

## Special measures to reduce the risk for consumers through *Salmonella* in table eggs – e.g. cooling of table eggs

(Question No EFSA-Q-2007-198)

Adopted on 22 January 2009

### SUMMARY

Following a request from the German Federal Institute for Risk Assessment the Scientific Panel on Biological Hazards was asked to deliver a scientific opinion on special measures to reduce the risk for consumers through *Salmonella* in table eggs, e.g. cooling of eggs.

As stated in the EFSA Community Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and Antimicrobial Resistance in 2007, the reported number of cases and incidence of human salmonellosis in the EU were, respectively, 154,099 cases and 31.1 cases per 100,000 inhabitants. The report also documents that the *Salmonella* prevalence in table eggs was 0.8%. According to an opinion from the Scientific Committee on Veterinary Measures relating to Public Health on *Salmonellae* in Foodstuffs (2003), eggs and products containing raw eggs are among the food categories most likely to pose the greatest risk to public health in relation to salmonellosis.

Table eggs are identified as a major source of *Salmonella*, and egg refrigeration has been suggested as one of many possible interventions along the food chain to reduce the incidence of salmonellosis in the human population. On the other hand, problems associated with this measure have long since been highlighted, including those resulting from an inability to maintain the cold chain and the consequential water condensation on the egg surface which facilitates growth and penetration of microorganisms into the egg. Additionally, rapid cooling may provoke cracks in eggs because of temperature gradients and this may further facilitate microbial migration through the shell.

The Scientific Panel on Biological Hazards concludes that cooling of table eggs at 7°C or below limits the growth of pathogens such as *Salmonella* spp. On the other hand, cooling does not reduce existing *Salmonella* contamination inside the egg, and can prolong the survival of *Salmonella* spp. on the egg shell.

Provided that the cold chain is maintained, commencing cooling at farm level has the highest beneficial effect with regard to the control of the growth of *Salmonella*. Cooling of table eggs is an additional control option complementing other measures applied at farm level and during processing in an integrated approach. Disruption of the cold chain is one factor that increases the risk of condensation and this could increase bacterial penetration into the egg.

There is evidence indicating that cross-contamination of egg shells can occur at the processing level (egg grading, packing, etc.). The probability of this cross-contamination depends on the

proportion of *Salmonella*-contaminated eggs, and is further influenced by the type of technology used and the hygienic practices applied. There is however not sufficient data to evaluate the occurrence of trans-shell penetration and growth of *Salmonella* due to cross-contamination during processing and consequently to assess the related risk for consumers.

The estimation of the relative efficacy of egg cooling as an additional measure to reduce the risk of human salmonellosis would require a quantitative approach, taking into account *Salmonella* prevalence and contamination numbers on egg shell and in egg content. In addition, storage conditions and consumer practices have to be considered. Such data are highly variable and available only to a limited extent.

The Scientific Panel on Biological Hazards recommends that a quantitative approach should be initiated in order to assess the benefits of egg cooling. The collection of quantitative data on *Salmonella* contamination of egg shell and content, guided by preliminary modelling activities is recommended for different EU Member States to estimate the effectiveness of cooling as an additional risk reduction measure. Also an assessment of the efficacy of ongoing *Salmonella*-reduction measures at farm level is needed. More research is needed on the relevance of cross-contamination of eggs with *Salmonella* at processing level and its consequences for public health.

**Key words:** *Salmonella*, egg, cooling, consumer risk