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IMMUNIZATION OF DUCKS AGAINST PASTEURELLA MULTOCIDA INFECTION BY AVIRULENT CU STRAIN 1- EFFICACY AND SAFETY OF THE VACCINE

(With 2 Tables)

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تحصين البط ضد الإصابة بكوليرا الطيور باستخدام عترة غير ضارية ١ ـ كفاءة وأمان اللقاح

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تم تحصين البط ضد الأصابة بمرض كوليرا الطيور باستخدام عترة غير ضارية عـن طريق مـاء الشرب تحت ظروف حقلية ومعملية · أجري أختبار التحدى للمناعة للبـط المحصن باستخدام عترة ضارية لميكروب كوليرا الطيور وقد ثبت أن التحصين أعطـى وقاية عالية وصلت إلى ٨٥٪ ، وباجراء خمس تمريرات متتابعة للعترة غير الضاريـة في البط وجد أن الميكروب لا يزداد ضراوة مع زيادة التمريرات · وثبت كفاءة اللقاح وفقا للمعايير المختلفة وهي معدل النفوق ـ وزن جسم الطائر ـ الوقاية من العدوى المناعية ·

SUMMARY

Vaccination of ducks against fowl cholera was done using avirulant CU strain via drinking water at 4- weeks of age under laboratory and field conditions. Challenge of the vaccinated ducks by virulent Pasteurella multocida (PM) serotype 1 Prooved that the vaccine produced high protection rate of 85%. Serial five blind passages of the vaccinal strain in susceptible ducks did not result in increased virulence of the strain and prooved that the vaccine was safe for ducks. Efficacy of the vaccine under field conditions was prooved according to the following parameters, livability, body weight and protection after challenge.

INTRODUCTION

Fowl cholera caused by Pasteurella Multocida (PM), is a highly destructive disease affecting any species of wild and domestic birds, including turkeys, chickens, ducks and pheasants (PAPBS-GARNON and SOLTYS, 1971).

Epornitics of duck Pasteurellosis were diagnosed in duck farms in Egypt causing mortalities of 5-30% with higher rates in ducks of more than 4 weeks of age, while mild cases were recorded in younger birds (BAYOUMI et al., 1988). IBRAHIM (1991) isolated 26 isolates of PM from ducks over 10 weeks of age. By serological identification, he proved that the isolates were serotype 3, 4 and 5.

The control of fowl cholera continues to be a problem despite extensive vaccination programms. Immunity can be induced in chicken, turkey and ducks with bacterins (OLSON et al., 1969; HEDDLESTON et al., 1974 and LAYTON, 1984) or with live strains of PM in chickens and turkeys (DERIEUX, 1978; DERIEUX & DICK, 1980 and DICK & JONSON, 1985). Live vaccines are easy to be administered by several routes, at different ages and they are found to protect against Pasteurella serotypes known to cause fowl cholera in chicken and turkeys (HEDDLESTON & REBERS, 1975 and DERIEUX & DICK, 1980).

This report evaluates: 1) efficacy of the CU strain in immunizing ducks against PM infection. 2) Field application of CU strain administered in drinking water. 3) The safety of CU strain for ducks.

MATERIAL and METHODS

1- Experimental ducks:

80-One day-old Pekin duckling were obtained from El-Wady El-Gadeed duck farm. The duckling were used for blind passage of CU strain as well as vaccination via drinking water.

2- Breeder ducks:

One of two flocks of 1500 pekin ducks at El-Wady El-Gadeed duck farm was vaccinated at 4 weeks of age via drinking water, the other was left as control.

3- Serial passages in ducks:

The CU strain was passaged in experimental ducklings as eye drop infection for 5 passages. The organism was reisolated from the auditory tube and liver of sacrificed samples.

4- Vaccine:

PM living avirulent CU vaccine produced by Vineland Laboratories U.S.A. Serial No. 7384, Batch No. 97037 V.

5- Virulant strain:

A virulent field isolate (serotype 1) was used for challenge by I/M infection. This strain was previously isolated in the Dept. of poultry diseases from sever outbreak in ducks with mortality rate 40%.

6- Media:

Tryptose broth and blood agar were used for culturing the organism.

7- Vaccination:

Vaccination was done in 4 weeks old duckling by drinking water. In dose of one 4×10^8 CFU/ml. (colony forming unit/ml).

