

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**  
**Belgaum – 590010**



**PROJECT REPORT ON**  
**(06CH85)**

**“STUDY ON CONVERSION OF MUNICIPAL SOLID  
WASTE TO LIQUID FUELS”**  
**(Sponsored by K.S.C.S.T)**

*Submitted in partial fulfillment of the requirements for the award of the degree*

**BACHELOR OF ENGINEERING**  
**IN**  
**CHEMICAL ENGINEERING**

**HEAD OF THE DEPARTMENT**  
**Dr.S.SHANMUKHAPPA**  
Ph.D

**PRINCIPAL**  
**Dr.B.T.ACHYUTHA**  
B.Sc. B.E, M.Tech. Ph.D, F.L.E, M.I.S.T.E

**PROJECT GUIDE**

**Dr.B.M.KULKARNI**  
M.Tech. Ph.D.

**PROJECT ASSOCIATES**

**PRADEEPA.P.H**

**4BD06CH009**

**JYOTHI.R**

**4BD04CH005**

**RAHUL.S.KATAKANHALLI**

**4BD06CH010**



**(2009 -2010)**

**DEPARTMENT OF CHEMICAL ENGINEERING,**  
**BAPUJI INSTITUTE OF ENGINEERING AND TECHNOLOGY,**  
**DAVANGERE-577004, KARNATAKA, INDIA**

## **ABSTRACT**

Increasing quality of life and high rates of materials consumption patterns have led to generation of wastes far beyond the handling capacities of urban bodies and unintended negative impact on the urban environment. All urban cities are now grappling with the problems of high volumes of generation of municipal wastes. At present these wastes are considered to be unwanted items. Low budgetary allocations, lack of proper management, techniques and poor public awareness have made municipal waste operations to be ineffective. But these problems have also provided a window of opportunity for cities to find solutions - involving the community and the private sector; involving innovative technologies and disposal methods; and involving behavior changes and awareness rising. These issues have been amply demonstrated by good practices from many cities around the world.

An effective way to solve this waste management problem is to device new technologies which produce value added products from these wastes.

Pyrolysis has been reported to be a feasible operation, as this process produces liquid and gaseous mixtures which can be substituted for petroleum fuels. Number of variables influences the yield of liquid and gas fractions.

Wastes generated in the campus are collected, segregated, and are analysed.

A pyrolysis reactor is designed, fabricated and tested for its performance. The feedstock for the reactor is dried household refuse (a mixture of food waste, fruits/vegetable, paper, plastic and textile materials). The experiments were repeated with the same percentages of waste components in the household refuse. The experiments were performed between 500<sup>0</sup>C and 650<sup>0</sup>C. A waste volume reduction of about 65% on the average was achieved after the experiments and pyrolysis oil (also known as bio-oil, biocrude, etc) was

obtained. The residues obtained were mainly char (30-35%) which showed that the process has a potential for the

treatment of municipal solid waste and is a good technology for resource recovery. Fast pyrolysis of biomass produces a liquid product, pyrolysis oil or bio-oil that can be readily stored and transported. Pyrolysis oil is a renewable liquid fuel which can be used for production of chemicals.

Oil fractions obtained from pyrolysis studies have been analysed. Spectral, elemental and fuel properties studies have been conducted. Organic carbon resulting from pyrolysis has also been analysed. Results obtained as analysed and discussed.