Design and Fabrication of Solar Incubator

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Abstract:- In this project a new method of solar poultry incubator design is suggested which could be used to hatch eggs from solar pv and hence could reduce the usage of power and can increasing at maximum usage of solar power which is a renewable source of energy. It is a prototype temperature control of hatchery incubator using microcontroller. The nature of hatching process takes 21 days with a temperature of 99-102°F or 37 to 38.9°C, with proper humidity and the egg must be moved several times for certain hour for optimum performance. In this project, the lamps were used as heaters to develop suitable heat temperature for the eggs. By using water and controlling fan, it is can make sure the humidity and ventilation in good condition. The health condition of egg is very important for the development of embryo within the eggs.

Key Words: Battery, Charge controller, Solar PV, Temperature, Humidity, Ventilation, Hatchability, egg incubator.

1.INTRODUCTION

A mother hen performs hatching function at low efficiency, using artificial method, in an incubator system simulates the environmental conditions required for such operation is used by poultry farmers within specified temperature and relative humidity range. These range between 36°c-39°c and

increases efficiency 50%- 90%.In this project a new method of solar poultry incubator design is suggested which could be used to hatch eggs from solar pv and hence could reduce the usage of power and can maximize the usage of solar power which is a renewable source of energy. Solar power-based Egg incubator are used to produce clean energy without harmful effects to environment. It is a prototype temperature control of hatchery incubator using microcontroller. The nature of hatching process takes 21days with a temperature of 99-102°F or 37 to 38.9°C, with proper humidity and the egg must be moved several times for certain hour for optimum performance. In this project, the lamps were used as heaters to develop suitable heat temperature for the eggs. By using water and controlling fan, it is can make sure the humidity and ventilation in good conditions.

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2. OBJECTIVES

Following are the main objective of the present study: Design a solar powered egg incubator. Fabricate the incubator with more of locally source materials. Hatch eggs in a clean environment devoid of any energy related pollution. Encourage the youth to venture into agriculture (poultry farm), small and large scale**.**

3. METHODOLOGY

Electrical power has been proven to be one of the most important resource in every country and due to its high demand and widely used, it has become exhaustible at one day because of it's a non-renewable energy source. So, we generate continuous power by using renewable energy sources like wind energy, solar energy etc., in my project in existing system i.e., natural hatching requires continuous heating to the eggs up to completion of its hatching, but due to more eggs provided below the hen some eggs will spoil due to lack of good hatching. So, we avoid that problem we are implement the solar incubator by using temperature controller. By this project we get 100% good hatching and no spoiling of eggs are appeared here. Its renewable energy source so maintenance cost also low and eco-friendly.

According to Siriluk S. (2011) designed an automatic solar incubator consist a number of chicks produce through natural hatching is very low due to irregular heating, humidity etc., So A Solar powered automatic incubator system was designed to operate in place where there is no source of electricity. The solar energy is used in two forms to provide solar electric energy and also to provide solar heat energy the solar to provide the electricity by using reflectors. Microcontroller, while the solar PV was used to charge the battery and supply to the power system during a day. The solar energy is used in two forms to provide solar electric energy and also to provide solar heat energy the solar to provide the electricity by using reflectors. Microcontroller, while the solar PV was used to charge the battery and supply to the power system during a day. At night or poor whether when battery used to power system, if the temperature goes below 36℃ an electric heater will be used to increase the temperature band to 36-37 ℃ and the heat of the heater will be decrease if temperature is getting greater than 37℃.The turning eggs is done 12 times daily and is achieved by using stepper motor which drive the egg tray either in clockwise or counter clockwise direction. Thus, good hatching will achieve.

