iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** XII **Month of publication:** December 2022

DOI: https://doi.org/10.22214/ijraset.2022.48034

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue XII Dec 2022- Available at www.ijraset.com

A Contrivance to Develop a Brooder for Eggs in Diminutive Scale for Domesticated Poultry

Gargi Shekhar[1], Happy Narang[2], Md. Shahbaz Alam[3], Aditya Malik[4], Sahil Shokta[5]
[1, 2]*Assistant Professor, AIST, Maya Group of Colleges, Selaqui Dehradun, 248011, Uttarakhand, India*
[3, 4, 5]*Student, AIST, Maya Group Of Colleges, Selaqui, Dehradun, 248011, Uttarakhand, India*

Abstract: ***An Egg brooder (incubation unit) was developed in Advance institute of Science and Technology at Maya Group of Colleges, Dehradun to demonstrate and evaluate the performance. The main focus of this research was to bring on a cost efficient interface for farmers to boost the outcome of poultry birds for small and marginal scale of farmers also involve in poultry production. The capacity of the incubation unit was kept 25 for trials and 6 trails were done from July, 2022 to November, 2022 with dependent variables viz. humidity and temperature. Humidity was maintained between 60% to & 70% .During the 1st week, temperature was controlled to 39.4ºC which was decreased and maintained to 38.9 ºC in 2nd and 3rd week. The eggs were turned gently by hands at 180 º side to side. In the trials the incubated eggs were seen fit enough to grow into healthy poultry birds, giving overall hatchability as 86.52%***

Keywords: Domesticated birds, egg, brooding, incubation, poultry

I. INTRODUCTION

Incubation is one of the oldest, fastest and easiest method of metamorphosing the eggs to chicks. Basically, it is a technology which gives a chance to poultry farmers to develop chicks from eggs without involving the hen. When it comes to incubating, artificial incubation units were 1st developed by Chinese and Egyptians through burnt charcoal supplying heat and brick incubators giving heat to egg rooms respectively. But in today's scenario , incubating eggs and hatching the fertile ones are done on large scale. Environmental conditions, handling, sanitation and record keeping are important attributes to be kept into account while working with incubators. Egg quality and Egg embryo survival depends on the age, ratio, health, genetic inheritance, nutrition and stress of the hen and sire. The incubator involves an incubation area which is considered as a chamber enclosed with various mechanism and controls. This area is an insulated area which prohibits the heat to escape from it. All the eggs are kept inside the chamber at proper distance for easy and better rotation of eggs. On an average, the mother hen lays 10-12 eggs and starts to brood. As soon as the brooding starts the mother hen stops laying eggs and rotates the eggs through its beak. During the natural brooding process some of the eggs get damaged and do not hatch , raising the mortality rate of the eggs. Hence, for small and marginal poultry farmers it is a great loss and becomes a need to develop such a brooding unit which requires less space, is easy to handle and has efficient control on hatching of eggs. Therefore in order resolve all the stated issues an egg incubation unit was developed in the crop research poultry farm of Maya Group of colleges. The main objective was to design and develop an incubation unit which is convenient to use and handle and reduced the mortality rate of eggs and increase the hatchability.

II. MATERIAL AND METHODS

A. Experimental Setups

For constructing the incubator, the insulated box of 54cm*39cm * 32 cm was constructed with thermocol and wood. Wood dust was kept at the floor of the box to keep the eggs and provide prolonged heating. It was installed with a temperature and humidity controller with sensor. The temperature function included automatic recognition of cooling, heating along with temperature function. The humidity function controls the humidifying, dehumidifying and humidity control function. The 112 v DC fan was installed for uniform distribution of heat all over the incubator box. A normal 40 W, 230 V bulbs was used for heating the chamber of incubation box. Two AC/DC power socket adaptor was installed to transform 110-240V AC from wall plug into 12 V DC. A humidifier was used which had atomizing head with input voltage of 24V and input current of 0.8 A. It had maximum evaporation of 350 ML/h for 4-9 cm depth of working at 1-50 ºC temperature along with water consumed for 75-80 ml/h and mist diameter of 4.5cm with approximate 4 cm of mist height.

©IJRASET: All Rights are Reserved



Figure 2.1. The egg brooding unit made and over all circuits established for efficient working.



