

STUNNY

Stunning of male embryos in the egg
in compliance with animal welfare



STUNNY



The challenge: Handling rejected embryos in an animal welfare friendly way.

The aim of in ovo sex determination in chicken hatching eggs is to detect male embryos and terminate their development at an early stage of incubation to avoid culling day-old-chicks after hatch. None of the market-ready methods that are currently being used are applicable in the first trimester of incubation.

In the discussion about the onset of pain perception, the question arises as how to handle the rejected male embryos in methods that are used from the seventh day of incubation onwards. Although numerous studies point to a definite absence of pain perception in the chicken embryo in the first trimester of incubation, there are no reliable findings on pain perception for the period of the second trimester of incubation.

For sex determination methods that are used after the seventh day of incubation, a solution is sought to interrupt the development of the male embryos in an animal welfare friendly and consumer acceptable manner. The EC Regulation No. 1099/2009 generally



allows simultaneous stunning and killing by mechanical disruption, however this has been met with little societal acceptance. According to its general definition in EC Regulation No 1099/2009, the term stunning means "[...] any intentionally induced process which causes loss of consciousness and sensibility without pain [...]".

The solution: Electrical anaesthesia of male embryos in the egg with STUNNY.

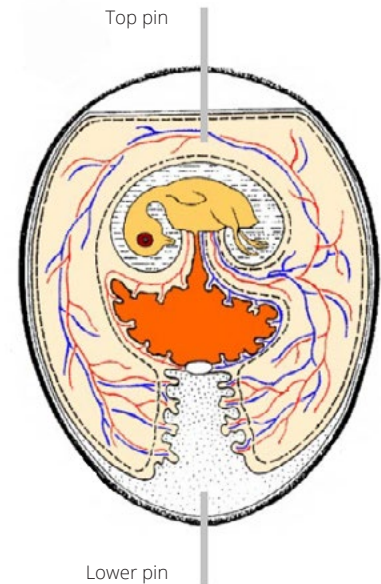
A practical method for embryo stunning in accordance with animal welfare requirements thus represents a further relevant step towards better animal welfare.

The novel method of electrical anaesthesia of male embryos in the egg is intended to close the gap precisely at this point.

In scientific studies it was proven that embryonic reactions associated with possible awareness of pain were absent in 99.3% of the examined embryos after perfusion with 110 Volt over two seconds (ZUMBRINK et al., 2020*). On this basis the high-throughput machine STUNNY was developed and evaluated in collaboration with the German Training and Consultancy Institute for animal welfare at transport and slaughter (bsi Schwarzenbek).



* Zumbink, L. et al. (2020). Electrical anaesthesia of male chicken embryos in the second third of the incubation period in compliance with animal welfare. *European Poultry Science*, 84.



modified after KALWEIT and BURMEISTER (1995)

The fully automated STUNNY anaesthesia unit is adjacent to the output of male embryos from the CHEGGY unit. Inside the STUNNY, the male embryos are anesthetized by electric current flow to eliminate any possible pain sensation for the embryos at the interruption of development.

Process Steps

1. Neutral position



The conveyor belt transports the eggs to the stunning pins.

2. Egg fixation



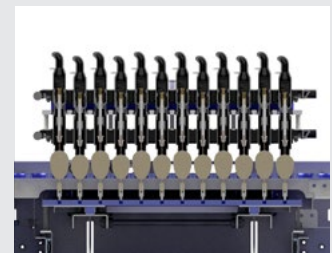
The stunning pin injectors will be positioned and locked. The position depends on the egg size.

3. Lower pin punch

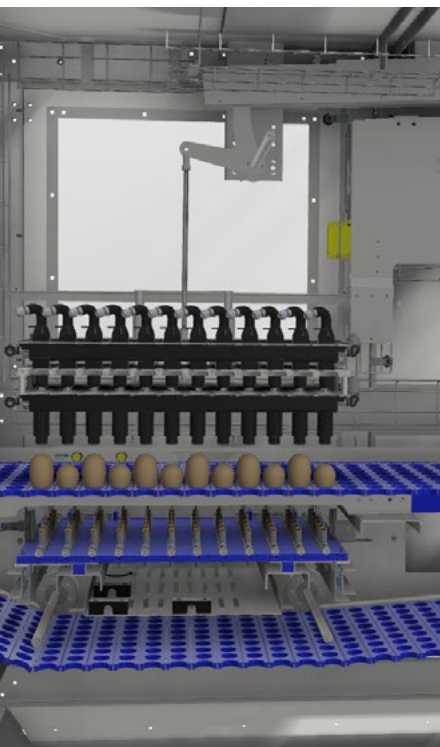


First, the bottom stunning pins penetrate the eggshell and connect with the egg fluid.

4. Top pin punch



Then the top stunning pins penetrate the eggshell and connect with the egg fluid. Now the electrical stunning gets started.



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Advantages

STUNNY enables hatcheries to integrate the stunning of male embryos in the egg in compliance with animal welfare during the second-third of incubation. The fully automated technique is based on a newly researched method and offers high throughput rates with maximum effectiveness simultaneously.

- ✓ Secure anaesthesia of embryos in the egg in seconds
- ✓ Throughput of up to 10,000 eggs per hour
- ✓ Camera-based position detection of hatching eggs
- ✓ Special egg fixation system for equal penetration depths with different egg sizes ensures maximum effectiveness
- ✓ Measurement and online documentation of the achieved current flow **per individual egg**
- ✓ Visualization of individual current flow rates, curve progressions or summarizing statistics on the display
- ✓ Complements the sex determination in the hatching egg with AAT's CHEGGY perfectly



Agri Advanced Technologies: From research to practice.

Technologies for poultry breeding and husbandry

Agri Advanced Technologies GmbH (AAT) founded in 2015 is a subsidiary of the global company EW GROUP, headquartered in Visbek, Lower Saxony, Germany.

Our main field of activity is the development of specialized application technologies for poultry breeding and husbandry, for example machines for in ovo sex determination of layers, grading and vaccination devices for broiler breeders or technical solutions for feed disinfection.

Knowledge through global network

We work closely with our sister companies in the EW GROUP, drawing on their knowledge from various fields. In addition, if necessary, we cooperate with external institutions such as universities or research service providers, as well as other business enterprises.

Solutions from one hand

Our solutions encompass the entire process of development, starting at scientific analysis through to the construction of the application technique until documentation and hand-book preparation.

We implement theoretical knowledge gained through research into practical applications and provide a range of solutions in the areas of poultry breeding and husbandry for customers all over the world.



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