

**DR. BRR GOVERNMENT DEGREE COLLEGE
JADCHERLA**

**STUDY PROJECT
2021-2022**

Topic: Energy Saving Utensils

Submitted By

DEPARTMENT OF PHYSICS

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Title : Energy saving utensils

Introduction

A).Description of the Research Problem :

Now a days in our day to day life Energy is so important in our daily lives **because it is a basic human need**. We use energy to not only heat our human-made structures but we use it to cool them as well. Energy is necessary for getting up out of bed, walking down the street, or even lifting our finger. **Energy conservation means that the efforts made to reduce the consumption of energy**. The energy on Earth is not in unlimited supply. Furthermore, energy can take plenty of time to regenerate. This certainly makes it essential to conserve energy. Most noteworthy, energy conservation is achievable either by using energy more efficiently or by reducing the amount of service usage.

Refers to our present study project we observed most of the heat energy is losing to surroundings due to radiation , while we are cooking with regular utensils . The supplied heat energy (gas) directly radiate to utensil but there will be a loss of heat energy to surroundings due to radiation or transfer of heat. So,then it will take more time to food processing and energy loss also there. Preferably women employees are losing more time in the kitchen.

Due wastage of gas , the fuel consumption will also more . So ,to overcome this problem we want to modify present utensils.

So, if we reduce the loss of heat energy to surroundings by modifying the present cooking utensils covered with outer utensil by manufacturing, this will be a one step to save energy and time which leads to energy conservation .

“A Modified cooking utensil system “should be used.

B). Aims and Objectives:

- 1). In our present study project for the purpose of saving heat energy and to save time , instead of regular utensils modified energy saving utensils with double layered should be prepared.
- 2). To prepare energy saving utensils using Aluminum material by welding method in which inner vessel covered with another outer vessel in which bottom part is removed..
- 3). To compare the time taken to heat up 200ml of water in normal cooking utensils and modified cooking utensils.
- 4). When outer utensil with removed bottom and inner utensil welded together at the top , the supplied heat energy directly radiate to inner utensil, so that in less time there will be a higher temperature difference. So cooking items will be prepared with less amount of heat energy in less time. That means wastage of energy to surroundings is reduced.

C). Review of literature.

Context to present project, already time saving and energy saving food processing cooking equipment's have been using for many years like pressure cooker, induction stove, microwave oven....etc.. But in these systems also

- i) Loss of heat is there
- ii) These are expensive to normal people.

So we prepared present modern cooking equipment's for the sake of women employees to complete their food processing in less time by saving energy and time, so that they utilize their valuable precious remaining time to their job.

“Can modifying modern utensils saves time and energy”?

Yes, they can .because modified energy saving utensils include double layered utensils in which loss of energy radiation to surroundings prevented and supplied heat energy directly radiate to bottom part of the cooking vessel.

D).Methodology:

To prepare the modified cooking utensils, the following Equipment needed.

- | | |
|--|--------|
| i). Normal aluminum vessels of same size with Lid. | Qty..2 |
| iii). Aluminum vessel slightly larger than earlier one | Qty..1 |
| iii). Gas flame.... | |
| iv). Thermometer | |
| v). Measuring jar | |
| vi). Welding machine | |
| Vii). Aluminum cutting machine | |

Working of Energy saving utensils

Sample Preparation:

- To prepare sample, two Aluminum vessels of same size and another Aluminum vessel slightly larger than earlier one are purchased from Jadcherla local steel shop.
- Later the bottom part of the larger vessel is cutted and removed with the help of cutting machine.

- Then smaller vessel which is to be used as cooking vessel i.e. inner vessel is inserted in larger vessel i.e. outer vessel and then these two vessels are welded together with the help of welding machine at the top portion such that their openings are fixing to each other. This is modified modern system and can be characterized.

Working of Energy saving utensils:

Unmodified utensil	Modified Energy saving utensil
1. When Heat energy of gas flame supplied, some of the energy losses due to radiation to the surroundings. So more time taken for required temperature difference. 2. In this time and energy are not saving	When heat energy of same gas flame supplied, the loss of heat to surroundings can be reduced as in this system heat energy directly radiate to bottom part of the inner vessel and the gap between inner and outer vessels prevents radiation loss. So, in less time required same temperature difference we will get. 3. In this time and energy both are saved.

Experimental Analysis:

Normal unmodified utensil	Modified utensil
1. We have taken 200 ml of water and noted the initial temperature with the help of thermometer as 27° c and this is kept on gas flame for	<ul style="list-style-type: none"> • We have taken 200 ml of water and noted the initial temperature with the help of thermometer as 27° c and this is kept on the same gas

5 minutes and then noted final temperature as 75° c.

