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DECONTAMINATION OF AIR IN BROLLER HOUSES BY SOME AERCSOL DISINFECTANTS (With 4 Tables)

By

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إستخدام بعض المطهرات لتطير هواء بيوت البــــــدارى

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يعتبر الهواه الجوى ومبلة هامة من ماثل نقل العدوى بين الحيوانات والطيور ولاسيمسما عد عند إنتشار الأمراض الوبائية داخل الحظائر · ولذلك كان ضرورياً إستخدام بعض المطهبرات المتوفرة والرخيصة الثمن لتطهير هواء الحظائم من آن لآخر أثناء تتواجد هذه الحيوانات والطيور داخل مساكنها . وفي هذه التجربة أستخدمت خمسة أنواع من المطهرات المعروفة والمترفسسرة لتطهير هواء بيوت البدارى (الساكن ذات ألفرشة السنديمة) ومسمن هسله المطهسرات الفاسكوسيبت ٢ ١٪ وللجبر المكلور (١٠جم / لتر) ومحلول اليود مع ١٪ ايدروكسيد السوديسوم وحيش اللاكتيث ٢٪ والأنتى حيرم ١٪ وأستخدم في رش المحلول المطهر مضخة وبمكن التحكسم فيها لإعطاء الجرعة المطلوبة في الوقت المناسب (١٧٧١ ملليمتر لكل متر مكعب من الهسسواء ٢٥١ دقيقة) • فحصت عينات من هواء الحظائر قبل رض المطهرات مكتريولوجياً لعرفــــــة العدد الكلي للميكروبات في اللتر من هواء تلك العقائر كما تم عزل بعض الميكروبـــــات كدلائل) مثل باسيل القولون ـ المكور السبحى والاستربتوكوكس فيكالس ، كذلك تم عسسزل الفطريات الموجودة في هواء هذه الحظائر ، ثم أعبد فحص الهواء بعد الرش ثلاث مرات (ساعة ٧ ماعات / ٢١ ماعة) • وقد رجد من نتائج هذا الفحس أن الناحكوميبت أعطى أفضي النتائج خلال مرات النحس الثلاثة بلية الحبر المكلور تم اليود مع ايدر وكسيد الصوبيسوم ثسم الباسيل القولون _ المكور السبحى _ الاستربتوكوكس فيكالس) • فقد تفاقمت تأثــــير هــــده المطهرات على هذه الأنواع بين البكتريا فوجد أن الناحكوسبت والحبر المكلور حد من تواجد باسيل القولون لمدة ؛ ساعات بعد الرش بينما حمض اللاكتيث ومحلول اليود ايدركسيد السوديوم قد حد من تواجد هذا الميكروب لمدة) " ساعة بعد الرش وقد وجد أن الانتي حيرم ليس لسب تأثير على باسيل القرارن ولاعلى المكور السبحى · من الفحص الفطرى للهوا · بعد الرش وجـــد أن كل من المطهرات المستخدمة لها تأثير على بعض أنواع الغطريـــات .

SUMMARY

Five types of aerosol disinfectants were used in broiler houses to reduce the biological contamination of the air and decrease the risk of infection among birds. For bacterial reduction percent, Nascosept was found to be the most efficient disinfectant after 1, 4, 24 hrs. from exposure (88, 65, 52.5), followed by chlorinated lime (86, 66, 50), Lugol's solution

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+ Na oH 1% (83.3, 74.2, 51.6) and lastly antigerm (40.5, 24.3, 5.4) respectively.

The effect of the disinfectants on fungi and air-borne bacteria were investigated.

INTRODUCTION

Disinfection of poultry houses is the most efficient procedure in the environmental management of the disease. The use of aerosol disinfectant specially in the occupied premises was found to be the most effective procedure for decontaminating air.

Lactic acid alone or mixed with other agents as an aerosol disinfectant was recommended by many authors for poultry and animal buildings. SYRNIKOVA (1974) proved that lactic acid and hydrogen peroxide plus citric acid were efficient aerosol disinfectants. Also, PERKOV et al. (1975) found that lactic acid aerosol in a quantity of 20 ml/m³ of air space reduced the number of microorganisms in the air by three or four times and decreased the count of coliform bacteria. Furthermore FISER (1978) reported that lactic acid aerosol in a concentration of 300-400 mg/m³ was effective aganist the microflora of the air and dust.

