BANNARI AMMAN INSTITUTE OF TECHNOLOGY

EMBEDDED SYSTEMS CELL

PROJECT NAME

ADIABATIC RAPID CO-COMPOSTER

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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.

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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

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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 RELATIVE 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

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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

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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

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STAINLESS STEEL PLATES:

XL-SIZE PLATE

L-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

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CLAMPS & 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

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

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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

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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.

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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.

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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.

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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

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TOTAL WASTE GENERATED PER YEAR 243.6 MILLION TONS

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CURRENT WASTE MANAGEMENT STATUS OF INDIA

SECURED MANAGEMENT :

COMPOSTING == 10%

INCINERATION == 05%

UNSECURED MANAGEMENT :

OPEN DUMPIND == 60%

UNSANITARY LANDFILLING == 15%

OTHERS == 10%

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FACTORS AFFECTING THE PRODUCT

TEMPERATURE

P-H CONTENT

HUMIDITY

MICRO ORGANISM

CARBON AND NITROGEN

PARTICLE SIZE

MOISTURE

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TARGET MARKET

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UNIQUE FEATURES OF IDEA

Physico Chemical Parameters

Suitable Microbial Consortium

Automation

Internet of Things

Rapid and Compact

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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

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LAYOUT

Fig.1. (Front View)

Fig.2.Stirrer cumSqueezing Plate

Fig.3. Top View

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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

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