

# **Vaccination failure(mangmental factors)**

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## **Introduction:**

In the beginning we need to define some terms to understand our research goals.

## **What is the vaccine ?**

Is a biological preparation (virl,bacterial,protozoan)which introduced to the bird to improve its immunity to a particular disease.

## **What is the vaccination ?**

Administration of a biological preparation (virl,bacterial,protozoan) to stimulate the immunity system to produce specific anti body levels against a particular disease by specific methods according to the manufacturer instructions.

## **What is the immunization ?**

After vaccination ,the immune system of the bird and its immune cells provoke the immune response and present the anti gen to T lymphocyte and by macrophage and from there it is expressed to B lymphocyte where response is initiated in term of anti body.

## **Why we vaccinate the poultry flocks ?**

Simply is to protect poultry flocks against field disease organisms .but when we look to the picture from larger aspect we find that the poultry industry and investments increased in

last few years to meet the needs of people from meat and eggs due to increase in no. of people all over the world and there for their needs form meat and eggs production increase so we need to produce healthy protected flocks to produce the people needs and to avoid money losses by billions in case of infection occurs.

### **Types of poultry vaccines.**

**1-Live attenuated vaccines:** the attenuation occurs through serial passage of alive pathogen as a virus into S.P.F embryted chicken egg or tissue cultures which reduce the virulence but it still able to replicate in the host inducing mild infection this leads to stimulating both cell and antibody mediated immunity response.

**2-killed inactivated vaccines :** inactivation occurs by heat or chemical treatment and after vaccination it is stimulate only antibody mediated immunity response and it requires adjuvant compound ;the aim of this type is to control clinical signs of the disease.

**3-DNA vaccines:** the DNA encoding an antigen of a pathogen is inserted to vector plasmid and when insert in the host it elicit both cell and antibody mediated immunity response.

**4-Recombinant vaccines:** Encoding proteins of specific viruses on pox virus or marek's virus as vectors and when insert in host it elicit both cell and antibody mediated immunity response.

### **How to apply the vaccine?**

There are many methods used to apply the vaccine all of them depend on the manufacturer instructions.

**1-in ovo vaccination:** this technique applied in the hatchery by the Inovoject system requires two well-trained persons at 18-day-old embryonated eggs, this technique reduce labor costs, stress of handling and injection, earlier development of immunity ,for a live vaccines.

**2-Drinking water vaccination:** applied in water which not contain sanitizer or add the vaccine stabilizer , enough drinker, enough thirst time that allow the bird consume the vaccinated water maximum in two hours, use of the vaccine as soon as possible after reconstitution, for a live vaccines.

**3-spray method vaccination:** apply of a live vaccine by spraying using cabinet sprayers in the hatchery or we spraying the bird in the farm. We should close the ventilation system before and after applying of the live vaccine for short time to adjust RH and make that the vaccine comes on the bird, also decrease the light intensity or spray at the night, the adjustment of the size of the droplet according the age of the flock, take care of the respiratory problems before spraying to avoid the post vaccinal reaction, use of treated water free from sanitizer or minerals.

**4-Eye drop vaccine:** apply of a live vaccine into the eye ,costs labor, time more accurate

**5-Wing web vaccination:** in case of pox vaccines which reconstituted in special diluent and applied by special forks with double needles.

**6-Injection method vaccination:** for both live attenuated live and killed inactivated vaccination which applied S/C or I/M .

## **What are our research Items ?**

1- When the vaccination failure occurs?

2-Causes of vaccination failure .

3-Notes on manage mental causes of vaccination failure.

And finely.....

### **The research goal Is**

How to overcome the causes of vaccination failure.

#### **1-When vaccination failure occurs?**

A vaccination failure occurs when, following vaccine administration, the chicken do not develop adequate anti body titer level and /or are susceptible to afield disease outbreak and the tendency to blame the vaccine although there are other factors must be evaluated to determine the cause of vaccination failure.

#### **2-Causes of vaccination failure.**

A--Causes related to the vaccine itself:1-use of an expired vaccines which leads to no immunity response.

2-use of a vaccine of poor antigenicity which means that the live vaccine must be applied at the level or above the minimum infective dose and also inactivated vaccines should contain sufficient amount of antigen to stimulate an immune response when applied to the bird

3-use of vaccine strain/serotype different from field strain which leads to no protection against field strain

4-use of a vaccine that has been excessively attenuated which leads to a lack of immunogenicity and enhances the susceptibility to field challenge.

B—Management causes of vaccination failure.

### **(3) Management causes of vaccination failure;**

**1- the vaccination program** :use of one stable vaccination program to the farm without any considerations to the field strains challenge .

