

# Effect Of Eggshell Temperature On Malpositions, Heart Weight, And Protein Use In Broiler Embryos

R. Molenaar\*, R. Meijerhof\*, B. Kemp‡, H. van den Brand‡

\*HatchTech Incubation Technology, Gildetrom 25, 3905 TB Veenendaal, The Netherlands;  
‡Wageningen University, Adaptation Physiology Group, 6700 AH Wageningen, The Netherlands

**In practice, high eggshell temperatures at the end of incubation are often observed due to cooling or air velocity problems in the incubator. This experiment evaluated consequences of high eggshell temperatures on malpositioned embryos, heart weight, and protein use in broiler hatchlings.**

Embryos were incubated at normal (37.8°C) or high (38.9°C) eggshell temperature (EST) after 7 days of incubation and hatchling quality was measured 12 h after emerging from the eggshell. Dead embryos in the high EST had 3.1% more 'head over wing' and 1.7% more 'head between legs' malpositions than in the normal EST. The reason for these malpositions is unknown, but might be related to weakness of the embryo or lower muscle activity.

Embryos in the high EST had a retarded body development at hatch in terms of a lower yolk free body, a larger residual yolk and a shorter chick length. Relative heart weight was also lower in the high EST (0.60%) than

in the normal EST (0.77%). This decrease in heart development might increase health problems in later life such as ascites and sudden death syndrome. Incubation time was 8 h shorter and decreased the time to develop in the high EST. In addition, efficiency in protein transfer from the egg to the hatchling was decreased in the high EST and protein energy was lost or might be used for other purposes than body synthesis.

In conclusion, high EST decreased body development and had a pronounced effect on relative heart weight, which is probably due to a shorter incubation time and a lower protein efficiency.