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Type and level of production provided by the requestor

Type of production: Broiler, Laying hen, Pullet, Turkey

Level: Killing, Hatchery

Keywords: Skeletal damage, management, stress

Background context provided by the requestor

Killing of unhatched chicks in shell/egg embryos through macerators in hatcheries.

Question raised by the requestor

Killing of egg embryos

1. How can authorities assess key parameters 1) maximum size of the batch to be introduced and 2) speed of rotation?

2. For key parameter distance between blades, the regulation does not set a maximum distance. Can the EURCAW Poultry SFA give recommendations for maximum blade distance for embryos of Gallus gallus and turkeys at the time of hatch (fully grown embryos)?

Answer

Introduction: killing egg embryos of *Gallus gallus* and turkeys at the time of hatch (fully grown embryos)

The information found about instantaneous mechanical destruction in literature is related to day-old chicks. It has not been found information related to embryos in unhatched eggs. However, the size of an embryo at the time of hatch and a hatched chick are similar, so the same recommendations (presented below) should apply for fully grown embryos.

Question 1: How can authorities assess key parameters 1) maximum size of the batch to be introduced and 2) speed of rotation?

These key parameters depend on the size and design of the macerator, which determine its capacity. Therefore, detailed instructions for the use of the equipment should be provided by the manufacturer, including species, categories, maximum size of the batch for which the equipment is intended to be used, speed of rotation and other recommended key parameters (Council Regulation (EC) No 1099/2009 of 24 September 2009 on the protection of animals at the time of killing, Article 8, letters a and b). So, maximum size of the batch and speed of rotation should be specified by the manufacturer for each type of equipment based on scientific studies. Instructions should be carefully read to check the compliance of the equipment.

To check if the maximum size of the batch is being respected, the number of eggs introduced in the machine should be calculated. Assessment of the eggs at the entrance of the macerator is recommended, to ensure that they are not being loaded before the previous ones are destroyed and they are not being thrown out of the machine by the blades. If overloading is detected, flow of eggs at the entrance of the machine should be reduced to avoid accumulation at the entrance (adapted from Close et al., 1997; EFSA, 2019; HAS, 2023).

Speed of rotation should be clearly detailed in the equipment guidance. Assessment should be made by checking the user manual of the equipment and equipment configuration. Close et al. (1997) describes that during maceration (of

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day-old chicks) blades must rotate at more than 5,000 rpm. Assessment of the macerated debris is recommended to ensure that unhatched embryos are dead when they come out of the machine. Mechanical destruction of embryos should result in slurry, rather than recognizable body parts such as internal organs, legs, wings and heads, to ensure that embryos were truly macerated (adapted from HSA, 2005; EFSA, 2019).

Question 2: For key parameter distance between blades, the regulation does not set a maximum distance. Can the EURCAW Poultry SFA give recommendations for maximum blade distance for embryos of *Gallus gallus* and turkeys at the time of hatch (fully grown embryos)?

Maximum blade distance should be provided by the manufacturer. The EURCAW cannot provide specific recommendations, as it depends on the design of the macerator and size of the eggs.

However, the Human Slaughter Association (HSA, 2023) states that if a "crushing" design is used, the gap between the rollers or side projections, i.e. the area through which chicks are crushed, should be less than 10mm for *Gallus gallus chicks*. The gap must never exceed 10mm and the rollers must not be forced apart as the chicks pass through (Figure 1).

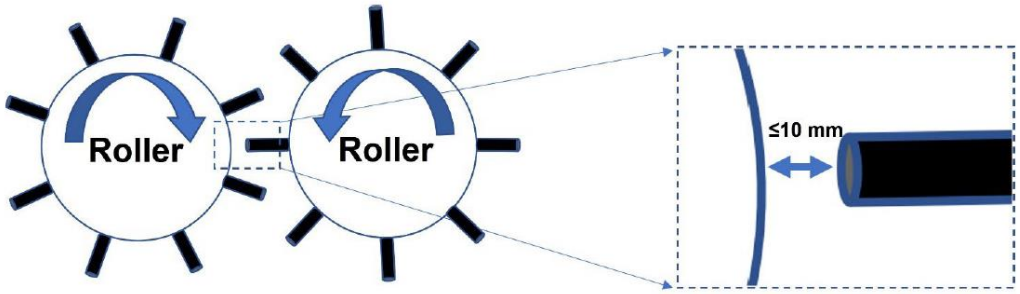

Figure 1: Roller-type design, with details of the distance between roller and projections. Source: HSA, 2023.

Same recommendations should apply for fully grown embryos of *Gallus gallus*. As turkey embryos are larger than *Gallus gallus* embryos, keeping this distance should not be a concern, whereas having a larger distance would be a welfare issue for *Gallus gallus* embryos. Therefore, setting should be adapted to egg size, to ensure the destruction of the embryos.

Conclusions

Manufacturer instructions should be provided specifically for each macerator and carefully read to check the compliance of the equipment. Assessment of the macerated debris is recommended to check if the machine is working properly, and all unhatched embryos are dead when they come out of the machine. Assessment of the unhatched embryos at the entrance of the macerator is recommended, to ensure that eggs are not being loaded before the previous ones are destroyed. A maximum distance of 10 mm between blades is recommended in literature and should be suitable for *Gallus gallus* eggs.

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