# OPTIMIZATION OF MUNICIPAL SOLID WASTE GASIFICATION CONDITION

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# ABSTRACT

The purpose of this study is to study and optimize the most effective conditions of the gasification process and to assess the potential of gasification process as an alternative to the combustion of municipal solid waste (MSW). To achieve this objective, a preparation of catalyst has been conducted for gasification of MSW. Gasification experiments were carried out in absence and presence of catalyst. The catalysts used were saw dust and activated carbon. It was observed that the gasification product which is syngas was dependent on process condition and catalysts used. The main role of the catalysts was reforming of the tar derived from gasification process, besides enhancing water gas shift reaction. A good quality syngas from gasifier was obtained by optimized design and operation of the gasifier, by the use of catalytic bed materials including internal reforming of tars.

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# CHAPTER 1

# INTRODUCTION

## 1.1 Research Background

Over the past decade, the rapid growth rate in the world population along with the economic development gives impact to the social and environment caused by municipal solid waste (MSW) generation. Municipal solid waste can be defined as types of solid wastes that commonly called as trash or garbage which comes from households, office and retail wastes. As we know, Malaysia is one of the most successful countries in transition. Based on statistics, the generation of municipal solid waste (MSW) in Malaysia has increased 91% from 2257 tonnes/day in year 1998 to 3478 tonnes/day in year 2005. Due to the increasing of municipal solid waste (MSW) produced every year, the issue of sustainable management solutions rising. MSW management activities contribute to the generation of greenhouse gas and consequently to the climate change problem which landfill waste decomposition contributes greatly to the formation of these gases, besides there is another environmental problem associated with MSW management systems which the potential generation of dioxins and furans associated to complete combustion of