EFFECT OF MICROCLIMATIC CONDITIONS AND SOME AIR POLLUTANTS INSIDE A POULTRY HOUSE ON MICROBIAL AIR LOAD AND BROILER PERFORMANCE

By

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SUMMARY

The effect of microclimatic conditions (air temperature, R.H. and air speed) and some air pollutants (Co2, ammonia and total dust concentration) on microbial air load inside poultry house and bird's performance was studied during three fattening periods.

The overall means value of air temperature was higher during the first fattening period (31.7 ± 3.9 °C) than during the 2nd and the 3rd fattening periods (26.06 ± 5.3; 23.1 ± 5.03 °C), respectively with a significant difference (P < 0.05). On the other hand, the overall mean values of relative humidity (R.H.) (75.4 ± 5.2 %), air speed (0.66 ± 0.37 m/sec.) and ammonia (25.5 ± 5.06 mg/L) inside the broiler house during the 3rd fattening period were higher than during the 1st and 2nd fattening periods. CO2 attained its higher values during the first fattening period (0.98 ± 0.31 mg/L). Also, the highest mean values of total dust concentration in air of the broiler house was recorded during the 1st fattening period (14.03 ± 2.6 mg/m3). The highest mean values of total bacterial and fungal counts in air of the broiler house (41.38 ± 1.54 CFU X 10^6; 0.54 ± 0.21 CFU X 10^3 , respectively) were attained during the 3rd fattening periods. Concerning the isolated bacteria from air of the broiler house, Staph. aureus, Strept.faecalis and Salmonella Spp. were isolated more frequently during the first fattening period than the 2nd and 3rd periods, while Strept. avium, E. coli, Pseudomonas Spp., Proteus Spp. and Klebsiella Spp. were isolated more frequently during the 3rd fattening period. Mycoplasma Spp. was isolated only from air of the broiler house during the 3rd fattening period where air temperature was much cooler and R.H. was much higher. Aspergillus Spp., Fusarium Spp., Monilia Spp., Mucor Spp., Penicillium Spp., Cladosprium Spp. and Streptomyces Spp. were isolated more frequently from air of the broiler house during the 3rd fattening period than the 1st and 2nd periods where more suitable conditions of temperature and humidity were

existed. Concerning the broiler performance, our results revealed that the highest mean values of final body weight and total gain of broilers were attained during the 2nd fattening period where the microclimatic conditions, air pollutants and microbial air load were moderate or the minimum. The mortality % was also the lower during the 2nd fattening period.

INTRODUCTION

The environment maintained in broiler houses has a major impact on the health and performance of broiler chickens. Caretakers are increasingly challenged in the operation of systems designed to remove both respired and excreted moisture and gases produced by the birds under management schemes where kilograms of meat produced per square meter continuous to escalate (Weaver and Meijerhof, 1990). The environmental conditions required by poultry including the microclimatic conditions, air, drinking water as well as the litter above which the are (Sotohy, 1989). The release of heat moisture and carbon dioxide in houses for broilers is influenced by the indoor air temperature, but indoor relative humidity also affects the partition between sensible and latent heat. Air velocity in the surroundings will also affect the release of sensible heat by convection (Von Wachenfelt et al., 2001). Aerosol concentrations are affected by changes in air temperature, relative humidity, ventilation rate, stocking density, bird activity, type of bird, bird age, type of food, feeding method and time of day (Yader and Von Wicklen, 1988).

High concentration of noxious gases such as CO2 and ammonia which result from respiration and from decomposition of excreta can cause ocular lesions, gross and histopathologic damage to the respiratory tract and depressed growth and food consumption in poultry (Curtis and Drummond, 1982). Dust and microorganisms, polluting the air in poultry houses are widely considered to be the principle risk factors for respiratory diseases (Clark et al., 1983). Poultry house dust is composed of feather and skin debris, food, litter and fecal material, all of which may be carriers of fungi, bacteria or viruses. Hartung (1992) explained that the effect of dust and airborne microorganisms on the health of man and animals could not be strictly separated because both form of the particles are inhaled. Their impact can be described as mechanical, chemical, infectious, immunosuppressive, allergic and toxic. More than 80% of the airborne microorganisms found with

poultry are Staphylococci and Streptococci. Fungi, moulds and yeast can form more than 1% and coli-type bacteria about 0.5% of the total aerobic count (Hartung, 1992). The importance of good quality litter for rearing broilers on the floor has been well recognized. Sotohy (1989) concluded that the litter plays an important role in the epidemiology of poultry diseases and transmission of these diseases occur through contamination of food and water with litter or even by inhalation of dust particles from contaminated litter.

