Effect of thatched poultry housing system on egg production in Konkan

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Abstract
The relative humidity variation during raining season was found to be in the range of 82% to 98%. The average temperature difference between inside and outside poultry structure was about 0.7 °C. The Relative humidity and temperature before thatching roof in sunny days showed that the average temperature difference between inside and outside poultry structure was 1.1°C. The Relative humidity and temperature after thatching roof in sunny days showed that the average temperature difference between inside and outside poultry was 2.4 °C. Thus, it was observed that after thatching the inside temperature was reduced considerably. The egg production after thatching roof was increased to the tune of 0.5 per cent which was reduced by 1.94 per cent.

Keywords: Thatched, humidity, raining, cashew, Konkan

Introduction
The Indian poultry sector is characterized by its industrialization, faster growth in consumption and trade than any other major agricultural sectors in the world. Today, India is the third largest egg producer in the world and the nineteenth largest broiler producer. India's contribution to world's egg and chicken meat production is nearly 5.3% and 2.53%, respectively (FAO, 2010a), whereas poultry sector contributes about 1% to national GDP and 11% of total livestock GDP in India. The estimated rate of growth in layers is 6-7% per annum and 10-15% for chicken meat. Thus, poultry development in the country has shown steady progress over the years. Along with this, poultry plays an important economic, nutritional and socio-cultural role in the livelihood of poor rural households in many developing countries, including India.

The most obvious constraint on poultry production is the climate. Poultry bird seems to be particularly sensitive to temperature associated environmental challenges, mainly heat stress. High temperature, especially when coupled with high humidity, imposes severe stress on birds and leads to reduced performance. Both of the climate change and poultry productions have always negative impacts one over the other.

The proportion of heat lost through radiation, conduction, and convection depends upon the temperature difference between the bird and its environment. The bird loses heat from surfaces such as wattles, shanks, and un-feathered areas under wings. The purpose of poultry house ventilation is to maintain a high enough air velocity or a low enough temperature in the house that the birds can maintain body temperature by sensible heat loss.

Heat stress interferes with the broilers comfort and suppresses productive efficiency, growth rate, feed conversion and live weight gain (Yalcin et al., 2001). Bouchillon et al. (1970) developed the mathematical model indicates that as the ambient temperature approaches chicken body temperature, all heat rejected by the chicken must be in the latent form. Consequently, for ambient temperatures near 41 °C, the relative humidity of the ambient air was a critical factor in heat rejection from the chicken. Yalcin et al. (1997) conducted study to examine the broiler production in tropical and subtropical regions. Body temperature was measured twice on three birds per sex per pen, 16 h and immediately before slaughter, and feather weight was determined for each of these birds. They found that the season effect was largest (33.5%) on body weight gain from 4 to 7 week, along with 23% and 15% reductions in feed consumption and efficiency, respectively, during these 3 weeks. Khan and Sardar (2005) studied the effect of vitamin C supplementation on the performance of desi, fayoumi and commercial white leghorn chicken exposed to heat stress in which they concluded that during summer, egg production fallen to as low as 30%.
Nardone et al. (2010) studied the effects of climate changes on animal production and sustainability of livestock systems from which it was concluded that the hot environment impairs production (growth, meat, egg yield, weight and quality) and reproductive performance, metabolic and health status, and immune response. Toguyeni et al. (2012) discussed on the influence of roof insulation involving local materials on cooling loads of houses built of clay and straw showed that the clay-straw mixture reduces the air conditioning load by about 8% compared to clay walled houses. Narwaria et al. (2017) found that by thatching the roof alone reduces heat stress to a greater extent in the tropical region.

Material and Methodology
The study was carried out in poultry structure situated at Shrigaon, Dist.-Sindhudurga. The building orientation was in the east-west direction. The poultry house was of size 24 m x 10 m. The Side wall height was 2.5 m and height at the center was 3.2 m. The ventilation was through windows with total ventilation area from side walls was about 88%. The asbestos sheeted roof slope was 35°. Roof overhanging on all sides was 0.70 m. The numbers of bird were 1500. Feeders and waterers are attached to cages from outside, except nipple waterers, for which pipeline is installed through or above cages. The type of cage used in the poultry was multiple bird cage (2 to 4) based on the arrangement M-type stair stage cage. Double deck and layer cage are used. The birds used in the poultry are white leghorn. Egg production of white leghorn is about 280-320 numbers per year per bird and the life span is about 80 weeks. The birds were purchased at the cost of Rs. 40 per bird. The floor space required for the bird varies according to age. The feed used for the bird throughout the study was Layer Crumbles PH-1. The quantity of feed rate was 100gm/bird.

The thatching material on roof was paddy straw a light weight material. The thatch was laid, to a total minimum thickness of 150 mm. Each successive layer conceals the poplar stick or wire that secures the previous layer. As thatching proceeds a layer of selected stems is spread evenly on the roof battens to a thickness of about 12 mm. The instruments used for measurement of microenvironment were Hygrometer and Thermometer. The readings were taken 3 times per day for ten days in rainy and summer season before and after thatching roof to check the inside and outside temperature and relative humidity. The number of eggs was counted daily.

Results and Discussion
The data of measured environmental parameters viz. indoor and outdoor Temperature (°C) and relative humidity (%) of Poultry house is revealed in Table 1.

Table 1: Observations of microenvironment and egg production

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<tr>
<th>Day</th>
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<th>Rh (%)</th>
<th>T\text{inside} (°C)</th>
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"481"
Relative humidity and temperature before the thatching in rainy season: Table 1 and Fig 1 and Fig. 4 showed that as temperature outside poultry structure was increased the relative humidity inside poultry structure decreased. The observed inside day time temperature of poultry structure varied from 22 °C to 28.5 °C. The highest outside temperature was 28 °C and corresponding inside temperature was 26 °C. The atmospheric relative humidity was varying from 82% to 98%. The average temperature difference between inside and outside poultry was about 0.7 °C. The temperature inside the poultry was almost uniform throughout the rainy days and thus any cooling treatment was not required in the poultry.

Relative humidity and temperature before thatching roof in sunny days
Table 1 and Fig. 2 and Fig. 4 showed that the observed inside day time temperature varies from 23 °C to 29 °C. The highest outside temperature was 30 °C and the corresponding inside temperature is 29 °C. The atmospheric relative humidity was varying from 60% to 96%. The average temperature difference between inside and outside poultry was about 1.1 °C. The rise in temperature in the poultry showed that the cooling is required.

Relative humidity and temperature after thatching roof in sunny days
Table 1 and Fig. 3 and Fig. 4 showed the observed inside day time temperature varied from 22°C to 28.5°C. The highest outside temperature was 32°C and the corresponding inside temperature was 28°C. The atmospheric relative humidity was varying from 40% to 92%. The average temperature difference from the inside and outside poultry is about 2.4°C. Thus, it was observed that after thatching the inside temperature was reduced considerably.
Fig 3: Temperature of poultry structure after thatching roof in summer

Fig 4: Comparative relative humidity of poultry structure

Egg production
Table 1 and Fig. 5 showed that the average eggs production during rainy season was 1268 eggs while it reduced to 1243 eggs during summer before thatching roof. After thatching the roof the temperature was reduced and average egg production was increased to 1248 eggs. Thus, thatching was having a positive impact on egg production.

Fig 5: Egg production in poultry
**Conclusion**

It was concluded from the study that after thatching the roof, the temperature inside poultry structure decreased. Consequently, the egg production after thatching roof was increased to the tune of 0.5 per cent which was reduced during summer by 1.94 per cent.

**References**