Finding alternatives to formaldehyde

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The European Union may not support formaldehyde under its European Biocidal Directive (EBC) as of July 2008. Even if formaldehyde is to be supported, many hatcheries are looking for formaldehyde free disinfection programmes, as formaldehyde is known to be a carcinogenic hazard.

The alternatives that are presented here are disinfectants based on glutaraldehyde and different quaternary ammonia compounds (QAC) and disinfectants based on stabilised hydrogen peroxide and peracetic acid. All these ingredients are supported by the EBC. There are different applications possible.

Disinfection of hatching eggs

● **Spraying disinfectants on eggs.**

A myth in incubation is that a hatching egg should never be wetted! However, in nature, many birds brood in an open air nest, where it can rain on the eggs when the bird leaves to eat and drink. Even non-aquatic birds walk in damp grass and thus wet their eggs with their damp breast feathers when coming back in the nest, so it is natural.

Hatching eggs can be washed with alkaline products (based on potassium hydroxide), to remove mainly fat and protein, which can be either chlorinated or non-chlorinated.

Proper temperature control (42-45°C or 108-113°F) is crucial. The water should be warmer than the egg contents throughout the cleaning cycle. This will result in a positive pressure in the egg, causing the inner membrane to expand against the shell to help prevent anything from entering the egg.

Contact time should be limited to approximately five minutes, in order not to damage the cuticle.

Ideally, the washing machine should be temperature and concentration controlled (automatically stopping when either are not optimal).

Disinfection afterwards should be at a slightly higher temperature, to prevent the product from entering the pores (45-47°C or 113-117°F); after rinsing at the same temperature. Use only disinfectants chemically compatible with the cleaning product. There must be no conflict between the surfactants in the cleaning product (anionic surfactants neutralise cationic).

Use only recommended disinfecting products at the correct concentration or penetration of the cuticle can occur. Ideally, a disinfectant with a residual action should be used, to prevent early re-contamination.

Spraying disinfectant on eggs in the hatchery, when correctly applied, is perfectly acceptable. Field results have proven it works. The disinfectant used is a combination of glutaraldehyde and different quaternary ammonia compounds (QAC).

Drysan from MSTechnologies is an application transforming any suitable liquid chemical into a fine dry gas.

However, oxidisers (based on stabilised hydrogen peroxide and peracetic acid) can also be used.

An official test in Poland concluded that 'the results obtained in both tests indicate that it is possible to use a 0.5% solution of Cid 2000 to disinfect hatching eggs of hens by spraying as an alternative to formalin'.

● **Ultrasonic fogging.**

The advantage of ultrasonic fogging is that the eggs do not get wet. It creates a smoke type of fog, of only 20 microns approximately.

As an alternative to formaldehyde fumigation, the Dutch Research Institute Praktijkonderzoek Pluimveehouderij Beekbergen found CID 2000 (a stabilised mixture of peroxygens and organic acids) in an ultrasonic fogger as efficient as formaldehyde, without affecting hatchability.

A new type of ultrasonic fogger, such as Drysan from MST, allows for other products than oxidisers, such as glutaraldehyde/QAC combinations. The advantage of such a product is that it is absolutely non corrosive. Field trials have proven its efficacy. This type of fogger is easy to install both on the breeder farm and in the hatchery.

● **Evaporating oxidising disinfectants.**

Mixtures based on stabilised hydrogen peroxide and peracetic acids with appropriate evaporative enhancers (as in CID 2000) have a boiling point of 50°C (122°F) and a flashpoint of 100°C (212°F).

If you heat up this type of product in the same type of pot as used for formaldehyde fumigation (provided it is stainless steel) at

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approximately 80°C (175°F), the evaporated product will disinfect the eggs without wetting them. This simple technique is successfully being applied on different continents. Testing data, indicating the appropriate ratio product volume/hatching room can support its efficacy, and is available upon request.

Disinfection in the incubator

● **Spraying in the setter during incubation.**
When using multi stage, it is particularly advisable to disinfect the setter by spraying in the cabinet. A combination of glutaraldehyde and quaternary ammonia is suitable. Quaternary ammonia alone will not kill fungi (Aspergillus fumigatis) and Pseudomonas have proven resistance against certain QAC.

● **Spraying in the hatcher during incubation.**
A glutaraldehyde/QAC combination will certainly do the job. However, the day old chicks will be less yellow. On the other hand, this technique will not 'burn' their trachea as formaldehyde does. Field trials have shown that chick quality is not affected at all.

● **Misting in the rooms.**
A combination of glutaraldehyde, QAC and alcohol (that makes the product 'lighter' and holds the suspension longer in the air) can be used to mist the setter room and the hatcher room (at night).

The advantage of this technique is that aerial disinfection is obtained to reduce bioaerosols. The mist goes through the machines via their inlets and leaves them via their outlets. Thus, the extraction ducts are also disinfected. Do not forget to clean extraction ducts from hatchers after every hatch. It is obviously easier to clean plenums or fluff tunnels. Salmonella can live in fluff for 4-5 years.

● **Disinfecting empty setters and hatchers.**
Excellent field results have been observed by foaming a glutaraldehyde/QAC combination. Foaming, contrary to spraying, allows a visual check to be carried out. One can see if the product has been applied on all surfaces. It also allows for a longer contact time and hence for a longer residual action.

In conclusion, it is possible to replace formaldehyde with disinfectants that are supported by the EBD and have been tested and registered and more and more hatcheries are doing so.

As always, to be successful the three Ps have to be managed correctly – products, procedures and people. ■

References are available from the author on request