Temperature difference in 5 minutes = $t_2 - t_1$

$$\begin{aligned}\Delta t &= 75 - 27 \\ &= 48^\circ\text{c}\end{aligned}$$

flame. Here we get the same temperature difference within 3 minutes 8 seconds. So here time is saved.

Temperature difference in 5 minutes = $t_2 - t_1$

$$\begin{aligned}\Delta t &= 75 - 27 \\ &= 48^\circ\text{c}\end{aligned}$$

- We supplied heat energy for 5 minutes and we got the final temperature of the water as 92° c.

$$\Delta t = 92 - 27$$

$$\Delta t = 65^\circ\text{c}$$

i.e. in less time we got high temperature difference. Loss of heat due to radiation is prevented.

Energy and time both are saved.

• **Expenditure incurred :**

- | | | |
|----------------------------|---|------------|
| 1. Aluminum vessels (No.3) | : | Rs. 400 /- |
| 2. Cutting | : | Rs. 100 /- |
| 3. Welding | : | Rs. 100/- |
| 4. Thermometer | | |
| 5. Measuring jar | | |

Total : Rs. 600/-

E. Findings:

- We found that for the same temperature difference of 48°C the modified utensil system has taken 3 min 8 sec, whereas unmodified system has taken 5 min. of time.
- And also we observed loss of heat due to radiation to surroundings is prevented. So this modified system can be used to save energy and time.

F. Conclusions and suggestions:

By manufacturing or modifying present house hold cooking utensils we will save gas (energy) and time. Transfer of heat to surroundings can be prevented. Preferably women employees use their remaining valuable time to their other works rather than cooking.

The product cost around Rs. 600/-

This set up can be incorporated with BLACK coating to the outer part of the inner vessel to prevent more loss of heat to surroundings.



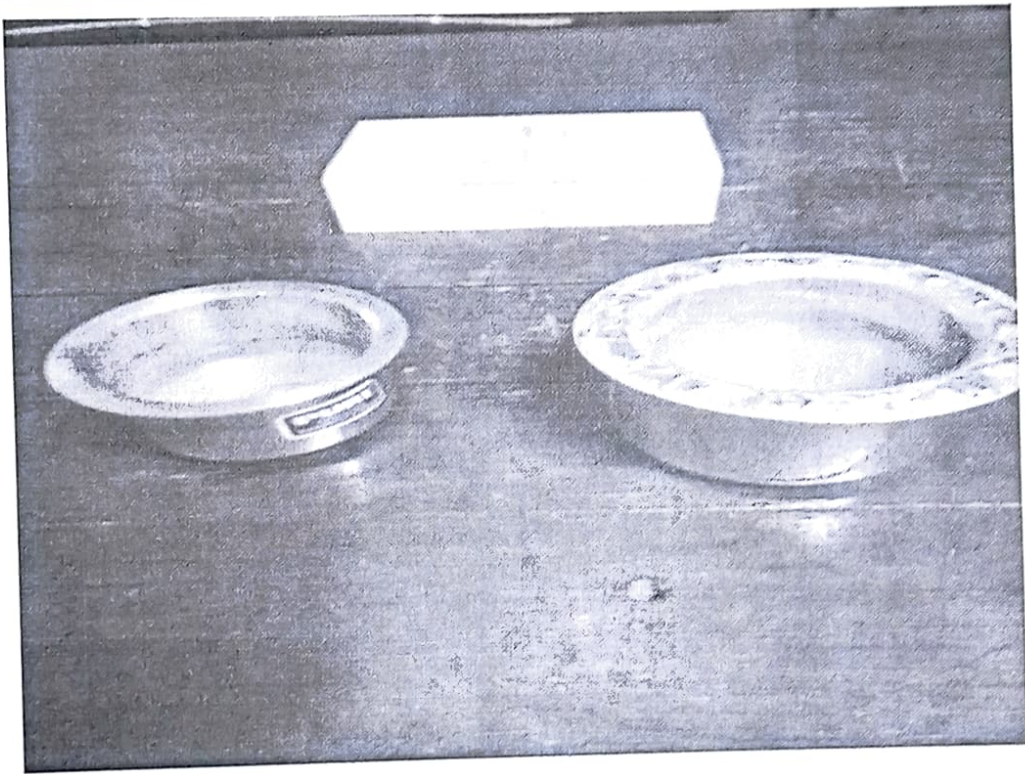
Purchasing cooking vessels at Jadcherla local shop for sample preparation



Project group - Experimenting



Samples





Students are Experimenting and noting of temperature

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“SAVE ENERGY FOR FUTURE”

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INCHARGE

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