



BANNARI AMMAN INSTITUTE OF TECHNOLOGY

EMBEDDED SYSTEMS CELL

PROJECT NAME

**ADIABATIC RAPID  
CO-COMPOSTER**

# INTRODUCTION

The public awareness for disposing of wastes and make public places clean is being rapidly decreasing day by day, the technologies that have been helping to contribute to this field is gathering the interest of scientists and researchers. People are looking forward to more effective and less expensive methods. Which can be made available to everyone. Smart and innovative ideas have many applications in technology. The adiabatic process has paved the way for disposing of the waste product to a usable product. Adiabatic Rapid co Composter is one of the most promising prototypes having its various applications in the agricultural field. It stands for rapidly composting the wastes by the adiabatic process. It is used in the composting of organic wastes in industries, flower and vegetable markets, restaurants, and homes. The advantage of this product is its compact size and time consuming to compost organic waste. And this paper is proposed to convey the future aspects of agriculture-based technologies and its versatile applications in the agriculture and waste management field.

# MATERIALS REQUIRED

## # STAINLESS STEEL :

- @ XL[SIZE]-VESSEL == 1
- @ L [SIZE]- VESSEL == 1
- @ XL[SIZE]-PLATE == 1
- @ L [SIZE]-PLATE == 1
- @ CLAMP [1 INCH] == 4
- @ OUTLET PIPE == 1

## # ARDUINO :

- @ UNO BOARD == 2

## # SENSORS:

- @ HUMIDITY SENSOR == 2
- @ TEMPERATURE SENSOR == 2
- @ BATTERY [5V] == 2

## # MINI FAN MOTOR

## AND ALL OTHER MATERIALS REQUIRED FOR DRILLING AND WELDING PURPOSES ##

# XL - SIZE VESSEL



THIS XL SIZE VESSEL IS USED FOR THE PROTECTION OF THE COMPONENTS



WE WILL FIX ALL THE COMPONENTS INSIDE IT



WE COME UP WITH STAINLESS STEEL DUE TO THE PROPERTIES WHICH IS ALMOST RELATED TO THE CONCEPT USED IN THIS PROJECT

**CONCEPT : STAINLESS STEEL**  
WILL KEEP THE HEAT INSIDE IT  
AND IT ALSO NOT RELEASE THE HEAT OUTSIDE OF IT

# L - SIZE VESSEL



IN THIS VESSEL WE ARE GOING TO DRILL 3 HOLES IN THE LEFT AND RIGHT SIDE OF THE VESSEL FOR INSERTING THE CONNECTING WIRES TO THE SENSORS