More trials are well established to determine the efficiency of some other types of aerosol disinfectant, in controlling many poultry infections. BEREZNEV (1978) recommended the use of sodium hypochlorite aerosols with 2% active chlorine (150 ml/m^3) to halt the spreading of mycoplasma infection among poultry populations. In addition COMAN et al. (1979) proved that aerosol disinfectant of Bromocet + iodosept sprayed in rooms of a confined chicken houses reduced the microbial count by 47% and 51% respectively. They added that the utilization of these aerosol disinfectants cause no traubles to the birds but they gave higher performance at the end of the experiments.

The aim of this work is to reduce the biological aggressiveness of air in the occupied building by using some available and suitable aerosol disinfectants.

MATERIAL and METHODS

Field trials were earried out on broilers raised on deep litter. The chicken were reared from their 1st to 50th days of age in a house of 96 m² floor space. Each house contains 1000 birds. The ventillation was achieved inside the house, naturally by windows and artificially by suction pumps.

Preparation of the disinfectants used:

The chosen disinfectants were prepared as follows:

1- Mixture of lugol's solution and 1% sodium hydroxide. Lugol's solution was prepared by adding a mixture of 1 gm iodine and 2 gm potasium iodide to 300 ml water. The solution obtained was then diluted 1:16 (FUSTES et al., 1985) followed by addition of an equal volume of sodium hydroxide 1% to it.

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- 2- Nascosept 0.2% as a quaternary ammonium compounds.
- 3- Antigerm as 54.4% quaternary ammonium compounts double component system and was used in 0.1%.
- 4- Lactic acid 2%.
- 5- Chlorinated lime contain active chlorina 37% and was used as 10 gm/Liter.

Application of the disinfectants and bacterial examination of air:

Each disinfectant solution was sprayed in the broiler house by means of spraying device. The apparatus was controlled at a pressure that 17.4 mi of the applied disinfectant was mixed with every cubic meter of air space during the 25 minutes application.

The intial contamination level at the broiler house before the application as well as the decontaminant effect of each disinfectant were checked through microbial evaluation of the air using the liquid impinger (COWN et al., 1956), with sepcial refrence to Mycoptasma gallisepticum, Pasteurella multocida, Streptococcus faecalis, Slaphylococcus aureus and E. coli as well as some species of fungi including penicilium species, Aspergillus and Mucor species.

The total germ numbers and identification of the microbial isolates which recovered before and after 1, 4 and 24 hrs. from application of any disinfectant were identified according to BAILY and SCOTT (1978); CRUICKSHANK et al. (1980) and SABRY (1968).

RESULTS

Results are tabulated in tables 1, 2, 3 and 4.

DISCUSSION

Its evident from table (1) that Nascosept was the most efficient aerosol disinfectant after 1, 4, 24 hrs. from exposure giving a reduction % of 86, 65, 52.5 respectively, followed by chlorinated lime (86.3, 65.9, 50) and lugol's solution + Na oH 1% (86.8, 74.2, 51.6). On the other hand, lactic acid and antigerm gave the lowest efficiency where their reduction % were 64.1, (53.33, 31.6) and (40.5, 24.3, 5.4) after 1, 4, 24 hrs. exposure respectively.

It is worth mentioning that the use of lactic acid in 2% conc. was efficient and gave a comparatively simillar results to that previously obtained by PERKOV et al., 1975 and FISER, 1978. However, the reduction in the concentration of such agent to 2% is necessary in order to prevent its irritant effect on the mucous membrane of the eye and upper respiratory tract.

The effect of the applied disinfectants on the different species of microbes are tabulated in tables 2, 3. It is clearty evident from these tables that Nascosept, chlorinated lime and lactic acid were the most superior aerosol disinfectants on the different species of bacteria and fungi than the other two agents.

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Nascoscpt is the most efficient disinfectants on Mycoplasma gallisepticum, Pasteurella multocida and staphylococci which they failed to detect in any of the 24 hours exposure. Other organisms including strept. Faecalis, E. coli were inhibited for only 1 and 4 hrs. after exposure respectively.

Chlorinated lime was found to be one of the most efficient disinfectant on Mycoplasma gallinerium and pasteurella multocida (24 hrs. inhibition). Other microbes comprising of staphylococci and E. coli could be recovered from the air after 1 and 4 hours from application respectively.

Lactic acid was found to be one of the best disinfectant on Mycoplasma gallisepticum, Pasteurella multocila, Aspergillus gluacous, Aspergillus nidulans which were not recovered during the 24 hrs. after exposure. Its disinfecting power on staphylococci and E. coli was limited only to one hour after exposure.