**2- Improper storage and transportation of vaccine** :this is most common cause of vaccine failure in routine use of vaccine. This might be due to improper transportation from manufacture to distributor to market or from market to farm. Failure of electricity ,failure of refrigerator ,storage in deep freezer ,exposure to sunlight ,ignoring use of ice box ,coolers, using of translucent thin membrane shopper permitting the sunlight exposure , and exposure to viricidal disinfectant(phenol-alcohol) this inactivate the vaccine

**3-Improper handling of the vaccine**: improper handling prior administration leads to vaccine damage, we must use of a live vaccine as soon as possible after reconstituted such as marek's disease vaccines are extremely fragile and failure to follow manufacturer's recommended handling practices will result in the inactivation of virus prior to administration. Also infectious bronchitis virus is reported to lose approximately 50% of its potency in warm conditions less than one hour after reconstitution.

**4-Improper administration of the vaccine:** via inappropriate route/site for example pox vaccine has mistakenly been confused with I.L.T vaccine gives by eye drop route which resulted in pox lesions in eye with substantial losses. Also if the vaccinator fails to deliver killed vaccine in appropriate site(I/M or S/C) this leads to vaccination failure, also missing birds during mass vaccination (drinking water or spraying) depending on horizontal transmission after virus replication in vaccinated bird result in excessive reaction for long time which delayed immunity in flock. The time consumed after reconstitute live vaccine in drinking water must not exceed 2 hour, and the hard water with high salt concentration has adverse effect on vaccine quality, spraying of vaccine inappropriate droplet size may lead to sever post vaccinal reaction such as fine spraying to small chicks less than 2 weeks old, also relative humidity will affect on droplet size during spraying,we must use vaccine stabilizer before drinking water vaccination.

**5-The effect of passive immunity(maternal immunity):** If the breeder flock has high levels of circulating antibodies which pass to the progeny through egg this may interfere with replication of live vaccine viruses as they would for field challenge viruses this will decrease the immune response to vaccine because it is not stimulate the immune system as long and to as great an extent. for example to IBD gumboro disease , if chick comes from hen breeder of high level of antibody for IBD the chick will typically has high level of maternal antibody for several weeks and vaccine will be neutralized and decreased response to vaccine results on the other hand delaying vaccine until antibody has been catabolized may leave the bird susceptible to field challenge.

**6-Environmental stress factor:** such as extreme heat produce high level of steroid which decrease lymphocyte so antibody not produced ,high level of relative humidity ,presence of ammonia in house its level exceed 30 ppm has bad effect on bird ability to produce local immunity due to destruction of cilia and cell on surface of moist membrane are affected badly because ammonia is a water soluble gas. So the bird become susceptible for infection particularly those which proliferate in respiratory system, poor nutrition like hypoproteinemia and antibodies made up of amino acids

**7-Health status of the flock:** timing of vaccination is very important because we can vaccinate apparently health flock and disease occurs due to during vaccination the flock already incubating disease, avoid vaccination of sick flock because of their immunity system is already functioning at diminished capacity.

**8-Immuno-suppressive conditions:** such as infection with IBD-CIV-Marek's disease , mycotoxicosis means that both cellular and non-cellular immunity not functioning properly result in development of limited protection and excessive vaccine reaction including morbidity and mortality.

**9-Genetic resistance:** the major histocompatibility complex (MHC) varies from bird to bird and its structure dictate if a bird will respond to an antigen at all, due to some structural lack in MHC it is possibility that birds recognize one of antigen therefore that strain of birds might be more susceptible to pathogen

**10-excessive use of drugs:** lead to immune-suppressive bird causing poor immunity development.

**11-Interference:** interference between two vaccines cause vaccination failure,for example live respiratory vaccines (IB,ND,ILT)should not be given within 3-4 days if not combined by the manufacturer in licensed combination ,reaction may be too great or response to latter vaccine may compromised due to interference.

#### **4-How to overcome vaccination failure.**

**1-Biosecurity:** means making of some preventive measures to prevent the introduce the disease into the farm by,

##### **a-between 2 cycles;**

1—proper cleaning and disinfection

2—water quality,water sanitation

3—insect control

4—rodent control.

5—feed sanitation(treatment)

##### **b-when the flock in;**

1—provide proper and good mange mental factor;

/provide suitable temperature.

/provide suitable relative humidity.

/provide suitable stocking density.

/provide good balanced ration.

/provide vitamins and mineral therapy

/decrease uses of drugs.

/provide suitable ventilation system.



### **c—vaccination;**

/make suitable vaccination program according to diseases challenge in farm area

/follow the all instruction of manufacturer's in storage, transportation , handling , and administration.

/use of well-trained persons.

/make vaccination records to each cycle to discover any failure.

### **d—control measures during the cycle**

/strict control at the gates of the farm

/strict control on the vehicles

/strict control on visitors

/strict control on pets ,wild birds and rodents.

/put disinfectant in front gates, every poultry house.

/proper disposal of dead birds.