WE ALSO CUT THE BASEMENT PART OF THE VESSEL AND WE ARE GOING TO WELD IT WITH L SIZE PLATE



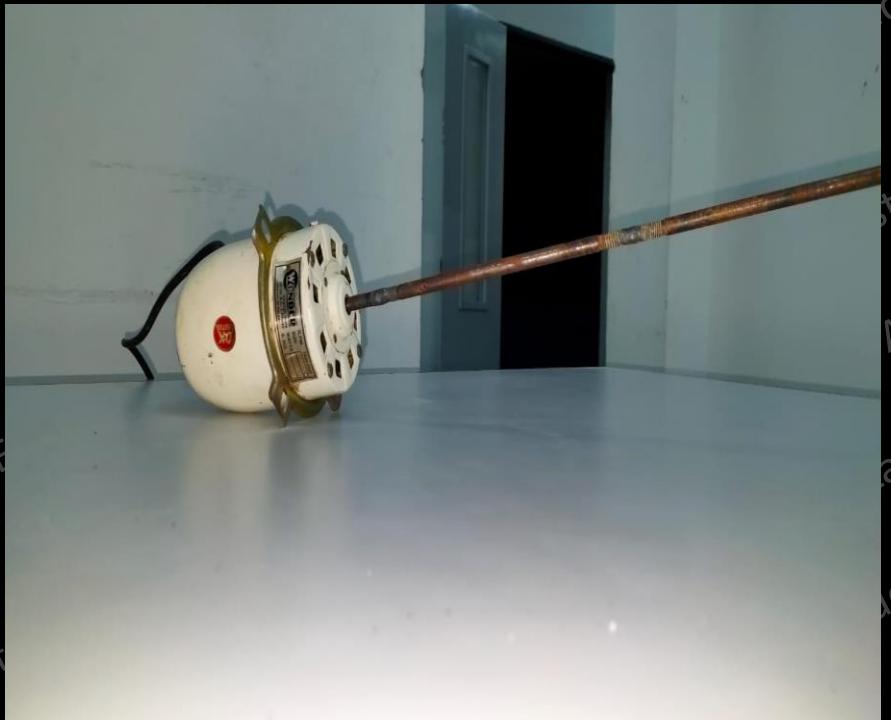
IN THIS VESSEL ONLY WE ARE GOING TO FIX THE HUMIDITY AND TEMPERATURE SENSORS



THIS VESSEL ALSO MADE UP OF STAINLESS STEEL



# MINI FAN MOTOR



**MINI FAN MOTOR IS USED TO  
MIX THE MATERIALS THAT CAN  
BE POURED INSIDE THE  
VESSEL**



**IT IS USED TO MIX THE  
MATERIAL EVENLY WHAT WE  
POUR INSIDE IN THE VESSEL**



**THE BLADES SHOULD BE FIXED  
WHILE MIXING THE MATERIAL**

# STAINLESS STEEL PLATES:



**L-SIZE PLATE**



**XL-SIZE PLATE**



**XL SIZE PLATE IS USED ONLY TO COVER THE TOP OF THE PRODUCT AND TO FIX THE MOTOR WITH IT BY MAKING HOLE IN THE CENTRE**



**L SIZE PLATE IS FIXED WITH L SIZE VESSEL WITH 6 HOLES IN IT**



**HOLES ARE MADE TO COLLECT THE WATER WHICH WILL BE FORMED DURING THE RUNNING PROCESS**

# CLAMPS & OUTLET PIPE



**OUTLET PIPE**



**1 INCH CLAMP**

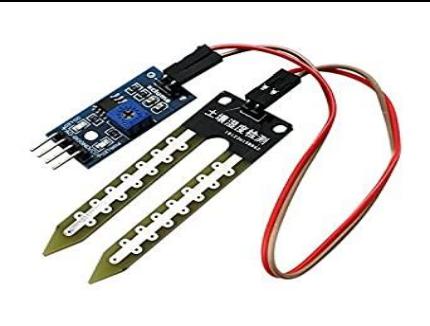


**1 INCH CLAMPS ARE USED TO FIX THE XL SIZE VESSEL WITH THE PLATE MEANS TO CLOSE THE VESSEL**

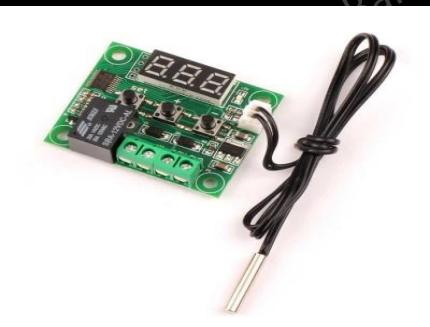


**OUTLET PIPE IS PLACED IN THE BOTTOM OF THE XL VESSEL TO REMOVE THE WATER FROM THE VESSEL**

# ELECTRONIC ACCESSORIES



**HUMIDITY SENSOR IS USED TO MEASURE THE HUMIDITY CONTENT OF THE MATTER PRESENT INSIDE IN IT**

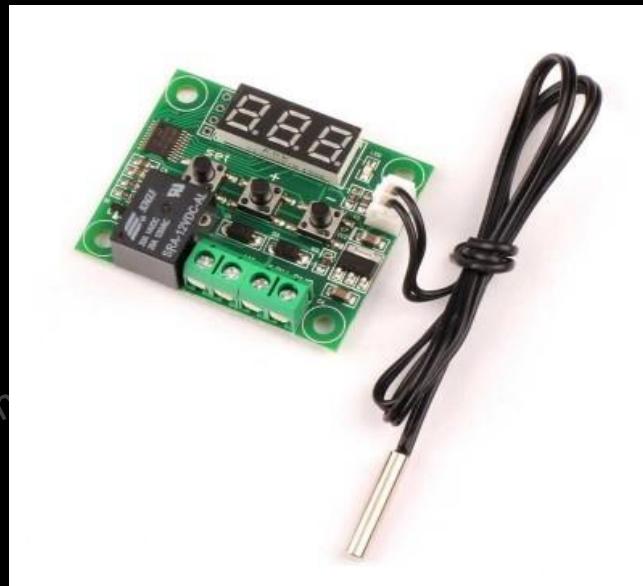


**TEMPERATURE SENSOR IS USED TO MEASURE THE TEMPERATURE TO MAINTAIN CONSTANT TEMPERATURE INSIDE THE VESSEL**



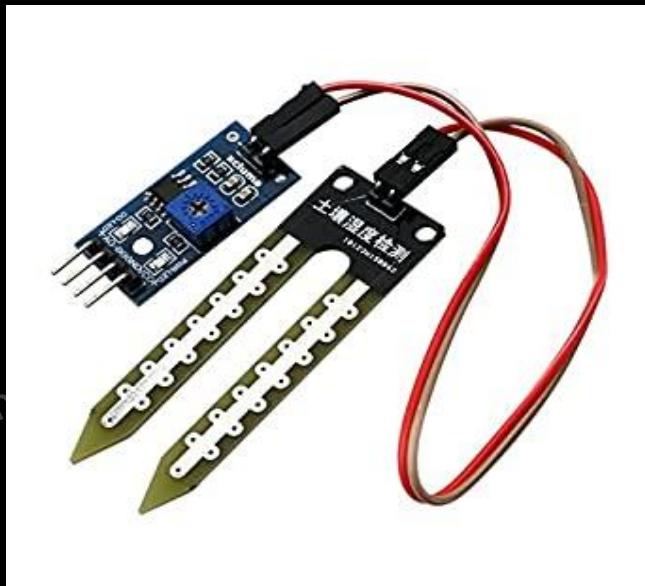
