4.5.1 On-site measurements
  4.5.2 Laboratory tests results
  4.6 The performance of the anaerobic pond
4.7 The performance of the facultative and maturation ponds

Chapter 5: Evaluation of design and process performance of the existing ponds

5.1 Design evaluation
  5.1.1 Design parameters
  5.1.2 Ponds design
5.2 Evaluation of process performance
Chapter 6: Conclusions and recommendations

6.1 Conclusions
   6.1.1 Inlet Structure
   6.1.2 Wastewater production
   6.1.3 Wastewater composition
   6.1.4 Start-up [period
   6.1.5 Anaerobic ponds
   6.1.6 Facultative and maturation ponds
   6.1.7 Odor emissions
   6.1.8 Mosquito breeding

6.2 Recommendations
   6.2.1 Inlet structure
   6.2.2 Alternative I recommendations
   6.2.3 Alternative II recommendations
   6.2.4 Operation and maintenance
   6.2.5 Staff training and environmental education
   6.2.6 Public health risks and neighborhood nuisance
   6.2.7 Further researches.

References

Annexes

Pictures