



DISSERTATION REPORT

On

“Experimental Investigation on Performance of Diesel Engine using Mixture of Diesel and Bio-Diesel as a Working Fuel with Copper Oxide & Zinc Oxide Nano Particle Additive”

Submitted by

Miss Meera Bhagwat Randive

Under the Guidance of

Dr. M. D. SHENDE

In partial fulfillment for the award of

Master Degree in Mechanical Engineering- Heat Power

Of

**DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
AURANGABAD (M.S.)**



Department of Mechanical Engineering

Shreeyash College of Engineering & Technology, Aurangabad

Maharashtra State, India

2018-2019

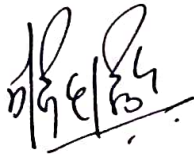
CERTIFICATE

This is to certify that, the Dissertation report entitled "**Experimental Investigation on Performance of Diesel Engine using Mixture of Diesel and Bio-Diesel as a Working Fuel with Copper Oxide & Zinc oxide Nano Particle Additive**", which has been submitted herewith for the award of the '**Master of Engineering**' in '**Mechanical Engineering (Heat Power)**' of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M.S.).

This is the result of the original work and contribution by '**Miss. M. B. Randive**' under my supervision and guidance. The work embodied in this dissertation report has not formed earlier for the basis of the award of any degree or compatible certificate or similar title of this for any other diploma/examination body or university to the best of my knowledge and belief

Place: Aurangabad

Date: 18/12/2018



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Department Mechanical Engineering



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Dr. R. S. PAWAR

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DISSERTATION REPORT

on

Design and Analysis of Single Composite Drive Shaft for Light Motor Vehicle

Submitted by

Mr. Ravikumar V. Taksande

PG Student

Under the Guidance of

Dr. M. D. Shende

in partial fulfilment for the award of

Master Degree in Mechanical Engineering

of

**Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
AURANGABAD (M.S.)**



**Department of Mechanical Engineering
Shreeyash College of Engineering and Technology, Aurangabad
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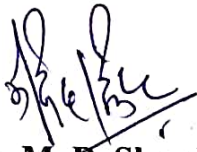
(2019)

CERTIFICATE

This is to certify that, the dissertation entitled “**Design and Analysis of Composite Drive Shaft for Light Motor Vehicle**”, which is being submitted herewith for the award of the ‘**Master of Engineering**’ in ‘**Mechanical Engineering**’ of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra State. This is the result of the original research work and contribution by ‘**Mr. Ravikumar Vishwambarji Taksande**’ under my supervision and guidance. The work embodied in this dissertation has not form earlier for basis of the award of any degree or compatible certificate or similar title of this any other diploma/examination body or university to the best of knowledge and belief.

Place: Aurangabad

Date: 25/4/2019



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Publications

ANNEXURE - 1

RESEARCH PAPER PUBLISHED

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**REVIEW ON HEAT STORAGE MEDIA USED
IN SOLAR AIR DRYERS FOR DRYING
AGRICULTURAL PRODUCTS AND METHODS
OF PERFORMANCE ENHANCEMENT OF
SOLAR AIR DRYERS.**

¹Mr. Athiyale N.V. ²Dr. Shende M.D.