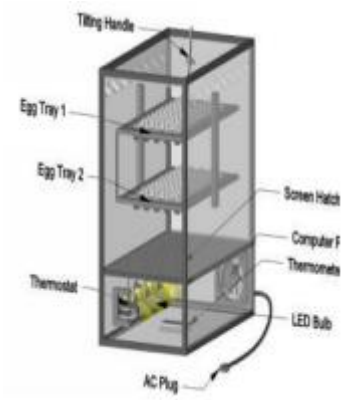
4. SCOPE OF PROJECT

The Scope of this project work is limited to design and fabrication of a tiny size solar powered egg incubator. Its capacity is limited to fifty eggs per time. It covers design, component fabrication and assembly of the various components to form the incubation

5. TABLE-1:WET BULB READING AT VARIOUS TEMPERATURES

Incubator Temperature	Wet Bulb Readings					
100^{0}F	81.3	83.3	85.3	87.3	89.0	90.7
101^{0}F	82.2	84.2	86.2	88.2	90.0	91.7
Percentage Relative Humidity	45%	50%	55%	60%	65%	70%

6. FABRICATION OF MODEL



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An incubator for chicken eggs was constructed to test and evaluate its performance. The incubator box's dimensions were 61cm (depth), 36.5cm (width), and 62cm(height).It was made from 12mm thick plywood, the incubator has four stands, the insides of the cabinet were covered with insulation foam to minimize heat losses by absorption and transmission through the walls to the atmosphere. The door of the incubator is made from plywood and glass, plywood was because of the insulating properties, ease in fabrication, durability and availability in the local market. Likewise, glass was chosen for the visibility of the eggs inside. schematic diagram,.

7. WORKING PRINCIPLE

WORKING Small Machines are semi-automatic having automatic heat control and manual egg turning, this machine can be powered through 3 power sources they are first option is solar power with 24V/250Wp photo voltaic module, then 12V/200Ah battery is provided to charge and reserve power. Second option is grid in which we have given a Switched Mode Power Supply (SMPS) option for AC/DC conversion, and the third is input grid power of solar power fails. The nature of hatching process takes 21days with a temperature of 99-102°F or 37 to 38.9°C, with proper humidity and the egg must be moved several times for certain hour for optimum performance. It will fill with the clean water or distilled water in to the plastic bowl, the water level is sufficient to develop 50% humidity/moisture inside the incubator during setting time (18days), By using water and controlling fan, it is can make sure the humidity and ventilation in good condition. Freshly collected eggs without dirt on shell keep on the tray, the trays for egg turning are very important for the positioning of the eggs, so the distance between the trays was enough to prevent the base of the upper tray from touching the eggs that may be set at the lower tray, in this egg incubator, the eggs were turned at least three times per day for normal embryonic development to take place, the gap between the egg trays when turned to an angle of 45°C is 35.5mm. The relative humidity in the existing incubator dropped in the afternoon due to the frequent opening of incubator door during the manual turning of the eggs. At night ana early morning, the eggs were not turned, thus opening of the incubator was not required, unlike during daytime when the incubator operator turned the eggs. During daytime, water was added to the water pan, and it affected the relative humidity. When water levels increased, the relative humidity increased and when water levels dropped, the relative humidity also dropped. The temperature display unit reading shoes 34.1 degrees Celsius and a relative humidity reading of 24.4%, when the temperature reading was 39.2 degrees and the lights went off, the relative humidity reading was 18.7% regarding the turning of egg tray on either side of the axle. The bulbs are ON when the temperature is below 36.5°C.

8. CONCLUSION

The results show that the setup is functioning consequently of course. In was responding to temperature variations that fell outside set temperature vary. identical was determined whereby it responded well to the wetness ratio readings outside the set humidity vary. The egg receptacle was additionally turning on either aspect to the shaft or pivot with most angle not prodigious 45 degrees. Also, the star PV system provided enough power to control the electric motor and additionally to supply power to different electronic gadgets within the system, and every one the in operation mechanism like egg receptacle turning operated of course. For any work the setup packaging is to be improved and be tested underneath traditional operating atmosphere with eggs within

9. REFERENCE

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