The purpose of this study is to evaluate the effect of microclimatic conditions and some air pollutants on microbial load of air and broiler performance in a broiler house under various climatic conditions.

MATERIALS AND METHODS

Approximately 4000 pullets (cob) from the age of 1 day till 50 days were reared in a broiler house situated in an desert area and belonged to the Faculty of Agriculture, Fayoum branch, Cairo University. The house of a conventional type and measured 37.5 length X 10-m width. The height of the house is 3 m, while 2.5 at sidewalls. The ridge opening is 0.3-0.4 m wide with an adjustable baffle to control ventilation. The longitudinal axis of the house is in the northeastern direction. The husbandry of the birds followed normal practices, birds fed ad libitum from open chain feeders, the litter composed of hydrated lime and straw. The photoperiod was initially 23 hours and reduced weekly until a day length of 9 hours at the fifth week. The broiler house was investigated after repeated complain of respiratory disorders. Collection of samples was started before introducing of baby chicks to the cleaned and disinfected house. The collection of samples continued a day weekly (at 7 a.m. and 3 p.m.). After the chicks being placed in the house throughout the fattening periods, first (mid July-end of August) 2nd (mid September end of October), 3rd (January mid February). Indoor air temperature, relative humidity and air velocity were recorded by using Ordinary thermometer, hair hygrometer and air anometer, respectively.

Air samples were taken in the center of the house at 10 15 cm above floor level, which was within the birds breathing zone. CO2 and ammonia concentrations in the outlets of air were measured according to Conceicao et al. (1989).

The total concentration of airborne dust was measured according to (Wathes and Randall, 1989) with an optical particle counter.

Microbial examination of air: Air samples were collected by liquid impinger at the rate of 20 L/min. for up to 10 minutes.

1) Total bacterial count was carried out according to Cruickshank et al. (1980).

2) Isolation of pathogenic and potentially pathogenic bacteria was carried out according to Corry (1979).

3) Detection of Mycoplasma Spp was performed according to Sabry (1968)

4) Total fungal count was done according to Madelin and Wathes (1989).

5) Identification of the isolated fungi was carried out according to Schipper (1978).

Statistical Analysis of the results was carried out according to Snedecor (1960).

RESULTS AND DISCUSSION

The internal environment of poultry buildings is complex dynamic system influenced by many contributory factors (Al Homidan et al., 1997). A number of these impact on bird health, behavior and productivity.

The obtained results in table (1) show the measurements of the microclimatic data, air pollutants as well as total bacterial and fungal counts bin the broiler house during three fattening periods. The mean values of the recorded indoor air temperature were (31.7 ± 3.9; 26.06 ± 5.3 and 23.1 ± 5.03 °C) for the three fattening periods, respectively. ANOVA test revealed a significant difference ($P< 0.05$) in air temperature of the broiler house between the three fattening periods, which might affect the bird performance, air quality and microbial air load inside the broiler house. The temperature can have a significant effect on bird performance. Van Wachenfelt et al. (2001) noticed that the indoors dry bulb temperature influences the release of heat, moisture and carbon dioxide in houses for laying hens. Studies conducted to determine microbial air load is related to elevated indoor temperatures inside poultry confinements (Petersen et al., 1978; Wathes et al., 1991). R.H. Plays important role in litter condition, ammonia levels, growth and carcass quality for broiler chicken. The mean values of R.H.

inside the examined poultry house during the three fattening periods were (60.5 ± 4.7; 65.9 ± 4.5 and 75.4 ± 5.2 %), respectively. While R.H. affects the partition between sensible and latent heat, elevated levels of R.H. significantly increase caking and litter moisture. Moreover, NH3 concentrations increased with increasing RH. Poor litter conditions have been also associated with lowered carcass quality and increased leg and foot abnormalities (Weaver, 1990).

