Contents

List of Tables

List of figures

Faculty of Veterinary Medicine Cairo University
Veterinary Hygiene and Management
Name: May Fathy Abdelaty Ahmed
Date of birth: 12/1/1985
Site of birth: Giza **Nationality:** Egyptian
Contact: mai_fathi12@hotmail.com, mayfathy@ahri.gov.eg
Speciality: Animal, Poultry and Environment Hygiene
Title of the research: The efficiency of disinfectants and disinfection programs commonly adopted in poultry farms in Egypt
Supervisors:
1. **Prof. Dr. Ehsan Yousef Bashandy** - Emirate Prof. of Animal, Poultry and Environment Hygiene-Faculty of Vet. Med.-Cairo Univ.
2. **Prof. Dr. Osama Mohamad Kamel Zahran**- Emirate Prof. of Animal, Poultry and Environment Hygiene-Faculty of Vet. Med.-Cairo Univ.
3.**Dr. Shimaa Abou Elsoud Nasr** – Assitant professor. of Animal, Poultry and Environment Hygiene-Faculty of Vet. Med.-Cairo Univ.
4. **Dr. Soad Abdel Aziz Abdel Wanis Nasef**. Chief Researcher of Poultry Disease, Reference Laboratory for Quality control on poultry production, Animal Health Research Institute
To refer this thesis: May F.(2017). The efficiency of disinfectants and disinfection programmes commonly adopted in poultry farms in Egypt Thesis submitted in fulfillment of the requirements of the degree of Doctor (Ph.D.) in Veterinary Sciences, Faculty of Veterinary Medicine, Cairo University.

Abstract

This study aimed to evaluate the cleaning and disinfection programmes in small scale of poultry production houses. Every procedure in cleaning and disinfection has a role to achieve the standard optimization for disinfection process. Local disinfectants Egyptian should be evaluated periodically for the efficiency and validity of active material. The use of Foam technique and the addition of chlorine to surfactant in cleaning process produced an excellent result. Biofilm is a problem in poultry farm which could be developed in water pipes and the cages of the birds. Plankton could be developed on the water pipes by the water which has a high microbial load. Disinfection process must be done periodically to remove the biofilm and the plankton by Clorox 2.5% or Calcium hypochlorite 1%. Also, this study aimed to replace liquid foot pan in the poultry farm, with a novel model using dry disinfectants as Calcium hypochlorite, Staldren, Halamid, Paraformaldehyde and Virkon S that is used more effectively in biosecurity program convenient with the workers in Egyptian farms that avoid the ordinary foot pan.

Key words: Sanitation - disinfection - cleaning - biofilm - foot pan - *Salmonella* - *Pseudomonas* -plankton - total colony count.

Summery

This thesis consists of three different studies about the disinfection programmes and the efficiency of the disinfectants in poultry farms.

The first study was about three different disinfection programs were applied in the three poultry (pines) houses in faculty of veterinary medicine at Cairo University which simulate small scale Egypt poultry farm sector using available traditional materials that easily obtained from Egyptian market. In the cleaning process we used surfactants, foam technique and 5 % chlorinated surfactant in Program A, B, C respectively and in the disinfection process we used quick lime mixed with cresol, quick lime mixed with Calcium hypochlorite and quick lime mixed with cresol and Calcium hypochlorite in program A, B, C respectively. The disinfection programs take three days, at the first day swabs were taken before applications, after whipping (Dry cleaning) and after applying water with high pressure directly (Wet cleaning), swabs after applying the detergent with brushing directly twice, after rinsing with water immediately. At the second day, swabs were taken after 24 hours from rinsing, swabs were taken after an hour from application the disinfectant. At the third day swabs were taken after 24 hours from applying the disinfectants. Fifteen swabs were taken from (walls, floor and roof) 5 swabs per each and the log mean of the average of each five was calculated and was obtained in each step. It concluded that the three programs were effective and successful as all of them achieved the reduction which is the standard optimization for the disinfection process. The use of the foam technique in cleaning process produced an excellent result; also the addition of chlorine to the surfactant achieved an observable reduction in microbial viability. Local Egyptian market products disinfectant present and produce in Egyptian market should be evaluated periodically as they may be devalued or less in their active material.

The second study, regarding to biofilm, this study aimed to produce biofilm in vitro on two substrate (galvanized wire, PVC), also to perform plankton on the PVC to mimic the condition in the poultry farm), then evaluate the efficiency of the disinfectants to remove it. The average of initial

Salmonella count log on the tested coupons was Log 10.3. While the primary average *Pseudomonas* count log was log 9 on the galvanized wire. Referring to average *Pseudomonas* count was 10.1.While on the PVC the average *Salmonella* count of the tested PVC coupons was 11, the bacterial count of plankton which recovered on the PVC coupons after 7 days was log 8. Only three disinfectants removed the bacterial count to zero cfu/cm^2 which are Clorox 2.5%, Pril 2%+ Clorox 2.5% and Formalin 5% in case of *Salmonella* and *Pseudomonas* which formed on the galvanized wire coupons.

The disinfectants which used in water pipes were Cupper sulphate 1%, Halamid 1%, Virkon S 1%, Formic acid 1%, Acetic acid 1%, Sulphamic acid 1%, Citric acid 1%, Clorox (25 ml per Liter), Calcium hypochlorite 1%, Clean Zix 0.7%, Dyne O might (1part:400part), Sodium hydroxide 1%, Iodocide 3%, Zix Virox 0.2%. All used disinfectants have the ability to remove *Salmonella* and *Pseudomonas* biofilm completely from water lines in poultry farm except Iodocide 3%, Zix virox 0.2% and sodium hydroxide 1%. All used disinfectants removed the planktonic bacteria completely except iodocide 3%, and zix virox 0.2%.

The third study aimed to replace liquid foot pan in the poultry farm, with a novel models that is used more effectively in biosecurity program convenient with the workers in Egyptian farms that avoid foot pan. These novel models are dry foot pan, semiliquid (wet) foot pan and floor mat that enabled the disinfectants to be worked for a longer time. We are looking for a durable footbath, stable, fast, easily applied and log acting in the reduction of aerobic bacteria and *Salmonellae*. The efficacy of powder disinfectants (Calcium hypochlorite powder, Halamid, Staldren, Virkon S and paraformaldehyde) were tested against aerobic bacteria and *Salmonellae* in a novel form of foot pan dry, semi-liquid and floor mat models.The disinfectants were diluted by calcium carbonate or sodium chloride powder in the dry form, surfactant in the semiliquid form and use of the sponge as a mat in the third form. Daily measurement of the active principle of the tested disinfectants and the log reduction of the *Salmonellae* were done. The dry form and semi liquid form of

the Calcium hypochlorite was successfully effective against aerobic bacteria and *Salmonella* for 8 days in dry form and 9 days in semiliquid form. However, Halamid and Staldren were successfully effective in dry form for 12 days and 13 days respectively, semiliquid form was worked for 21 days and 3 days and floor mat was effective for 21 days and 3 days respectively.Paraformaldehyde powder was also effective for 5 days in the dry form, but in the semiliquid form was effective for 7 days, floor mat was effective for 7 days. 5% Virkon S could be effective for 3 days in the dry form and semi-liquid form but only 2 days in the floor mat form.