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انتقال فيروسات النفيوكاس والرعاش السوائي من خلال البيض وطرق مقاومته

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مصطفى ب. طامي، فتحي سعد

1. تأكد من الدراسة انتقال فيروسات النفيوكاس والرعاش السوائي من خلال البيض ولكن يحتاج لأدواته إلى إعادة عزل هذه الفيروسات من البيض المعدئ.

2. وضح من الدراسة أن فيروس النفيوكاس يتأثر نسبة بالملوثات الآتية:
   10% أيزوبرميل الكحول
   1% حمض الفينيل
   وكذلك فيروس الرعاش السوائي يتأثر بالمملوكة الآتية:
   10% أيزوبرميل الكحول
   2% فورمالين

3. زيادة نسبة تركيز هذه المملوكة لا يزيد بالمثل من قوتها ولكن نقصان التركيز يؤدي إلى نقص في التأثير على هذه الفيروسات.
TRANSMISSION OF NEWCASTLE DISEASE AND AVIAN ENCEPHALOMYELITIS VIRUSES THROUGH EGG SHELL, AND ITS CONTROL.
(With 3 Tables)

By
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SUMMARY

Transmission of Newcastle disease, and avian encephalomyelitis viruses were evident and confirmed, but it requires virus reisolation. Relatively 10% isopropyl alcohol and 1% phenolic acid (for Newcastle disease virus), and 10% isopropyl alcohol and 2% formalin (for avian encephalomyelitis virus) were considered the most effective disinfectants on the Newcas-
tle disease, and avian encephalomyelitis viruses.

Increasing the concentration of these disinfectants not increase their efficaciy, but decreasing this concentration decrease their efficaciy.

INTRODUCTION

Newcastle disease virus isolated from the yolk sac of chicken embryos, this emphasizes the possibility of transmission of the disease from breeding hens to their offsprings (DELAY, 1947). HOFSTAD (1949) isolated Newcastle disease virus from dead embryos and infertile eggs collected during decline in egg production following an outbreak of Newcastle disease. AHMED and EL-SISI (1964) showed the possibility of shedding virus vaccine strain in eggs for at least 31 days following vaccination. Formalin (BRANDLY et al. 1946), beta propiolactone and phenol (MACK and CHOTISEN, 1955) had been used to destroy the infectivity of the virus of Newcastle disease. Avian encephalo-
myelitis virus was evident in some flocks in Egypt (AHMED et al. 1975).

The aim of this work was to study the possibility of Newcastle disease, and avian encephalo-
myelitis viruses transmission through egg shell, effect of certain virucidal disinfectants and fumiga-
tion with formaldehyde on viability of the viruses.

MATERIAL and METHODS

1) Embryonated chicken eggs free from haemagglutination inhibition antibodies against Newcastle disease virus and neutralizing antibodies against avian encephalomyelitis virus.
2) Virus strains: A velogenic viscerotropic strain of Newcastle disease virus obtained from the Animal Health Research Insitute, Cairo (SHEBLE and REDA, 1976).

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3) An egg adapted standard avian encephalomyelitis virus strain was obtained from Institute für Gelügel, Hannover, West Germany.
4) Disinfectants: formalin, phenolic acid, acriflavin, isopropyl alcohol, iodine plus potassium iodide, and chloramin T, were used in this study.

EXPERIMENTS

1) Experiment (1):

Was designed to study the possibility of Newcastle disease, and avian encephalomyelitis viruses transmission through shell. Seventy two eggs were dipped in different dilutions of Newcastle disease virus (EID<sub>50</sub> 10<sup>2</sup>, 10<sup>5</sup>, and 10<sup>7</sup>) for 4 minutes at 4°C, the eggs were subjected to isolation of the virus at 24, 48, 72, 120 and 144 hours, after infection. Thirty eggs were dipped in suspension of 10<sup>7</sup> EID<sub>50</sub> of avian encephalomyelitis virus for 4 minutes at 4°C. The eggs were subjected to virus isolation by reinoculation in embryonated chicken eggs.

2) Experiment (2):

Was designed to study the effect of different disinfectants on viability of Newcastle disease, and avian encephalomyelitis viruses inside the eggs, and disinfectants toxicity to the embryos. The viruses were serially diluted in isopropyl alcohol, phenolic acid, iodine and potassium iodide, chloramin T, formalin, and acriflavin separately and titrated. The viruses were titrated in sterile normal saline as well as control. The minimum EID<sub>50</sub> for the tested virus was the best effective disinfectant.

3) Experiment (3):

Was designed to check the suitable concentration of effective disinfectants on Newcastle, and avian encephalomyelitis viruses. Ten fold dilutions of the viruses were made in different concentrations of each disinfectant and inoculated into five, 9 days old embryonated chicken egg into the allantoic sac and then the EID<sub>50</sub> was calculated according to the method of READ and MUENCH (1938).