The mean values of air speed in the examined broiler house were (0.57 ± 0.23; 0.65 ± 0.29 and 0.66 ± 0.37 m/sc.) for the three fattening periods, respectively. The initial concern when increasing the velocity of air movement over birds is its effect on the thermoregulation and consequently its possible influence on performance. Simmons et al. (2003) indicated that significant improvements were noted in body weight gain and feed gains for increased air velocities from 4 to 5 and 5 to 6 week of age.

Ammonia is a highly irritating colorless gas and at concentration of up to 50 PPM during the first 28 days period adversely affects weight gain, feed conversion, body weight and mortality rates (Reece et al., 1980). The mean values of ammonia in air of the broiler house were (14.4 ± 4.2; 12.9 ± 4.4 and 25.5 ± 5.06 mg/L, respectively) during the three fattening periods. It is likely that the ammonia concentrations in the broiler house could be greater towards the end of the crop, especially where litter management was poor. However, our results showed that NH3 concentration was higher during the 3rd fattening period than the 1st and 2nd periods. This is probably due to the wetting of the litter as winter ventilation was half that in summer.

Concerning CO2 concentration in the broiler house during the three fattening periods, their mean values were (0.98 ± 0.31; 0.73 ± 0.24 and 0.88 ± 0.28 mg/L), respectively. There was no significant difference in CO2 concentrations during the three fattening periods, which were within the tolerable limits. Harwood and Reece (1974) found that average CO2 level ranged from 2000 – 3000 PPM during the first weeks of brooding broiler chickens and stated that CO2 concentration is considered as a reliable index of judging the efficiency of ventilation in livestock habitations.

Hartung (1992) defined dust as dispersed particles of solid matter in gases, which arise during mechanical processes or have

been stirred up. About 85% of the dust inside livestock housing consist of organic matter that contain large numbers of microorganisms. The mean values of total dust concentration measured in the broiler house were (14.03 ± 2.6; 6.1 ± 1.9 and 6.16 ± 1.37 mg/m^3) during the three fattening periods, respectively. These results agreed with those reported by (Wathes et al., 1991 and 1997; Noll et al., 1997), but lower than that recorded by Al Homidan et al. (1997). Our results indicated that dust concentration during the 1st fattening period (July – August) was higher than during the 2nd period (September –October) and the 3rd period (January – February). This finding coincided with that of Nakaue et al. (1980) who reported that dust concentrations in commercial broiler house during the summer were higher than in winter. The detected high concentrations of dust inside the broiler house might reflect its poor air quality with its effects either on human or bird health and performance. Parry et al. (1987) explained that large amount of dust may cause over loading of the clearance mechanisms in the respiratory passages and mechanical irritation which facilitate the beginning of infection.

The data presented in table (1) also revealed that the mean values of the total bacterial count of air inside the examined broiler house during the three fattening periods were (20.6 ± 0.75; 10.7 ± 0.58 and 41.38 ± 0.54 cfu X 10^6/L), respectively. These results indicated that the higher bacterial counts were recorded during the 3rd fattening period (January – February), where the means of indoor air temperatures and relative humidities were (23.1 ± 5.03 °C and 75.4 ± 5.2%, respectively). These results agreed with those previously recorded by Zahran (1981); Sotohy (1989) and Wathes et al. (1991). This can be referred to the ill ventilation during the relatively cool weather during the 3rd fattening period together with elevation of R.H. On the other hand, during hot weather birds tend to minimize their movements inside the broiler house, that quite conditions help in preventing stirring of dust containing microorganisms in air. Provision of good ventilation during hot weather seems to have a great effect on the bacterial count by reducing R.H. and increasing the rate of clearance.

Concerning the fungal counts of air inside the broiler house, the mean values of fungal counts during the three fattening periods were (0.15 ± 0.05; 0.54 ± 0.21 and 1.71 ± 0.54 cfu X 10^3/L), respectively. Nearly similar results were obtained by Wathes et al.