**ARDUINO UNO BOARD IS USED TO PROGRAM THE BOTH SENSORS AND TO INTERFACE THE DISPLAY WITH IT**

# ELECTRONIC ACCESSORIES



**TEMPERATURE SENSOR** A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes. There are many different types of temperature sensors. Some temperature sensors require direct contact with the physical object that is being monitored (contact temperature sensors), while others indirectly measure the temperature of an object (non-contact temperature sensors). There are many applications where maintaining a specific temperature is vital, for example, if products must be kept at a certain temperature or for patient monitoring, the responsiveness and accuracy of the temperature sensor is critical.

# ELECTRONIC ACCESSORIES



**HUMIDITY SENSOR** is an electronic device that measures the humidity in its environment and converts its findings into a corresponding electrical signal. Humidity sensors vary widely in size and functionality; some humidity sensors can be found in handheld devices (such as smartphones), while others are integrated into larger embedded systems (such as air quality monitoring systems). Humidity sensors are commonly used in the meteorology, medical, automobile, HVAC and manufacturing industries.

The applications of humidity sensor range far and wide. People with illnesses affected by humidity, monitoring and preventive measure in homes employ humidity sensors. A humidity sensor is also found as part of home heating, ventilating and air conditioning systems (HVAC systems). These are also used in offices, cars, humidors, museums, industrial spaces and greenhouses and are also used in meteorology stations to report and predict the weather.

