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EFFICIENCY OF VENTILATION EXISTING IN SOME POULTRY HOUSES AT BEHERA AND ALEXANDRIA GOVERNORATES

(With 3 Tables)

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كفاءة التهوية في بعض مزارع الدواجن في محافظتي البحيرة والاسكندرية

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درست كفاءة التهوية في ٣١ مزرعه دواجن (١٦ بياض ، ١٥ بلدى) منتشرة في محافظتي البحيرة والاسكندرية وجد أن متوسط درجة الحرارة (م°) الرطوبة النسبية (٪) ، كمية الأمونيا(جزء في المليون) نسبة غاز ثاني أوكسيد الكربون (٪) كانت ٥ر٢٥ ـ ٩ر٥ه ، ٩٨ر٧٠ + ٩ر١٠، ٣ر١٠ + ٣ر٠٤، ٠٨ر٠ + ٠٢ر٠ على الترتيب . ومن ناحية أخرى وجد أن هذه النتائج كانت متقاربة في كل من مزارع الدجاج اللبياض والبدارى. ولوحظ أن هذه القيم تقع في حيز الحد المسموح به في مزارع الدواجن وتدل على كفاءة التهوية داخل مساكن هذا الدجاج مما ينعكس على راحة وصحة وانتاج هذا الدجاج.

SUMMARY

The efficiency of ventilation in 31 poultry houses (16 for layers and 15 for broilers) located at different localities at Behera and Alexandria Governorates was studied. It has been found that the mean values of ambient temerature (°C), relative humidity (%), Ammonia (ppm) carbon dioxide (%) were 25.5±5.9; 70.48±10.9; 10.3±3.03 and 0.08± 0.02 respectively. On the other hand, a nearly similar results were obtained in the investigated layers and broiler houses.

Such concentrations and values provide an evidence of the efficiency of ventilation which have a good effect upon the comfort of poultry health and production.

INTRODUCTION

Economic poultry production is based on the capacity of flock to maintain a state of equilibrium with its environment. Accordingly, the micro-climate has to be adjusted for the requirements of the species, age group and production purposes at the lowest possible costs.

SMITH (1974) stated that the reliable index in judging the efficiency of ventilation in a livestock habitation is the carbon dioxide. In the same year (1974) KOMAROV and SEMEROV recommend a permissible limit of carbon dioxide ranged from 0.01 to 0.09%.

REECE and LOTT (1980) observed decreased body weight among broiler chickens when exposed to 12000 ppm of CO_2. VALENTINE (1964) reported that ammonia was considered as a predisposing factors for keratoconjunctivitis and tracheitis when the concentration reached 60-70 ppm. Moreover, CHARLES and PYNE (1966) stated that food intake and growth rats were decreased when the concentration of NH_3 reach up to 100 ppm. DENDY (1973) found that ammonia concentration above 200 ppm in broiler houses caused irritation of mucous membranes of eye and respiratory tract.

REECE et al. (1980) stated that increased NH_3 in broilders houses reduced the weight gain, food conversion and increased mortality rate.

ASAJ et al. (1970) proved that temerature and relative humidity in poultry hosues will influence the metabolism which is directly reflected on the production.

JACK and BLUM (1978) reported that high environmental temperature had an adverse effect on food intake, egg production, egg quality and body weight gain.

DOSOKEY (1981) stated that the bacterial counts were affected by the change in the environmental conditions as temperature and relative humidity. So this work, was performed in order to expose the sanitary faults in ventilation efficiency which may reflexed on the comfort, helth and production of poultry living in the property.

MATERIAL and METHODS

The efficiency of ventilation of 31 poultry houses located at Behera and Alexandria Governorates which include 16 farms for layers and 15 farms for broilers as illustrated in Table (1) was studied in connection with the following considerations:

(1) **Air Temperature (°C):**
The ambient temperture was recorded inside each house by mean of ordinary thermometer (0-100).

(2) **Relative Humidity (%):**
Relative humidity was determined by changing the Hair hygrometer above the floor level by one meter.

(3) **Carbon Dioxide Content:**
Determination of carbon dioxide content inside the poultry houses according to TAYLOR (1958).

(4) **Ammonia Content:**
The method recommended by AOAC (1975) was used to determined the concentration of ammonia inside poultry houses.

Broilers were reared on deep letter system with gas heaters and a floor area of 0.47 m^2 for each bird. On the other hand, laying birds were reared on laying battaries with gas heaters and a floor area of 0.5 m^2 for each laying hen.

RESULTS

Results presented in tables (1, 2 & 3).

Table (1) : Numbers and localities of the investigated poultry farms.