Figure 2.2. Egg Brooding unit made for small scale poultry farmers



Figure 2.3 hatching of Eggs after 21 days of Incubation.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

Table 2.1. Major specification of Incubator unit

Sr. No.	Specification	
1	Egg Capacity	25
2	Dimension of box	54cm*39cm * 32 cm
3	Weight	4kg
4	Power Supply	12V
5	Voltage	230V

In operation mode, if the temperature gets below the room temperature, light is turned on which lights up till the desired temperature is attained. As soon as the desired temperature is accomplished the fan is turned on and the light goes off. The eggs are so rearranged that the turning of eggs can be easily done side by side at 180˚, end to end turning is avoided. On 9th day of incubation, candle test is performed. This candling system is a process through which the infertile and dead eggs are detected and removed from the lot. It helps to determine the development of embryo to chicks but should be stopped before 18th day as growing eggs should not be disturbed in 3rd week i.e. after 18th day. It is important to remove the dead and infertile egg from the incubator as it evolves superfluous gases which are undesirable for the environment of incubator. The Hatchability percentage of eggs was calculated through following formula:

$$\textbf{Hatchability (\%)} = \frac{No.of\ Hatched\ eggs}{No.of\ Fertile\ eggs} * 100$$

III. RESULTS AND DISCUSSION

The outcome of the egg incubator unit was calculated on basis of 6 trials which were performed from the month of July 2022 to November 2022. The temperature was kept 39.4˚ C in the 1st week and the humidity was 65%, during the 2nd and 3rd week, temperature was maintained at 38.9˚ C and humidity was increased to 70%. The egg was turned at 180˚ manually for uniform distribution of heat all over the eggs.

Table 3.1. the outcomes of Egg incubator test in 6 trials from the month of July to November

No. of Trial	Date of Trials	Total no. of eggs kept in Incubator unit	No. of fertile eggs	No. of Infertile/dead eggs	No. of Hatched Eggs	Hatchability %
1	3-7-2022 to 23-7-2022	25	22	3	18	81.82
2	25-7-22 to 14-8-2022	25	23	2	19	82.60
3	15-8-2022 to 4-9-2022	25	22	3	19	86.36
4	5-9-2022 to 26-9-2022	25	22	3	20	90.91
5	26-9-2022 to 16-10-2022	25	21	4	19	90.48
6	17-10-2022 to 6-11-2022	25	23	2	20	86.95
Average of all 6 trials was calculated as :						86.52

IV. SUMMARY AND CONCLUSIONS

The above stated unit worked very effective between the range of 65-70 % of humidity when the temperature was maintained at 39.4˚ C in the 1st week and 38.9˚ C in the 2nd and 3rd week. The hatchability percentage of eggs in 6 trials were found to be 86.52% which depicted that the above designed and constructed egg brooder was suitable for small and marginal poultry farmers. The egg brooder unit was found a cost efficient and was very easy to handle. Also it required less space which made it very proficient for small scale mass production of poultry eggs. It was recommended for different domesticated birds of similar range like duck which is a popular poultry bird in India.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

REFERENCES

[1] Abiola SS (1999). "Effects of turning frequency of hen's eggs in electric table type incubator on weight loss, hatchability and mortality". Niger. Agric. J. 30: 77-82.