# ELECTRONIC ACCESSORIES



**ARDUINO UNO** Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your Uno without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

# WASTE THAT CAN BE CONVERTED

## KITCHEN WASTE :

- # VEGETABLE WASTES
- # FRUIT WASTES
- # FOOD WASTES
- # PAPER/WOOD/CLOTH

## AGRO WASTE:

- # DRY LEAVES
- # LAWN CLIPPINGS
- # GRASS RESIDUES
- # PLANT RESIDUES
- # BUSHES
- # BROWN RESIDUES

## INDUSTRY WASTE :

- # SLUDGES
- # FAECAL SLUDGES

**TOTAL WASTE GENERATED  
PER YEAR **243.6 MILLION  
TONS****

# CURRENT WASTE MANAGEMENT STATUS OF INDIA

## SECURED MANAGEMENT :

# COMPOSTING == 10%

# INCINERATION == 05%

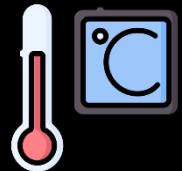
## UNSECURED MANAGEMENT :

# OPEN DUMPING == 60%

# UNSANITARY  
LANDFILLING == 15%

# OTHERS == 10%

# FACTORS AFFECTING THE PRODUCT



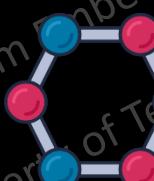
TEMPERATURE



P-H CONTENT



CARBON AND NITROGEN



PARTICLE SIZE



HUMIDITY



MOISTURE

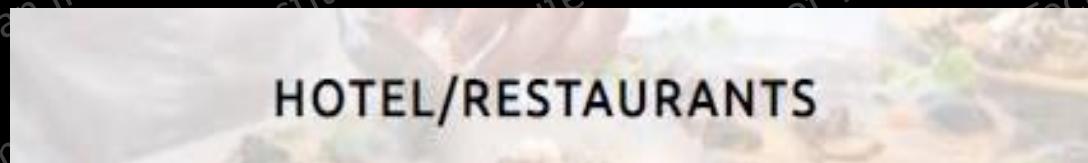
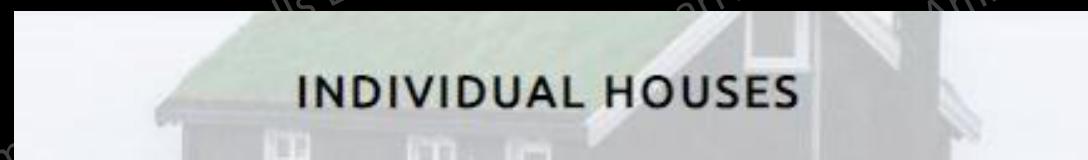


