

PRESERVING HATCHABILITY AND POST HATCH PERFORMANCE IN LONG STORED EGGS IN PRACTICE

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SUMMARY

An experiment has been conducted in practice to study the effect of temporary heating of hatching eggs before storage on hatchability, broiler performance and slaughter yield. Results showed that this technique can decrease the negative effects of storage on hatch results and broiler performance, and improve slaughter yield of female broilers, regardless of age of the parent flock or storage time.

INTRODUCTION

Storage of hatching eggs has detrimental effects on hatchability (Brake et al., 1997) and post hatch performance (Tona et al., 2004). With increased hatching egg storage time, egg quality deteriorates and embryo vitality decrease (Benton and Brake, 1996, Decuyper et al., 2001). Common stage of embryonic development at oviposition was around stage X (Fasenko et al., 1992), but embryos in more advanced stages seem to be more resistant to variable storage conditions (Coleman and Siegel, 1966).

Temporary heating of hatching eggs before storage at incubation temperature was tested positively to bring more embryos to a higher developmental stage (Kosin, 1956, Fasenko et al., 1992), and prevented hatchability to decrease less with storage time (Fasenko et al., 2001, Lourens, 2002). Because the heating technique worked well to maintain hatchability in eggs stored longer than 7d (Lourens, 2006), the question rose what the heating effect would be for eggs stored for less than 7d. Also, the effects of heating eggs on broiler performance and slaughter yield is unknown. Therefore, an experiment was carried out to determine the effect of temporary heating of hatching eggs at incubation temperature at the breeder farm to determine hatchability, broiler performance and slaughter yield.

MATERIALS & METHODS

A commercial incubator (EMKA, Belgium) has been installed at a Ross 308 broiler breeder farm to warm up half the daily production of hatching eggs for 4 hrs effectively at 37.8°C eggshell temperature. The other half of the daily production was not warmed and used as reference. At the flock age of 35 and 55 weeks, warmed and non warmed eggs were stored for 3 and 10 days, and incubated to determine hatch results in 6 hatching baskets per group. Next, chicks were sexed and 72 male and 72 female chicks per group were taken to the broiler grow out facilities at “Het Spelderholt” in Lelystad, The Netherlands. A total of 48 floor pens were used, at a stocking density of 12 chicks per pen (0.75 m²) to determine growth, feed consumption and slaughter yield.

RESULTS & DISCUSSION

The four-hour effective heating period was chosen carefully, because it is known that longer heating periods can seriously decrease hatch results (Lourens, 2002).

Therefore, it has to be realized that pre-incubation techniques need to be developed further to become fully monkey proof. In the recent study, heating of hatching eggs had no effect on hatchability in eggs that were stored for only 3d. The percentage of chicks that hatched from fertile, long stored eggs was increased by 0.2 % ($P>0.05$) and 3.1 % ($P<0.05$) in eggs from parents of 35 and 55 wks, respectively, compared to short stored eggs. The differences could be related to differences in early embryonic mortality. Effects of the heating treatment on broiler performance is summarized in Table 1.

TABLE 1. Effect of storage time (short = 3d; long = 10d) and heating treatment (No or yes) on bodyweight (BW), feed consumption (FC) and feed conversion ratio (FCR) in broilers that hatched from parents of 35 and 55 wks of age.

Storage	Heating	Males			Females		
		BW	FC	FCR	BW	FC	FCR
Parent age: 35 wks							
Short	No	2422 ^a	3678 ^a	1.52 ^{ab}	2124 ^a	3342 ^a	1.57 ^a
Short	Yes	2409 ^a	3571 ^b	1.48 ^b	2108 ^a	3301 ^a	1.57 ^a
Long	No	2352 ^b	3632 ^a	1.54 ^a	2031 ^b	3199 ^b	1.58 ^a
Long	Yes	2425 ^a	3674 ^a	1.52 ^{ab}	2116 ^a	3254 ^{ab}	1.54 ^b
Parent age: 55 wks							
Short	No	2425 ^a	3851 ^a	1.59 ^{ab}	2079 ^a	3338 ^a	1.61 ^b
Short	Yes	2457 ^a	3800 ^{ab}	1.55 ^b	2038 ^{ab}	3259 ^b	1.60 ^b
Long	No	2351 ^b	3784 ^b	1.61 ^a	2003 ^b	3344 ^a	1.67 ^a
Long	Yes	2429 ^a	3823 ^a	1.57 ^{ab}	2068 ^{ab}	3302 ^{ab}	1.60 ^b

In general, the heating technique prevented a loss of technical results for chicks that hatched from long stored eggs. This effect was more pronounced in chicks that hatched from eggs laid by older parents. Effects of the heating treatment on slaughter yield is summarized in Table 2.

In general, the heating technique could not prevent a certain decrease in slaughter yield of male broilers. For female broiler however, the heating technique proved to increase slaughter yield, regardless age of the parent flock and storage time of the hatching eggs.

TABLE 2. Effect of storage time (short = 3d; long = 10d) and heating treatment (No or yes) on carcass (% of body weight), wings, legs and filet (% of carcass weight) in broilers that hatched from parents of 35 and 55 wks of age.

Storage	Heating	Males				Females			
		Carcass	Wings	Legs	Filet	Carcass	Wings	Legs	Filet
Parent age: 35 wks									
Short	No	65.9	11.0	33.6	30.4 ^a	67.0	10.9	33.2 ^b	30.3 ^b
Short	Yes	66.2	10.9	33.7	30.2 ^a	67.0	11.0	32.7 ^a	30.7 ^a
Long	No	66.8	11.1	33.6	29.8 ^b	66.8	11.1	33.1 ^b	30.0 ^b
Long	Yes	66.5	11.1	33.9	29.7 ^b	67.4	10.8	32.9 ^a	30.4 ^a
Parent age: 55 wks									
Short	No	66.6	10.9	33.7	30.4 ^a	68.0	10.9	33.2 ^a	30.3 ^b
Short	Yes	66.9	10.9	33.8	30.3 ^a	66.7	11.0	32.7 ^b	30.7 ^a
Long	No	66.7	11.0	33.7	29.8 ^b	66.8	11.1	33.1 ^a	30.1 ^b
Long	Yes	67.5	11.0	33.9	29.8 ^b	67.2	10.8	32.8 ^b	30.5 ^a

CONCLUSION

It can be concluded that heating of hatching eggs before storage can decrease the negative effects of prolonged storage on hatchability and broiler performance, and can increase the slaughter yield of female broilers regardless hatching egg storage time. Broiler breeders should be assisted more with practical knowledge, applications and finances to increase the profits in the poultry chain down stream.

LITERATURE

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