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Effects of post-hatch fast of chick on digestive tract development and growth performance according to diet and rearing environmental conditions

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Abstract

In commercial conditions, chicks underwent a post-hatch fast (PHF) between 24 and 72h, and about 24h when hatchery and farm are in the same region. Effects on digestive tract development (DTD) and animal growth are controversial due to several factors such as definition of bird age (from hatching in most studies, or from farm arrival), animal genetics, or dietary and environmental conditions (DEC).

Here, the effect of PHF was studied on body weight (BW) and DTD of Ross PM3, during a first experiment (48h fast), with age of birds determined as the age at farm arrival with access to feed and water. To study the effect of DEC, birds were reared either in optimal DEC, or damaged DEC (low quality diet and/or low quality rearing environment) in a 2x2x2 factorial design (6 pens/treatment ; 54 birds/pen of 2.3 m² of useful area). In a second experiment, the effect of a shorter PHF (24h) was studied on chick BW and DTD.

In the first study, PHF showed effects on DTD, BW and animal health, differing according to DEC. At the farm arrival, PHF chicks had lower BW than direct fed (DF) chicks (-3.5 g), due to lower yolk sac (YS) (2.0 vs 5.1 g), but similar BW without YS. The relative weight (rW) of the segments of the DT (expressed relative to BW without YS) was higher in PHF chicks (proventriculus : +37% ; gizzard : +33% ; small intestine (SI) : +27 ; caeca : +79%). At 3 weeks of age (w), PHF showed no effect on the DT, but, at 5 w, a lower rW of gizzard (- 14%) was observed in PHF chickens, irrespective of DEC. No difference in SI morphology was observed at 3 and 5 w, irrespective of DEC, as well as for dry matter ileal digestibility at 3 w. In optimal DEC, PHF led to beneficial effect on BW as well as at 3 w (+5%) and 5 w (+3.5%). Damaged DEC led to a higher decreased BW in PHF than in DF chickens, -12% and -10.5% respectively at 3 w, and -16% and -10% at 5 w. This led to a lower final BW in PHF compared to DF chickens (-3.5%). These damaged DEC led to higher footpad dermatitis in PHF chickens at 3 w, but no difference at 5 w.

In the second study, a decrease of chick BW after PHF was also observed (-2.6 g), due to lower YS (3.2 vs 6.0 g), as well as an increase of the rW of the segments of the DT (proventriculus : +21% ; gizzard : +25% ; SI : +23% ; caeca : x 2.75).

In conclusion, PHF (24 or 48h) has a positive effect on the chick DTD. These PHF seem beneficial on bird growth in optimal, but not in damaged DEC. This period of live needs to be managed according to DEC.