(1991), while Madelin and Wathes (1989) recorded higher fungal counts in the air of a broiler house. Dennis and Gee (1973) stated that the primary source of airborne fungi in a deep litter pullet house is the litter and species change according to PH value, moisture content and composition. Our results indicated that the highest mean value of total fungal count was detected in air of the broiler house during the 3rd fattening period. Meanwhile, the highest mean values of R.H. (75.4 ± 5.2%), NH3 (25.5 ± 5.06 mg/L) and CO2 (0.88 ± 0.28 mg/L) were recorded during the same fattening period. Wathes et al. (1991) observed that the concentration of both respirable and non-respirable mesophilic fungi was positively correlated with relative humidity, CO2 and ammonia but not with temperature.

Table (2) represent the effect of microclimatic conditions inside the broiler house on the distribution and frequency of the isolated bacteria. Our results showed that the most frequent bacteria recovered from air of the broiler house during the three fattening periods was Staph. aureus. In addition to these, Strept. avium, strept.faecalis, E. coli, Mycoplasma spp., Salmonella Spp., Psuedomonas Spp, Proteus Spp and Klebsiella Spp. were also isolated. These results agreed with those of Ahmed et al. (1984); Madelin and Wathes (1989) and Sotohy (1989). Sotohy (1989) concluded that the demonstration of pathogenic and potentially pathogenic bacteria in air constitutes the most direct proof of dangerous impurity, since air is considered as one of the most important environmental components that maintaining the infection cycle inside poultry houses. Staphylococcus aureus is the commonest cause of synaovitis and artheritis and is considered as an etiologic agent in cases of wound infection, septicemia, omphalitis and endocarditis (Muller, 1974). Streptococcus faecalis cause acute streptococcal septicemia in chicken with loses up to 50% and indicates bad hygiene of poultry house (Ahmed et al., 1984). E. coli is responsible for various diseases causing major economic loses in the poultry industry including colibacillosis, coligranuloma, peritonitis, salpingitis, synovitis and air saculitis. It is also used as a reliable index of fecal pollution (Zahran, 1981; Ahmed et al., 1984 and Sotohy, 1989). We found that the highest frequency % of E. coli isolation was recorded during the 3rd fattening period where the mean air temperature value was the lowest (23.1 ± 5.03 °C). This result coincided with that reported by Zahran (1981) and Sotohy (1989). Our results revealed the isolation of Salmonella Spp. from air during the 1st and the 2nd

fattening periods with the percentages of (5.83 and 1.6), respectively where the indoor air temperatures were relatively high (31.7 ± 3.9 and 26.06 ± 5.3 °C, respectively). This result disagrees with that obtained by Sotohy (1989). Salmonella spp. was implicated in cases of Pneumonia, septicemia, enteritis, and chronic respiratory diseases and also incriminated in outbreaks of Salmonella pullorum artheritis (Bhatia et al., 1971). Pseudomonas Spp. was detected in air of the broiler house with highest frequency % of isolation during the 2nd and 3rd fattening periods (3.3 and 4.16), respectively. These results agree with those of Zahran (1981) and were lower than those of Sotohy (1989). Pseudomonas Spp. has been incriminated in cases of pseudomoniasis and generalized edema (Golosov et al., 1974). The highest frequency % of Proteus spp. isolation from air of the broiler house was detected during the 3rd fattening period (15.8) followed by the 2nd fattening period (11.6). Members of genus Proteus were implicated with many other organisms in cases of pneumonia, septicemia, retained yolk sac and CRD (Bhatia et al., 1971).

Klebsiella Spp. were isolated during the 1st, 2nd and 3rd fattening periods in the percentages of (5.83; 6.6 and 8.3), respectively. These results agreed with those of Zahran (1981) and were higher than those of sotohy (1989). Klebsiella Spp. was incriminated in many diseases of broilers as omphalititis and septicemia. Its presence in air of poultry houses is considered as an index of air pollution with organic particles derived from animate origin (Sotohy , 1989).

Mycoplasma Spp. could be detected in the air of the broiler house only during the 3rd fattening period with the % of (1.6) where the mean indoor air temperature was (23.1 ± 5.03 °C). It is well known that Mycoplasma Spp. is more frequently isolated during the winter season. This result coincided with that of Sotohy (1989) but disagreed with that of Zahran (1981). Mycoplasma Spp are recognized as the primary cause of chronic respiratory disease in chicken, which is widespread disease, and of economic significance (Hofstad et al., 1978).