MICRO



ORGANISM

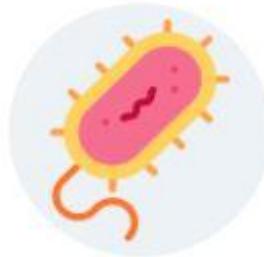
# TARGET MARKET



# UNIQUE FEATURES OF IDEA



**Physico Chemical  
Parameters**



**Suitable  
Microbial  
Consortium**



**Automation**



**Internet of  
Things**

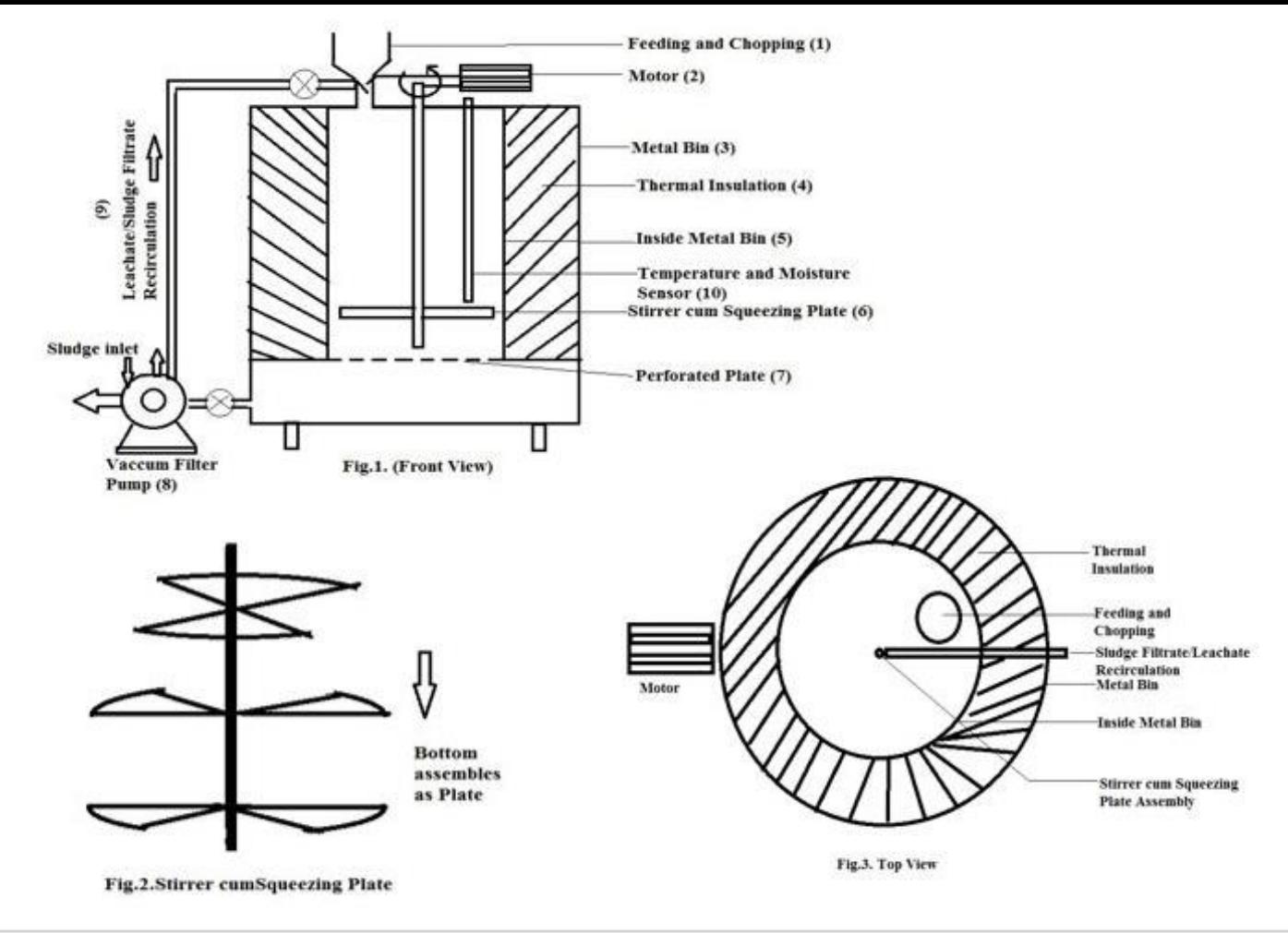


**Rapid and  
Compact**

# **ADVANTAGES AND APPLICATION**

- 1. TRANSPORTATION COST REDUCED FOR WASTAGE COLLECTION**
- 2. AVOIDS DUMPING**
- 3. AVOIDS OVERFLOW**
- 4. AUTOMATIC FEED SELECTION**
- 5. PROMOTES LAWN GARDENING**
- 6. PROMOTES TERRACE GARDENING**
- 7. FARMING**

# LAYOUT



## **GUIDES:**

**BALA GANESH P**

**RAMESHWARI R**

**VASUDEVAN M**

## **HARDWARE AND SENSOR WORK:**

**E K HIRTHICK GUHAN**

**V GOPALA KRISHNAN**

**D RANJITH**

## **OTHER TECHNICAL WORK:**

**S RUTHU VERSHON**

**R PRAANAPH**