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Abstract: Generally farmers dry their agricultural products and food stuffs in open sun. In open sun drying the products were sprayed under sun and moisture evaporates from it. This open sun drying is having so many drawbacks such as dust contamination, insect contamination, microbial attack, Decay due to rain etc. To overcome these drawbacks, the new technology emerged in market is Solar Air Dryer. It is a device used for product drying and controlling product quality and taste with proper applications of solar energy. Solar dryer is operated during off sunshine period by using Thermal Energy Storage (TES) technology. Energy storage medium collect solar energy during sunshine period and supply it for product drying during off sunshine period. Developing efficient and low effective energy storage in solar air dryer is as important as developing new energy sources. There are three kinds of TES technology namely sensible heat storage (SHS), Latent heat storage (LHS) and thermo chemical heat storage (TCES). Out of these three technologies, due to high energy density and constant working temperature LHS technology is efficiently used in solar air dryer for drying agricultural products and foodstuffs in the temperature range of $+5^{\circ}\text{C}$ - $+60^{\circ}\text{C}$ [1]. LHS technology uses Phase Change Material (PCM) as TES medium in solar air dryer which stores the thermal energy during sunshine period and supply the stored energy for drying products during off sunshine period. This paper presents the review of phase change materials, their corresponding performance in respective applications, refined methods of performance enhancement of PCM and their applications and various designs of solar air dryers used to enhance its performance. Although a lot of research work on performance enhancement of LHS systems has been performed and many valuable results have been obtained, there are still many works need to be performed. It is proposed that the novel phase change material will synthesized by Fischer's esterification Method. By Fischer's esterification of glycerin (i.e. Glycerol) with Acetic acid, Acetylaminic new PCM will be obtained. The comparative results of performance of phytanin, Acetaminic and new PCM obtained by Fischer's esterification of glycerin (i.e. Glycerol) with Acetaminic, can be presented in graph and table format.

Index Terms: Solar Drier, farm products; PCM, LHS, Glycerol, Acetamide.

INTRODUCTION

INTRODUCTION

In order to preserve agricultural products and food stuffs, the farmers dry their products under open sun. Under open sun drying moisture evaporates from products and thus products can be preserved for long period of time. During drying products under open sun drying, due to addition of various factors the quality and taste of the product changes and it cannot remain stable. The factors affecting quality and size of products are addition of dust, dirt through blowing air, addition of water due to rain, attack of insects, birds and other microbes. Due to this low quality of products farmers do not get right price on selling product. To dry these agricultural products without deteriorate its quality and taste, the equipment available in the market is solar Air Drier (SAD). Blower, flat plate or r-roofed plate collector, drying chamber, air exhaust fan, pyranometer (to measure solar intensity), temperature measurement instrument (i.e. temperature sensors, thermometer, etc), manometer (to measure exhaust air flow rate) are the basic components of solar air drier. In SAD the food grains or food stuffs to be dry are kept in drying chamber. Atmospheric air is sucked by blower and it is forced to flow over heated plate collector. Air receive heat of plate collector by convection. The hot air is forced to flow around products kept in drying chamber. Convection type heat exchanger takes place between products (at ambient temperature) and hot air which remove the moisture from the product. By proper selection of plate collector (flat plate-roofed or other of other type) and heat storage media inside collector, the temperature obtained at the outlet of plate collector can be controlled and thus the temperature of the air flowing around the product is controlled. Percentage of moisture to be removed from the products depends on the temperature of the air flowing around the products. To dry products during day time by using available

Due to unavailability of solar energy during night time, the products are dried only during dry time by using available solar energy. It is the need to store the solar energy so that it can be used during off sunshine period and ultimately it will increase the performance and productivity of solar air dryer. To store solar energy when it is available and use it during unavailability of solar energy is the new technique incorporated in solar air dryer which accelerates the rate of drying by providing safety against attack of foreign fungi and increase the quality of product. New and better heat storage Media are being searched by the researchers day by day. There are three types of energy storage techniques namely sensible heat storage

Performance Evaluation of Acetamide as a Latent Heat Storage Medium in Reflecting Mirrors Equipped Solar Air Dryer Used For Drying Potato Chips

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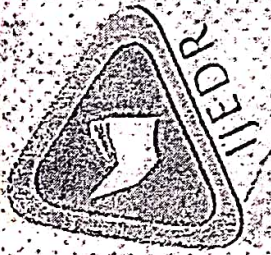
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Abstract

Solar air Dryer (SAD) are used for drying agricultural products during sunshine periods but for drying products during off sunshine period the solar air dryers are equipped with latent heat storage medium. Various latent heat storage media are being researched by various scientist, engineers and scholars across the world.