The most commonly isolated airborne fungi were Aspergillus Spp., Fusarium Spp., Monilia Spp., Mucor Spp., Penicillium Spp., Cladosoruim Spp. and Streptomyces Spp. they were all isolates in higher frequencies from air of the broiler house during the 3rd fattening period. Their presence in the air of poultry house expose

broilers to the infection under adverse conditions. Many of these species are considered as toxic producers leading to poultry mycotoxicosis. Ahmed et al (1984) isolated Aspergillus Spp, Fusaruim spp., Cladosporuim spp., Penicillium Spp. and Mucor Spp. from air of poultry houses in Assiut and indicated that the detection of these different species of fungi refers to insufficient ventilation and increased amount of stirred dust containing spores is considered an important mean which increase air pollution inside poultry house. Petersen et al. (1980), Wathes et al (1991) and Madelin and Wathes (1989) recorded similar results. Table (4) represented the effect of microclimatic measures as well as the air pollution parameters and microbial air load on the performance criteria of broilers during the three fattening periods. It was evident from the table that the lowest mean value of final body weight (1788.4 ± 68.28 g) was attained during the 1st fattening period rather than the 2nd and the 3rd periods. Cheng et al. (1997) concluded that the optimum feed conversion was at 26.6 °C. The total gain and feed consumption showed also similar patterns. These results agreed with those of (Noll et al. 1997; Bonnet et al. 1997 and May and Lott 2001). The mortality % was higher during the 3rd fattening period (4.85%) followed by the 1st (4.3%) and finally the 2nd period (2.85%).

From the forgoing data, it is clear that the microclimatic condition and air pollution parameters, which were higher during the 1st and 3rd fattening periods than during the 2nd period may, played their role in lowering the broiler performance and health.

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Table 1 Microclimatic conditions, some air pollutants, total bacterial and fungal counts of air in the broiler house during three fattening periods

Group / Parameter	1st fattening period				2nd fattening period				3rd fattening period				F-value
	0 2 W	2 4 W	4 6 W	Mean ± SE	0 2 W	2 4 W	4 6 W	Mean ± SE	0 2 W	2 4 W	4 6 W	Mean ± SE	
	33.8 ±3.1	31.8±3.6	29.7±5.2	31.7±4.6	30.7±4.6	25.7±5.4	21.8±6.6	26.06±5.3	28.5±5.6	22.3±5.2	18±4.3	23.1±5.03	4.71*
R.H.	46.7±3.2	68.6±5.1	64.4±5.8	60.5±4.7	54.6±4.1	74.6±4.8	68.7±4.7	65.9±4.5	63.7±3.5	82.7±5.8	79.8±6.3	75.4±5.2	1.38
Air speed (m/sec)	0.27±0.16	.5 52±0.23	0.93±0.31	0.57±0.23	0.26±0.14	0.67±0.3	1.02±0.4	0.65±0.29	0.27±0.18	0.58±0.37	1.13±0.57	0.66±0.37	0.06
Ammonia (mg/L)	4.2±2.6	20.6±5.6	18.5±4.4	14.4±4.2	4.4±3.2	18.7±0.2	15.7±4.8	12.9±4.4	5.2±3.8	38.7±5.6	32.7±5.8	25.5±5.06	0.93
CO2 (mg/L)	0.66±0.27	0.87±0.31	1.42±0.36	0.98±0.31	0.57±0.23	0.74±0.2	0.88±0.3	0.73±0.24	0.77±0.26	1.02±0.31	0.87±0.27	0.88±0.28	0.75
Total dust (mg/m^3)	2.8±0.88	20.7±2.7	18.6±4.3	14.03±2.6	2.7±0.6	8.4±2.6	7.3±2.7	6.1±1.9	2.77±0.76	6.41±2.4	9.32±2.8	6.61±±1.37	1.61
Total bacterial count (cfu X 10^6)	0.76±0.03	17.5±0.93	43.7±1.3	20.6±0.75	0.68±0.02	9.7±0.87	21.8±0.9	10.7±0.58	10.2±0.11	15.3±6.3	105.6±2.87	41.38±1.3	0.55
Total fungal count (cfu X 10^3)	ND	0.21±0.06	0.26±0.07	0.15±0.05	0.036±0.005	0.76±0.23	0.84±0.21	0.54±0.7	0.18±0.7	2.71±0.7	2.24±0.86	1.71±0.54	

