

**CHANGES IN OXIDATION-REDUCTION POTENTIAL (ORP)
DURING MICROBIAL TRANSFORMATION PROCESSES IN
BULK WATER PHASE UNDER
ANOXIC CONDITION**

By

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ABSTRACT

The sewer is a reactor for chemical and microbial transformations of wastewater. These in-sewer processes affect the quality of the wastewater and thereby the sewer itself, the subsequent treatment and the receiving water quality. Thesis focuses on the changes in oxidation-reduction potential (ORP) during microbial transformation processes in bulk water phase under anoxic condition.

This study is based on experimental works on microbial transformation processes in the bulkwater phase of municipal wastewater. Test on 7 different municipal wastewater samples taken from the inlet of wastewater treatment plant (WWTP) at IWK Section 23, Shah Alam were conducted. In this study, a reactor subjected to anoxic condition was used to measure the ORP value and to determine the nitrate/nitrite utilization rate (NUR) during the anoxic condition.

The sample that extracted from reactor was tested for nitrate and nitrite concentration by ion chromatography unit Metrohm and I.C 790 respectively.

KEYWORDS

Microbial transformation process; anoxic, in-sewer processes, oxidation-reduction potential, nitrate, nitrite,

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Sewer networks and treatment plants have been separately designed and operated. Two different and separate functions have been dealt with: the sewer system collects and conveys the wastewater to the treatment plant, and the treatment plant reduces the pollution load into the receiving water according to the pre-determined quality standards. A typical sewerage system can be illustrated by the components shown in Figure 1.1. A new approach is being introduced where sewer design and operation should incorporate the possibility of the sewer to act as the physical, chemical, and biological reactor. More centralized wastewater treatment plants (WWTPs) are constructed to replace the existing smaller plants, resulting in increased transport time.

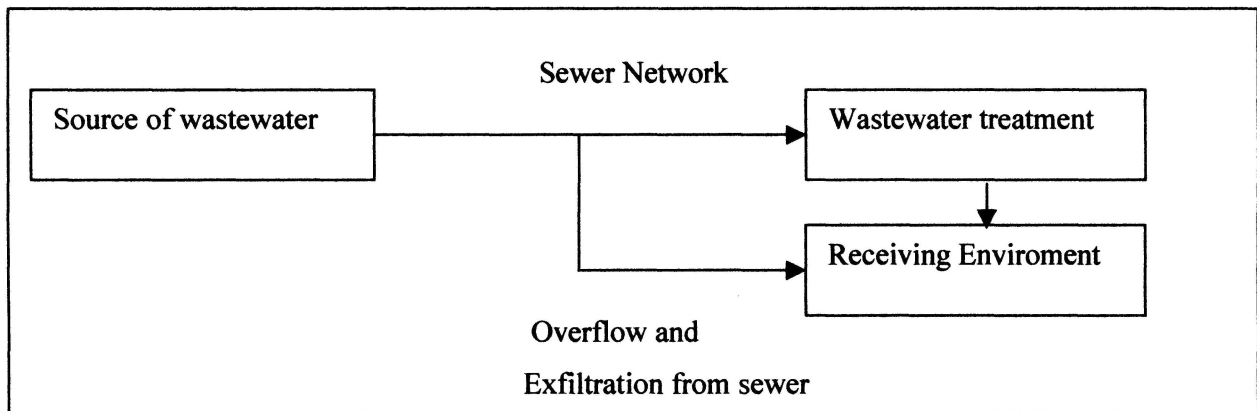


Figure 1.1: Components of Sewerage System – The Conventional View

In this situation, a sustainable and integrated dimension of wastewater management in sewer networks is needed. The consideration of sewer processes as an element in the design and operation of sewers will give a new dimension to improved