# EVALUATION OF RELATIVE HUMIDITY OF AIR IN PROTOTYPES OF POULTRY FACILITIES FOR BRAZIL IN WINTER CONDITIONS

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Brazil possesses the third largest aviculture industry in the world and one of the smallest production costs of chicken meat, but little attention has been given to the planning phases and architectural conception of the poultry facilities. The quantification of alternatives for improvement of the thermal comfort, studied in reduced models, as well as the ideal scale for those prototypes, is still incipient for poultry facilities in the Brazilian conditions, since most of the research on this subject has been developed for temperate climate areas. The objective of this work was to test three different small scales prototypes of poultry facilities and three different types of coverings, and its influence on the relative humidity of the inside air during winter conditions.

This work had its experimental phase accomplished in the experimental area of University of Viçosa, during the period of June to July of 2000. The nine prototypes used represented the characteristics of a poultry facility for broiler chickens, following international patterns that have been globally adopted. The structures of the prototypes were made out of wood. The sides orientated north-south were open, while the other sides, which were orientated east-west, were closed with a plate of corrugated cardboard. Three different scales were tested: 1:10, 1:8, 1:6 and three different types of roof covering were used: ceramic roofs, aluminum roofs and tile of zinc with expanded polystyrene. During the experimental period, data were collected daily, for ten days, every two hours from 8:00 a.m. to 6:00 p.m. The data of temperature of dry and humid bulb inside of the prototypes, in order to calculate relative humidity were collected at height of 0.30 m.

Table 1 shows the relative humidity for each type of covering and scale of the prototype. It was observed that with ceramic tile coverings there were differences in relative humidity between the different scaled prototypes, with the value for the 1:6 scale being within the recommended range. Relative humidity in the 1:8 and 1:10 scales were above recommended values. Relative humidity did not differ between the different scaled prototypes when the roof coverings were aluminum or zinc with expanded polystyrene, and values were within recommended range. The same didn't happen with the values obtained inside the prototypes with covering of ceramic tile, that presented values above recommended.

**Table 1. Average of relative humidity (RH) related to the interaction facility x scale**

| Coverings | Scales: | 1:10 | 1:8 | 1:6 |
|---|---|---|---|---|
| Ceramic | | 78.4$^{ab}$ | 84.7$^{a}$ | 68.3$^{ac}$ |
| Aluminum | | 68.8$^{ab}$ | 66.4$^{ab}$ | 67.1$^{a}$ |
| Zinc With Expanded Polystyrene | | 68.3$^{ab}$ | 67.6$^{ab}$ | 67.0$^{a}$ |

Values within rows with the same superscript are not significantly different at P>0.05

The lowest relative humidity was found inside the prototypes with roof tiles of zinc with expanded polystyrene happened, probably due to the good thermal insulation compared to the other coverings. This value of relative humidity is within the range recommended for the poultry, according to Tinôco (2001), and it appears that roof covering of zinc with expanded polystyrene was the best type for the analyzed conditions. The scale that was most suitable for this was 1:6.

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