In this paper the SAD equipped with and without reflecting mirrors on both side of collector and Acetamide as a latent heat storage medium is fabricated and thermal performance of Acetamide as a latent heat storage medium is checked by finding out values of 1) The temperature at various locations in SAD 2) The time duration of heat supply by Acetamide and 3) Time required to dry 250 gm of Potato chips. Experimental set up is placed towards south at Aurangabad (Maharashtra-India) with Latitude 19.517444, Longitude 75.86699, and Elevation 0.0. From the analytical results it is observed that the useful heat energy given by SAD with Reflecting mirrors is more than SAD without reflecting mirrors by 1.588 KJ. The temperature of drying chamber after sunset at 6:00 PM (When $m = 0.064 \text{ Kg/Sec}$) in SAD with PCM was 32°C more than SAD without PCM. The present set up gives heat to product up to 3 hours after sunset. SAD with reflecting mirrors and PCM takes 3 hours less time to dry Potato



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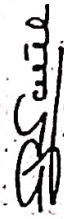
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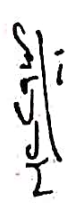
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This is to certify that Dr./Prof./Mr./Ms. Sagar Sambhaji Shinde has presented /attended a paper titled "Advanced Distillation using solar energy" at National Conference on "Recent Trends In Mechanical Engineering" held on February 11th & 12th, 2016.


Prof. P. R. Ingole
Co-convenor


Prof. S. L. Shinde
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A Review of Advanced Distillation System Using Renewable Energy

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Abstract: The intention of this effort is to make healthy society by providing clean, pure and fresh drinkable water. The influence of Advanced RE Distillation System (AREDS) single slope or wick type solar still attached with inlet pipe of copper tube and blackened plate along with reflector for improving the efficiency of solar still to avoid short supply of drinkable water which is fit to drink. Today it is also required in several Industries, Hospitals, school and colleges, Agricultural uses. The supply of pre-heated water has to improve of AREDS. The AREDS means a special arrangement using direct radiation (short-wavelength radiations) to throw the pre-heated water into basin so that will escapes maximum vapor. The output result will increase than previous research to fulfill the increased demand of society. Therefore regulating the potable water sources.

Keywords: Renewable Energy; Short-Wavelength Radiations; Water; Wick Type Solar Still; Efficiency.

I. INTRODUCTION

The purpose of this effort is to develop new experimental set-up and improvement in the efficiency of a wick type single slope solar still with advanced distillation system. In the construction and operation the auxiliary arrangement is used to supply pre-heated water in a copper tube with black coated plate and reflector (mirror) also addition of gravel's at the bottom of basin as shown in Fig.1 By doing this arrangement there is definite addition of latent heat of vaporization into the basin water, this increase of heat increases evaporation rates of vapor. More the vapor escapes and stick to the glass cover and maximum will be the distillate through trough and collected in the flask. The water produced by this advanced distillation system is the pure, clean and fresh water (i.e. can be used for food cooking, bathing and consumption etc.)

II. SYSTEM DEVELOPMENT

To improve the heat absorption and collection by the still, it is observed that by experiment on different materials on the bottom-sand, gravel, or charcoal. The gravel at base gives the maximum efficiency. An additional advantage of gravel is acts as a best filter, and gravel beds are used as filters in rain water harvesting system. Therefore, we determine to use



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Dissertation Report on
**“EXPERIMENTAL INVESTIGATION OF CLOSED LOOP
PULSATING HEAT PIPE THERMAL PERFORMANCE AND
VALIDATION USING CFD ANALYSIS”**

Submitted By
SHAILESH DILIPRAO RAJENDRA

Under the Guidance of
Dr. R. S. Pawar
&
Co-Guidance of
Prof. D.A. Deshmukh

In partial fulfillment of the award of
Master of Engineering (Mechanical Engineering)



**Department of Mechanical Engineering
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[2018-19]



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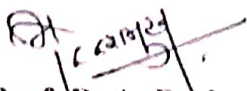
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Submitted by
Mr. SHAILESH DILIPRAO RAJENDRA


is the bonafied work completed under my supervision and guidance, in partial fulfillment for the requirement of degree of Master of Engineering (**Mechanical Engineering**) of the Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M.S.) in the academic year 2018-19.


Place: Aurangabad

Date: 14.07.2019


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AURANGABAD (M.S.)**

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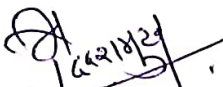
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