بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

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Advanced Studies on Pasteurellosis in Farm Animals

A thesis presented by

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(B.V.Sc., 2013; M.V.SC., 2017)

Faculty of Veterinary Medicine, Cairo University

For the degree of Ph.D.

(Infectious Diseases)

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(2021)

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Abstract

Pasteurella multocida (*P. multocida*) and *Mannheimia haemolytica* (*M. haemolytica*) are widespread pathogens, resulting in economically significant animal diseases. This study aimed to investigate some of the epidemiological aspects of *P. multocida* and *M. haemolytica* infections in Egypt, proper diagnosis of *P. multocida* and *M. haemolytica* infections, describe the distribution of capsular types of *P. multocida* isolates, measure the prevalence of multi-drug resistance in bacterial isolates recovered from cattle, buffaloes, sheep, and goats (ruminants) suffering from respiratory manifestations, investigate the humoral immune responses and protective immunity conferred by a prepared polyvalent formalin-killed *P. multocida* and *M. haemolytica* vaccine with the use of Montanide™ ISA 71 VG oil as an adjuvant in mice along with a biochemical and immunological evaluation of the prepared vaccine in sheep. A total of 155 deep nasal swabs were collected from 20 cattle, 37 buffaloes, 80 sheep, and 18 goats. Detection of 24 *P. multocida* and 12 *M. haemolytica* isolates from tested samples was carried out by bacteriological isolation, then identified by biochemical tests, and confirmed by polymerase chain reaction (PCR). The highest rate of infection with *P. multocida* and *M. haemolytica* has been found in young males (0-6 months age group). *P. multocida* capsular group A was found in the majority of the *P. multocida* strains (87.5%), while group D bacteria were identified in only three samples. Capsular groups B, E, and F have not been detected. The antimicrobial susceptibility pattern of *P. multocida* and *M. haemolytica* isolates indicated a high prevalence of multi-resistance to the majority of antimicrobials used as high resistance was detected against ampicillin, amoxicillin, penicillin-G, tetracycline, streptomycin, cefotaxime, and chloramphenicol, however, 100% sensitivity was demonstrated by *M. haemolytica* isolates to gentamicin. Therefore, continuous monitoring of antimicrobial resistance is important to prevent the dissemination of resistant bacteria. Five groups of mice were vaccinated with two doses of a killed vaccine prepared from locally isolated *P. multocida* and *M. haemolytica* by intramuscular (I/M) injection 2 weeks apart and one group used as control and did not receive the vaccine.

Experimental infection was established 4 weeks after primary vaccination by intranasal (I/N) and intraperitoneal (I/P) inoculation of live *P. multocida* and *M. haemolytica* in both non-vaccinated mice and mice that had been previously vaccinated. The prepared vaccine posed no safety problems when mice were injected I/M with this preparation. The serum antibody titers were tested by ELISA. ELISA results showed that the levels of antibodies were significantly higher in the sera from vaccinated groups than in those from the non-vaccinated group from 14 days up to 28 days after primary vaccination (P=0.000). Peak antibody titers were recorded on day 28. Antibody responses in the I/N challenged animals were greater than for the I/P challenged animals. Also, the prepared vaccine was biochemically and immunologically evaluated in two groups of sheep. The first group received the prepared vaccine by intramuscular injection, whereas the second group did not receive the prepared vaccine and used as non-vaccinated controls. The biochemical profiles of both sheep groups (vaccinated and control) were estimated and the humoral immune response in the two groups was evaluated by indirect ELISA. All vaccinated animals remained healthy till the end of the study. Antibody responses to the prepared vaccine were greater for the vaccinated sheep than for the control ones and reached their peaks around one-month post-vaccination. Biochemically, there were no significant differences in most biochemical parameters between the vaccinated and control groups.
Keywords: Antimicrobial resistance, Biochemical, Capsular groups, ELISA, Montanide^{TM} ISA 71 VG oil, *M. haemolytica*, Mice, *P. multocida*, Polyvalent vaccine, Ruminants.

DEDICATION

I dedicate this work to my family especially my parents for all kind support they lovely offered and their continuous encouragement during my post-graduate studies.