Lugol's solution and antigerm had no inhibitory effect on all the recovered isolates except Aspergillus ustes, Mucor species which were inhibited by lugol's solution during the 24 hrs. after exposure.

From the results achieved one can safely conclude that Nascosept, chlorinated lime and lactic acid were the best aerosol disinfectants aganist bacteria specially Mycoplasma gallisepticum and Pasteurella mullocida and thus may be used in controlling epidemices caused by these agents. In addition chlorinated lime may give a beneficial results as a fungicidal agents in occupied buildings where moulds are present. However, the use of aerosol disinfectant once a day is necessary specially in the occupied buildings to reduce the bacterial population inside the house (PERKOV et al., 1975; FISER, 1978) as well as decrease the risk of infection (KHATSKEVIOH et al., 1982; BEREZNEV, 1978) and inturn increase the body gain (PERKOV et al., 1975).

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Table (1): T.G.C. and the reduction % after application of 5 types of aerosol disinfectants.

Type of	Conc.	T.G.C. befor use	Total colony count after application	application	after	Reduction % after applica- tion	% after	applica-
disinf.		of disinfectant	1 hr	4 hrs	24 hrs	1 hr	1 hr 4 hrs 24 hr.	24 hr.
Lescosept	0.2%	200.105	24.105	24.105 70.105 95.105	95.105	88 88	88 % 65 % 52.5%	52.5%
Chlorinated	10gm/L	44.105	6.105	15.10 ⁵ 22.10 ⁶	22.106	86.3%	86.3% 65.9% 50 %	50
Lugol's +	lugol's	62,105	10.105	10.10 ⁵ 16.10 ⁵ 30.10 ⁵	30.105	83.8%	83.8%. 74.2% 51.6%	51.6%
Lectic acid	B	120.105	43.105	56.10 ⁵ 82:10 ⁵	82:105	64.15	53.33% 31.6%	31.6%
Antigerm	0.1%	37.105	22.105	22.105 28.105 35.105	35.105	40.5%	24.3% 5,4%	5,4%

T.G.C. = Total germ count.

Antigerm Lactic acid Lugol's + Na oH Chlorinated lime Nascosept disinfectant Table (2): Indicator bacteria isolated before and after application of the five aerosol disinfectants. Type of +Na oH 1% Lug 1:16 10gm/L 0.1% 0.2 % Conc. 23 + ve + ve Before Ve Ve + ve 1 1 hr 1 1 ı Ve ve ve Ve + ve + ve + ve t 1 4 hrs Ve After ve coli + ve + Ve + ve + ve + 24 hrs ve Bacteria Before 1 hr - Ve 1 1 1 + Ve Ve ve Ve - Ve 1 - Ve 1 1 Strept.faecalis Ve ve Ve 1 t - ·Ve + Aiter 4 hrs Ve Ve Ve ve 1 ı -WVe - 70 + 24 Ve ve Ve hrs

Eycoplasma gallisepticum After Before 1 hr 4 hrs 24 hrs
oplasma gallisepti. After re 1 hr 4 hrs 24 h
plasma gallisepti. After e 1 hr 4 hrs 24 h

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		Fungus isolated	Fungus isole	Fungus isolated after application	cation
Type of disinf.	Conc.	befor application	1 hr	4 hrs	24 hrs
		Tourist 11 ium en	+ VP	+ ve	+ ve
Nascosept	0.2%	A. flavus	+ ve	+ ve	+ ve
The state of the s		5	+ 40	+ Ve	+ ve
		A. Higer	+ ve	+ Ve	+ Ve
	10 0 1	hacor of	+ ve	+ ve	+ ve
Chlorinated lime	TO Sm/ T	A flavus	- ve	- ve	- ve
		A. terrous	- ve	- ve	- 40
	1 1.16	A flavila	+ ve	+ ve	+ ve
rne en + B, roang	Tue Tito	A Hatte	- ve	- ve	- ve
	oH oH	Mucor sp.	- ve	- ve	- ve
		Pencillium sp.	+ ve	+ ve	+ ve
		A flavus	+ ve	+ ve	+ ve
Lectic acid	2 %	A. flucreus	- ve	- Ve	- ve
		A. nidulons	- ve	- ve	- Ve
		A flaving	+ ve	+ ve	+ ve
	0 19	Mucor sp.	+ ve	+ ve	+ ve
Anigerm	0,10	A. ustes	+ ve	+ ve	+ 40