

Temperature Controlled Solar Heated Chick Brooder System – CED Method

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ABSTRACT

Comparative evaluation of a small scale passive Brooder system for Brooding day old chicks was done. The chick Brooder system consist of metal Copper-Cathode Electro Deposition (CED) coted tube's. specification measurement about 1.0m length and Diameter 16mm and 1.0mm thickness. The solar Energy collector storage system is a compact unit on top of the Brooder house made of PUF(poly urethane foam) Sheet's. The medium of solar energy storage is water. The Brooder system tested experimentally with day old chicks for about eight weeks. The ambient temperature range was 18.6 to 32.8⁰C and the Brooder temperature range between 29-41⁰C could be maintained. This shows that the Brooder system is a good Temperature moderating device, the average weekly global solar Radiance was in the range of 10-868 W/m²over the period.

KEYWORDS:- Solar poultry Brooding solar irradiance.

INTRODUCTION:-Brooding as defined by the efficient provision of optimal environmental conditions and nutritional requirement under which day old chicks are raised from day one up to a period of four to six weeks of age. This is the most delicate phase in poultry farming. The Brooding is necessary because day old chicks need a heated environment to keep them warm since the chicks are yet to develop the heat insulating covers that give them adequate protection against cold weather. Low temperature results to high mortality rate due to salmonella infection, bunching and crowding with the accompanying evil of smothered chicks. Chicks that become overheated will experience problems like pasting, heat stress.

Solar Brooding System: A solar brooding system has been identified to be either active or passive. Active solar brooding systems utilize complex equipment to absorb, release, transfer, or store the energy in the required manner. In some cases active solar Brooding systems are supported by auxiliary heating

such as electricity, gas etc. To augment the energy collected from the sun through a solar collector. Passive solar energy poultry system depends entirely on solar radiation. There is no auxiliary heating or external support and no complex or mechanical device like fans, dampers or thermostats.

Brooding Temperature:- Temperature regulation is one of the critical requirements of a good chick brooding. Maintenance of proper Brooding temperature is critical to the success of the Brooding operation because it impacts on body weight gain, feed conversion and mortality rate. Poultry men tend not to agree on the temperature range appropriate for the chicks in the first few weeks of life. First week Brooding temperature should be about 35°C, 31°C to 29°C in the second week, 29°C to 27°C in the 3rd and should be about 25°C in the 4th week and normal ambient temperature.

Relative Humidity:- weight, relative humidity levels can be controlled using ventilation and heating systems. High humidity may result in wet ceilings, walls, windows and litter while a very dry atmosphere will cause poor feathering. According to researchers at Academy of Sciences National Research Council, a relative humidity of 30-60% .

Brooding space:-The cage or Brooder height must allow for the birds to stand erect. According to Smith, a minimum clearance of 5 to 6 inches should be maintained over the chick’s back. The litter floor space for a broiler as adapted from is shown in Table 1.0. The floor space of the solar Brooder used is as described in the next section.

Table 1.0: Floor space requirement of a Brooder

Weeks	Floor space (cm/bird)
01	65-200
02	120-210
03	180-300
04	240-390

Materials specification: - A good solar Brooder system should be able to convert solar radiation into useful energy and store the same for utilization when needed. Hence a small sized passive solar Brooder constructed at the National Centre for Energy Research and Development, The small scale passive solar energy chick Brooder system consists of metal Copper-Cathode Electro Deposition (CED) coted tube’s. Specification is 1.42m (length) by 0.92m (width) by 0.52m (height). The brooding floor is made of wire mesh which is supported at intervals with steel bar. The wire mesh prevents the chicks

from matching on their droppings which could cause them to be affected by coccidiosis disease. Directly below the wire mesh is a poultry manure conveyor made of tarpaulin material. The conveyor facilitates the collection and easy handling of the poultry droppings. The droppings from the chicks were cleared every two days to avoid the formation of ammonia gas that can choke the birds. The solar energy collector/heat storage system is a compact unit on top of the Brooder house made of Copper sheet specification is (1.38m x 0.47m x 0.04m). The medium of solar energy transfer to water. The sides of storage system are insulated with wooden materials to reduce and prevent heat loss from the system. We are attached the Digital Thermocouple device in inlet and outlet of the system for maintaining the Temperature and also time to reduce the temperature or increase the temperature while Brooding chicks.

Digital thermometer Monitor the temperature accordingly the Brooder system every day in the morning, afternoon and late evening. A weighing balance was used to measure the daily weight of 5 randomly selected chicks and the daily average taken. Solar radiation, wind and ambient

temperature data was collected from R & D Centre.

CONCLUSION :- The results shows that the Brooding temperature range of 28-41°C could be maintained in the Brooder system used by CED coated copper tubes, this system helps to us while sunset and winter seasons also we can maintain the constant temperature. its shows that the small scale passive solar Brooder system could sustain day old chicks hence is a good heat storage and temperature moderating device for poultry Brooding operations.

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