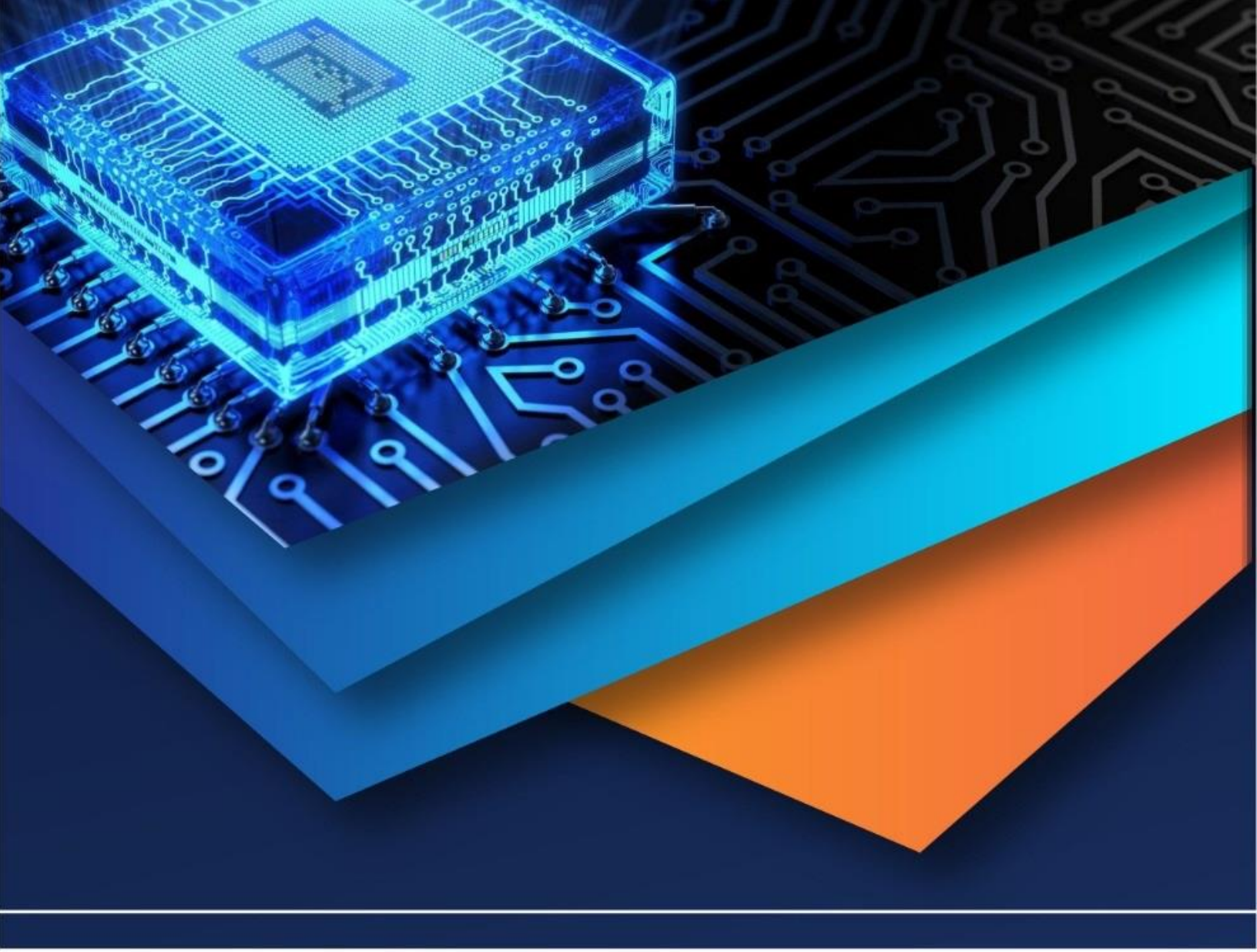
[2] Ajani Adegbenro Sunday, Olusoji Amos Ogunbode , Egbeyale Godwin Babatunde, Adeniji Muyideen Olalekan,2020, "Design And Construction Of Automated Eggs Incubator For Small Scale Poultry Farmers",Volume V Issue VII, August 2020

[3] K. Radhakrishnan, Noble Jose , Sanjay S G , Thomas Cherian, Vishnu K R, 2014, "Design and Implementation of a Fully Automated Egg Incubator",International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (An ISO 3297: 2007 Certified Organization) Vol. 3, Issue 2, February 2014.

[4] Okpagu, P. E. & Nwosu, A. W ,2016,"Development And Temperature Control Of Smart Egg Incubator System For Various Types Of Egg", European Journal of Engineering and Technology, Vol. 4 No. 2, 2016

[5] M. F. Omar, H. C. M. Haris, M. N. Hidayat, I. Ismail, M. N. Seroji, 2015, "Smart Eggs Incubator System" DOI 10.5013/IJSSST.a.17.41.35, ISSN: 1473-804x online, 1473-8031 print.

[6] Pallavi Bhosale, Jagriti Tripathi, Hemant Gillurkar, Veena Barapatre, Priyanka Ramteke, Rahul Burange,2018, "Development of Smart Egg Incubator System Using Arduino", International Journal of Engineering Science and Computing, March 2018.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)