

## Basics of day old chick vaccination by injection

The injection of a live water based or inactivated oil based vaccine using automatic or semi-automatic equipment is a common activity in hatcheries. In this method, injection failure can lead to more immediate consequences like wet fluff, bleeding, lameness or death of the chick. Equipment selection and team training is of paramount importance to ensure successful vaccination and animal welfare.

### Technique

The principle consists of using the parenteral route to bring a live virus vaccine (Marek, Gumboro immune-complex) or an inactivated virus vaccine (Newcastle disease, influenza) in contact with its first target cells: the macrophages. The desired immunity is mainly general (systemic).

Two routes are possible, subcutaneous and intramuscular, with comparable results. Needle diameters will be chosen according to the vaccine and volume used: 0.7-0.8mm for 0.2ml of water based vaccine or 0.1ml of oil based vaccine, 0.9-1mm for 0.2ml of oil based vaccine.

### Automatic equipment

Automatic machines only use the subcutaneous route. They can be fitted with one or two needles depending on whether one or two non-miscible vaccines (water and oil based vaccines) are injected. The energy required for mechanical movements and injection is both electrical and pneumatic.

The operator takes a chick in each hand and places their heads in a compartment of the machine designed for this. The chicks are stuck at the level of the neck: their spinal column is moderately extended by pushing on their back. Injection is done on the dorsal side of the neck, in its lower third part.

In general, the machines also administer an eye spray (a method close to the eye drop) and some of them can trim beaks.

The spray may also be oriented towards the mouth for anticoccidial vaccination. The positive aspect of this is the reduced number of stresses as all the operations are carried out in one attempt.

Chicks can be brought manually (box by box) or continuously on a conveyor belt. In the latter case, the machines can reach 4,000 chicks per hour.

The risk of incorrect injection is reduced by the automatic positioning system: if the operator does not place the chick properly at the beginning of the cycle, the machine jams and injection does not occur. Needle movements take place behind a 'protection carter' installed in the machine, thus making it impossible for the operator to get injured.

Currently, systems are being tested to automate chick catching and completely eliminate human intervention.

## Semi-automatic equipment

Unlike automatic equipment, the operator maintains the chick on the machine during injection: the progress of the operation is closely related to his/her dexterity and carefulness.

Semi-automatic equipment can perform subcutaneous injections in the neck or intramuscular injections in the thigh. The machines are used with boxes brought manually or with 'chickgo-round' carousel conveyors. They can be either pneumatic or electrical.

The recommended working speed is 2,500 chicks per hour. Some people can reach much higher speed rates, but this can negatively affect the injection quality. Normally these machines are equipped with only one needle. Twoneedle machines have been developed but do not seem to be satisfactory (injured chicks).

Currently, some machines on the market, like the Dovac Double Automatic Injector, are fitted with one needle connected to two syringes. Each syringe contains a vaccine that will be injected successively according to the following cycle: penetration, oil based vaccine injection, water based vaccine injection, needle withdrawal. It can inject a water based vaccine and an oil based vaccine at the same time, as long as the vaccines are compatible.

During the injection cycle, the needle pops out of the machine; therefore, these systems present some risk of selfinjection in the operator's finger, particularly if chicks are not taken or held on the machine properly, or if the work pace is too fast. The phase of personnel training is very important.

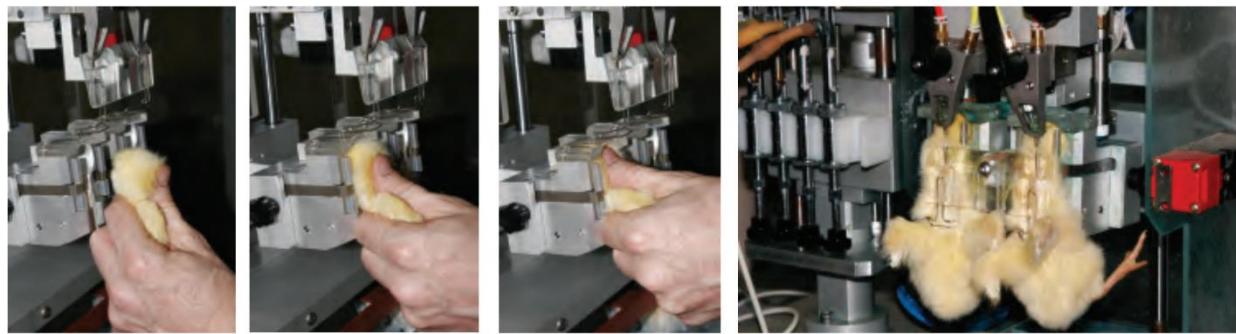
## Manual injection

Manual Injection consists of injecting the vaccine manually using an automatic syringe. At each injection, the syringe is automatically refilled with vaccine continuously supplied by a connected tube.



As this system is slow (500-1,000 injections per hour) and depends a lot on the operator's skill, this practice no longer exists, except in countries where labour is inexpensive.

The risks of injection failure or self-injection are very high.



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