Table 2. Effect of microclimatic conditions on the distribution and frequency percentages of bacteria isolated from the broiler house during the three fattening periods

	Means during 1st period			Means during 2nd period			Means during 3rd period		
	Air temp. 3.9	R.H. 4.7	Air speed 0.23	Air temp. 26.06	R.H. 4.5	Air speed 0.29	Air temp. 5.03	R.H. 5.2	Air speed 0.37
Isolated bacteria	**No.**	**%**		**No.**	**%**		**No.**	**%**	
Staph. aureus	32	(26.6)		15	(12.5)		18	(15.8)	
Strept. avuim	3	(2.5)		2	(1.6)		4	(3.3)	
Strept faecalis	5	(4.16)		2	(1.6)		3	(2.5)	
E. coli	15	(12.5)		14	(11.6)		18	(15.8)	
Mycoplasma Spp.	--	--		--	--		12	(10.9)	
Salmonella Spp.	7	(5.83)		2	(1.6)		--	--	
Pseudomonas Spp.	1	(0.83)		4	(3.3)		15	(12.5)	
Proteus Spp.	9	(7.5)		14	(11.6)		18	(15.8)	
Klebsiella Spp.	7	(5.83)		8	(6.6)		10	(8.3)	

Table 3. Effect of microclimatic conditions on the distribution and frequency percentages of fungi isolated from the broiler house during the three fattening periods

	Means during 1st period			Means during 2nd period			Means during 3rd period		
	Air temp. 3.9	R.H. 4.7	Air speed 0.23	Air temp. 26.06	R.H. 4.5	Air speed 0.29	Air temp. 5.03	R.H. 5.2	Air speed 0.37
Isolated fungi	**No.**	**%**		**No.**	**%**		**No.**	**%**	
Aspergillus Spp.	6	(5)		10	(8.3)		19	(15.8)	
Fusaruim Spp.	--	--		1	(0.83)		5	(4.16)	
Monilia Spp.	3	(2.5)		7	(5.8)		8	(6.6)	
Mucor Spp.	5	(4.16)		19	(15.8)		7	(5.8)	
Peniciluim Spp.	--	--		3	(2.5)		--	--	
Cladosporuim Spp.	--	--		2	(1.6)		4	(3.3)	
Streptomyces Spp.	3	(2.5)		2	(1.6)		--	--	

Table 4. Effect of microclimatic conditions and air pollution parameters, bacterial and fungal counts in air of the broiler house on the performance criteria and mortality % of broilers during the three fattening periods

Parameter in fattening group	Initial body weight (g)	Final body weight (g)	Total gain (g)	Feed Consumption (g)	Feed conversion rate	Mortality %
I -Air temp.°C (31.7± 3.9) -R.H. (60.5 ± 4.7) -Air speed (m/sec.) (0.57 ± 0.023) Ammonia(14.4±4.2mg/L) -CO2 (0.98±0.31mg/L) -Total dust (14.03 ± 2.6mg/m^3) -Bacterial count (20.6 ± 0.75 cfu X 10^6) -Fungal count (0.15 ± 0.05 cfu X 10^3)	47.8 ± 1.8	1788.1± 68.2	1740.3 ± 66.4	3830.6±10 4.6	2.2	4.3
II -Air temp.°C (31.7± 3.9) -R.H. (60.5±4.7) -Air speed (m/sec.) (0.57 ± 0.023) -Ammonia(14.4±4.2 mg/L) -CO2 (0.98±0.31mg/L) -Total dust (14.03 ± 2.6mg/m^3) -Bacterial count (20.6 ± 0.75 cfu X 10^6) Fungal count (0.15±0.05 cfu X 10^3)	48.4 ± 1.4	1918.6 ± 75.02	1870.2± 73.62	3856.5±11 4.4	2.00	2.85
III -Air temp.°C (31.7± 3.9) -R.H. (60.5 ± 4.7 %) -Air speed (0.57± 0..23 m/sec.) -Ammonia (14.4 ± 4.2 mg/L) -CO2 (0.98±0.31mg/L) -Total dust (14.03 ± 2.6mg/m^3) -Bacterial count (20.6 ± 0.75 cfu X 10^6) -Fungal count (0.15 ± 0.05 cfu X 10^3)	48.7 ± 1.5	1874.3± 82.5	1825.6± 80.9	3870.5±12 5.8	2.12	4.85