Type of farm	No.	Locality
Layers	2	Fac. of Agric.
	10	El-Nubaria Co.
	4	Kafr El-Dawar
Broiler	2	Fac. of Agric.
	7	El-Nubaria Co.
	2	Kafr El-Dawar
	4	El-Amyria
Total	31	

Table (2) : Mean values of micro-climatic conditions inside poultry houses.

Variable	Temp.°C	R.H.%	NH_3 (ppm)	CO_2%
Max.	35	91	16	0.5
Min.	10	44	3	0.01
Mean	25.5±5.9	70.48±10.9	10.3±3.04	0.08±0.02

Table (3): Mean values of micro-climatic conditions inside both layers and broilers farms.

Type of birds	No. of houses	Temp. (C) Max.	Min	Mean	R.H. (%) Max.	Min.	Mean	NH_3 (ppm) Max.	Min.	Mean	CO_2 (%) Max.	Min.	Mean
Layers	16	35	10	25.32+6.7	89	52	72.3+9.3	16	3	10.19+3.6	0.5	0.02	0.12+0.02
Broilers	15	34	19	25.67+5.3	91	44	68.6+12.7	15	7	10.4+2.3	0.07	0.01	0.06+0.01

DISCUSSION

The figures presented in Table (2) revealed that the ambient temerature inside poultry houses were ranged from C 10-35°C with an averge of 25.5±5.9°C which is suitable for poultry; since it lies within the comfort zone recommended by MILLIGAN and WINN (1964) who stated that the average favourable temperature inside poultry houses was between 15 and 27°C. On the other hand, the mean ambient temperature inside layer and broiler houses were found to be 25.32±6.7 and 25.67±5.3°C, respectively (Table 3). These figures are considered to be higher than the recommended temperature by SAINSBURY (1980). However, at high ambient temperature, a considerable heat loss through vapourization was recorded and consequently poultry consumed a large quantity of water, the rate of both egg production, egg weight and body gain were decreased which might be due to high respiratory rate through increased, dropped wings and loss of appetite (TRIPATHI, 1974 and PETERSON et al., 1976).

The data presented in Table (2) reveal that the average value of relative humidity determined inside the poultry houses was 70.48±10.9% which is higher than those reported by PETERSEN et al. (1976) and AMIN (1979). Moreover, the mean values of relative humidity inside the investigated layers and broilers houses were 72.3±9.3 and 68.6±12.7%, respectively (Table 3). No harm was observed when the relative humidity varied between 35 and 75% however, it becomes dangerous when accompanied with high environmental temperature which lead to lowering in growth rate and high mortality among the birds (PETERSEN et al., 1976). On the other hand, when the relative humidity becoms as below as 30% may aggrevate infection and helps contagion (SAINSBURY, 1980).

The concentrations of ammonia in investigated poultry houses are presented in Table (2). However, its mean value (10.3±3.4 ppm) which lies within the permissible limits recommended by LILLE (1970) and KLING (1971) for poultry houses. In additions, the mean values of ammonia content inside layer and broiler houses were 10.19±3.6 and 10.4±2.3 ppm respectively (Table 3). These levels are considered satisfactory in laying and broiler houses as recommended by LILLIE (1970) and KLING (1971) and SAINSBURY (1980) who stated that the concentration of ammonia inside poultry houses were acceptable between 15 and 20 ppm. It has been found that a high ammonia content inside poultry houses can lead to lowering egg production, and redndering them more suspectible to the infection on account of lowering their body resistance as a result irritation of the mucous membrane of the upper respiratory tract and eyes (SAINSBURY, 1980).

The percentage of carbon dioxide in the atmospheric air of poultry houses was considered by SMITH (1974) and QUARLES and KLING (1974) as a result index in judging the efficiency of ventilation. In the present study, it has been found that the 0.08±0.02 which is lower than those recorded by ZAHRAN (1981) however, lies within the permissible limit rcommended by KOMAROV and SEMENOV (1971) which varied from 0.01 to 0.09%. In addition, the average concentration of carbon dioxide inside the investigated

laying and broiler houses were 0.12±0.02 and 0.06±0.01%, respectively (Table 3). High carbon dioxide content not only increase the rate of respiratory but also responsible for spreading of respiratory infections due to the reduction in body resistance and damage some cillia of the upper respiratory tract (ANDERSON et al., 1966).

From the above mentioning results, it can be concluded that the extent of ventilation inside the investigated poultry farms was efficient since the excretion and droppings of birds are removed from time to time for the purposes of cleaning so no decomposition of the droppings as well as evaporation of water concent. This can occurred under the supervision of trained personnel to avoid the beid effect of ambient temperature and, relative humidity upon the birds and also minimize their effect upon the viability of the micro-organisms inside the poultry houses.

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