

CHAPTER ONE

Introduction

1.1 Background

Biogas is formed naturally from biogenic matter, indeed all forms of biomass, under anaerobic conditions. This naturally occurring biogas escapes into the atmosphere where its main component, methane, is a significant contributor to global warming. Over the last century, methane has become one of the most used fuels for power generation, heating and transportation purposes. While the vast majority of methane used in society today comes in the form of natural gas, there is rapidly growing interest in capturing the methane formed from decaying biomass. This, of course, does not mean capturing the methane released from all the natural sources in nature. It means setting up dedicated biogas facilities where the biogas process can be fully contained, controlled and optimized and a commercially viable industry can be established, harnessing nature's potential to produce renewable, environmentally sustainable, gaseous biofuel.

1.2 Importance of Study

The main reason for anaerobic digestion is that methane is a major greenhouse gas; Using biogas not only removes polluting wastes, but also mitigates global warming.

An anaerobic digester can solve sanitation problems by taking in human as well as animal manure, improving home and farm hygiene and the general environmental conditions.

1.3 Problem Formulation

Organic waste is representing an important environmental pollution source, not only for the soil and ground water, but also for the air. So this problem can be solved by converting it to a biogas which can compensate the Shortage of natural gas for cooking in Sudan, and reduce the need to the expensive petroleum products.

1.4 Scope and Objectives

1.4.1 Scope

Design of anaerobic digester to produce methane-rich “biogas” suitable for cooking, and electricity generation.

1.4.2 Objectives

- (i) Full design of anaerobic digester.
- (ii) Material estimation for construction of the digester.

1.5 Methodology

Design a fixed dome digester provided with all mathematical calculations , which suitable for construction at assalaya sugar factory, cow farm, then calculate the material needed such as cement, sand, brickwork , etc,

1.6 Thesis Structure

Chapter [1]: Introduction which is outline of the main conception and key factors of research topics. Chapter [2]: is literature review, which describes the biogas plants types, biogas concept, processing, biogas commercial analysis, biomass sources, chemical reaction process, and measurements devices. Chapter [3]: in which proposed design of biogas plant included, anaerobic fixed dome digester design, calculations, and material estimation. Chapter [4]: the result and discussion. Chapter [5] conclusion and recommendations. Also the research includes the holy Quran verses, acknowledgements for which roles in the study, abstract for clear idea, chapter's tables of contents, list of tables, list of figures and abbreviations of the more used words.