الملخص العربى

تأثير بعض ظروف الطقس الدقيقة وبعض ملوثات الهواء داخل مسكن الدواجن على الحمل الميكروبي للهواء وأداء دجاج التسمين

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أجريت هذه الدراسة لدراسة تأثير ظروف الطقس الدقيقة (درجة حرارة الهواء داخل مسكن الدواجن , الرطوبة النسبية , سرعة الهواء) وكذلك بعض ملوثات الهواء (تركيزات ثانى أكسيد الكربون , النشادر , الغبار الكلى) على الحمل الميكروبي للهواء داخل مسكن الدواجن وعلى أداء الطيور خلال ثلاث دورات تسمين تمت تحت ظروف طقس مختلفة. وقد لوحظت النتائج الآتية:

-سجلت أعلى درجات حرارة داخل مسكن التسمين خلال الدورة الأولى وكانت (31,7 ± 3,9 م).

- سجلت أعلى نسب الرطوبة خلال دورة التسمين الثالثة وكانت (75,4% ± 5,2) وكذلك معدل سرعة الهواء (0,66± 0,37 متر/ثانية) وتركيز النشادر داخل مسكن التسمين (25,5 ± 5,06 مجم/لتر) بينما سجلت أعلى تركيزات غاز ثاني أكسيد الكربون داخل المسكن أثناء دورة التسمين الأولى وكان متوسطها (0,98 ± 0,31 مجم/لتر) وكذلك متوسط تركيز الغبار الكلى فى الهواء وكان(14,03 ±2,6).
- بالنسبة للحمل الميكروبي للهواء داخل مسكن التسمين فقد سجلت أعلى متوسطات العد الكلى للبكتيريا والفطريات خلال دورة التسمين الثالثة.بالنسبة للبكتيريا التى تم عزلها من هواء مسكن الدواجن أثناء الدورات الثلاثة كانت المكور العنقودي والمكور السبحي لبرازي وميكروب السلمونيلا والميكروب القولونى و السيدوموناس والبروتيس و الكلبسيلا بنسب متفاوتة حسب كل دورة تسمين. أما بالنسبة لميكروب الميكوبلازما فقد تم عزله فقط أثناء دورة التسمين الثالثة عندما توفرت الظروف الملائمة له من درجة حرارة منخفضة و نسبة رطوبة مرتفعة.

- كمـــا تم عزل مجموعة من الفطريات من هواء مسكن الدواجن أثناء الدورات الثلاث وكان عـــزلها بصورة أكبر أثناء الدورة الثالثة لتوفر الظروف البيئية المناسبة من درجة حرارة ونسب رطوبة.
- بالنســـبة لتأثير العوامل السابقة على أداء الطيور فقد لوحظ أن أكبر أوزان كلية للطيور تم الحصول عليها أثناء الدورة الثانية للتسمين عندما كانت ظروف الطقس الدقيقة و ملوثات الهواء والحمل الميكروبي للهواء داخل مسكن الدواجن معقولة أو أقل ما يمكن. كذلك كان معدل النفوق أقل ما يمكن أثناء الدورة الثانية.
- ولـــذا فانـــه يوصى بتوفير الظروف الملائمة أثناء تربية دجاج التسمين و العناية بالفرشة لعـــدم إثارة الغبار مما يؤدى لزيادة الحمل الميكروبى للهواء فيلعب دوره فى نقل العدوى وانتشارها بين الطيور ويخفض معدلات الأداء ويزيد من نسب النفوق.

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