8- Challenge:

Vaccinated ducks either in exp. II or III were challenged, 3 weeks postvaccination by intramusculer infection of a virulent field isolate.

9- Criteria for evaluating experiment:

The following parameters were used for evaluation of the efficacy of the vaccine:
1) Mortality rate 2) Clinical signs 3) Lesions 4) body gain.

Experimental design:

Experiment I:

It was designed to determine whether serial passage can increase the virulance of CU strain to ducks. Five blind passages had been done using 10 ducks (free from Pasteurella multocida) for each passage at 4 weeks of age. For the first passage five ducks were sacrificed 6 days post infection and Pasteurella was reisolated from auditory aurifice and liver, then used for further passage. The other five ducks were observed for 2 weeks. Any symptoms or deathes were recorded.

Experiment II:

It was designed to evaluate the protection afforded by CU strain vaccination via drinking water. Twenty ducks were vaccinated at 4 weeks of age, then challenged 3 weeks postvaccination. Another ten ducks were left as non vaccinated challenged control.

Experiment III:

Experiment III:

For field evaluation of CU vaccine, a flock of 1500 breeder ducks grown at El-Wady El-Gadeed duck farm was vaccinted at 4 weeks of age via drinking water. Another flock of the same age and source was considered as control. Evaluation was done according to parameters recorded at 8 weeks of age which included: livability, body weight and protection after challenge of a random sample of 20 ducks.

RESULTS

Result of experiment I:

PM was isoalted from the aurifice of the auditory tube and liver of the sacrificed infected ducks. Neither clinical signs nor deathes were recorded post infection with the CU strain along five serial passaes.

Result of experiment II:

Challenge showed that vaccination resulted in 85% protection as compared with non vaccinated challenged controls (0% protection). The organism was reisolated from challenged dead ducks (Table 1).

Ducks	Challenge route	No. of died/ No. of exposed	Survival %
Vaccinated	I/M	2/20	90 %
Control non vaccinated	I/M	10/10	0 %

Results of experiment III:

Results of protection rate, body weight and livability are recorded in table (2). It was clear that vaccination had no negative effect on growth or mortality rates. A protection rate of 80% was recorded in vaccinated challenged ducks.

Ducks	No.of infected	Deathes	Protection rate	Body weight "gm"	Livability %
Vaccinated	20	4	80 %	1850 +-233	93 %
Control non vaccinated	20	20	0 %	1860 +-210	92.7%

DISCUSSION

Many reports have questioned the value of live vaccines against fowl cholera. The safty and the immunogenic value of the avirulant strain of PM have been proved when used as a vaccine under laboratory and field conditions (DOUGHERTY, 1953; BIERER & ELEAR, 1968; DERIEUX, 1978 and DERIEUX & DICK, 1980). Many investigators concluded that the principal way to control this disease is by efficient vaccination (HEDDLESTON and HALL, 1958 and BIERER & SCOTT, 1969 and MATUMOTO & HELFER, 1977). In this way the most economical and practical route of administering the vaccine is via the drinking water. The epidemiological and the immunological studies indicate that the organism has a respiratory route of infection and contaminated water is the most propable source of infection (HUGHES & PRITCHETT, 1930 and PABS-GARNON & SOLTYS, 1971).

Results of experiment I proved that the CU strain of PM was safe to ducks when used via drinking water even after 5 blind serial passages. Similer reports on the safty of this strain in turkeys were provided by (BIERER & ELEAZER, 1968; DERIEUX, 19778 and DERIEUX & DICK, 1980).

Results of experiment II showed that protection in the vaccinate was excellent (85%), whereas 100% of the unvaccinated challenged controls died withen 3-5 days postinfection indicating also that challenge was sever. AVAKIAN et al., 1989 reported a significant higher rate of protection in chickens given bacterin only.

Because the experimental populations in experiment I and II was small, a field trial was plannd inorder to make a generalized conclusion on the possible use of ducks. Results showed that the strain was safe and efficient but consideration should be given to the use of live strain for immunizing ducks against cholera and one should be aware of the possible adverse reactions to live strains of PM by different routes, doses and ages. For this resons further work was plannd to through more light and give a generalized conclusion.

Further investigation are designed to inestigate duration of immunity for the anticipated productive life of breeder ducks with different vaccine programs.

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