The minimum EID<sub>50</sub> was the suitable concentration of each disinfectant.

RESULTS

Table (1): Results of Newcastle disease, and avian encephalomyelitis viruses transmission through egg shell

<table>
<thead>
<tr>
<th>Virus conc.</th>
<th>No. of dipped eggs</th>
<th>No. of dead embryos had Path. changes</th>
<th>No. of +ve HA eggs</th>
<th>No. of +ve eggs after reisolat.</th>
<th>percent. of virus trans.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&lt;sup&gt;2&lt;/sup&gt; ND virus</td>
<td>18</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>16.66</td>
</tr>
<tr>
<td>10&lt;sup&gt;5&lt;/sup&gt; ND virus</td>
<td>18</td>
<td>-</td>
<td>3</td>
<td>9</td>
<td>66.6</td>
</tr>
<tr>
<td>10&lt;sup&gt;7&lt;/sup&gt; ND virus</td>
<td>18</td>
<td>-</td>
<td>2</td>
<td>10</td>
<td>66.6</td>
</tr>
<tr>
<td>10&lt;sup&gt;4&lt;/sup&gt; AE virus</td>
<td>30</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Control (non infected)</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Transmission was evident, but its detection requires reisolation

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Table (2): Effect of disinfectants on ND and AE viruses

<table>
<thead>
<tr>
<th>Disinfectant</th>
<th>Titer of treated N.D. virus with disinfectant</th>
<th>Titer of A.E. virus with disinfectant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenolic acid</td>
<td>$10^2$</td>
<td>$10^2$</td>
</tr>
<tr>
<td>Isopropyl alcohol</td>
<td>$10^2$</td>
<td>$10^1$</td>
</tr>
<tr>
<td>Acriflavine</td>
<td>$10^6$</td>
<td>$10^3$</td>
</tr>
<tr>
<td>Iodine and Pot. iodide</td>
<td>$10^6$</td>
<td>$10$</td>
</tr>
<tr>
<td>Chloramine T.</td>
<td>$10^6$</td>
<td>$10^1$</td>
</tr>
<tr>
<td>Formalin</td>
<td>$10^6$</td>
<td>$10$</td>
</tr>
<tr>
<td>Control</td>
<td>$10^6$</td>
<td>$10^1$</td>
</tr>
</tbody>
</table>

None of the above chemicals had complete effect on the viruses.

Table (3): Suitable concentration of effective disinfectants on N.D and A.E viruses

<table>
<thead>
<tr>
<th>Virus treated</th>
<th>Effective disinfectants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Isopropyl alcohol</td>
</tr>
<tr>
<td></td>
<td>5%</td>
</tr>
</tbody>
</table>

1) Titer of N.D. Virus after treat. with

|               | $10^5$ | $10^3$ | $10^3$ | $10^4.5$ | $10^2.5$ | $10^2.5$ | - | - | - |

2) Titer of A.E Virus after treat. with

|               | $10^2$ | $10^{1.5}$ | $10^{1.5}$ | $10^{3.5}$ | $10^{2.5}$ | $10^{2.5}$ | $10^3$ | $10^2$ | $10^2$ |

10% isopropyl alcohol and 1% phenolic acid were the most effective concentrations against ND and A.E. viruses.

**DISCUSSION**

Newcastle disease virus transmission, through egg shell was evident, not by embryonic deaths but by virus reisolation and +ve hemagglutination activity. WALKER and POWELL (1950) showed that no evidence that it transmittes to the eggs, but VAN ROCKEL (1946), ASPLIN (1949), and ZARGER and POMEROY (1950) reisolate Newcastle disease virus from eggs. Eggs were dipped in either 10% isopropyl alcohol or 1% phenolic acid, although incubated with infected eggs were protected from the virus, the disinfectants used inactivated the virus within a certain limit, however no complete inactivation occurred. BREMER et al. (1949), and SCHMITTE and MONSFIELD (1950), reported that fumigation with formaldhyde inactivated the virus on egg shell. MANHELL and HERLYN (1976) showed that chloramin T and iodine were the most effective disinfectants on the virus, but REDA and AHMED (1967) showed that Newcastle disease virus was not inactivated by hydroxylamine.
Avian encephalomyelitis virus transmission through egg shell was evident and easily could be detected by embryonic deaths and presence of specific lesions, although no eggs from the control group seemed to be contaminated when incubated with infected eggs. JONES (1934), and BOTROFF et al. (1936) showed that no evidence that avian encephalomyelitis virus is transmitted to the eggs, but TAYLOR et al. (1955), and SCHOF and LAMOREUX (1955) showed that the infection was egg borne. Dipping eggs in disinfectants protect clean eggs from contaminated ones, although set in the same incubator. The disinfectant used inactivated avian encephalomyelitis virus with a certain limit, however no complete inactivation occurred, this agreed with CALNEK et al. (1960), MIYAMAE (1974), and ITAKURA and GOTO (1975).

REFERENCES


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