

Thesis Title	A Development of Solar Assisted Egg Incubator
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Candidate	Mr.Charnwit Udomsakdigool
Supervisors	Asst. Prof. Dr. Sirichai Thepa Asst. Prof. Dr. Mana Amornkitbamrung
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Abstract

The objectives of this research work are to design and construct a solar incubator for using in remote areas as well as to investigate how to control its optimum operating conditions. In operation, hot water from a solar collector flows through a radiator and heat is drawn to the incubator by a fan through radiator. Humidification in solar incubator was delivered from natural evaporation. In this study, a 0.8 m x 1.00 m x 1.60 m solar incubator with capacity of 720 eggs was designed and constructed. The incubator was made of plywood, of 0.01 m thick with a 0.40 m x 0.50 m radiator installed under the incubator. A 0.30 m diameter fan was installed above the radiator with a 0.40 m x 0.30 m water tray on top. The temperature within incubator was controlled by an automatic temperature controller. A set-up time device was used to turn the eggs at a prescribed time. The electric current of the device was 12 volts obtained from six of 53-watt solar cells. The heat for incubation was produced by the solar collector which consisted of hot water tank with a capacity of 130 liters and two sets of 0.90 m x 2.00 m flat plate collector. An absorber plate was made of aluminum welded together with six hot water pipes. There were fins inside the pipe in order to increase the heat transfer area. The absorber plate was anodized in black.

From the experimental results of the pilot solar incubator with a capacity of 720 eggs, it was found that the radiator efficiency was 33.3%. The efficiency of solar collector before using hot water was 35.5%. And while using hot water for incubation it was 23.9%, at temperature of 50-70 °C. The testing results of solar cell showed that at solar intensity of 100 W/m², solar cell

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efficiency was 4% at average temperature of 31 °C. At solar intensity more than 400 W/m², solar cell efficiency was constant at 6% at average cell temperature of 45 °C.

The testing results of solar incubator showed that the temperature in the incubator was in the range of 37-39 °C, moisture of 60-80% and hatching percentage of 70%

Keywords : Solar Incubator/Solar Water Heating System/Solar Cell/Radiator