PENETRATION OF *Salmonella* Enteritidis Through the Vitelline Membrane of Hen's Eggs As Affected by Its Strength During the Laying Period.

S. Leleu¹, L. Herman¹, M. Heyndrickx¹, E. Delezie², M. Bain³, J. Gautron⁴, C. Michiels⁵, J. De Baerdemaeker⁶, W. Messens¹

¹Institute for Agricultural and Fisheries Research (ILVO), Technology and Food Sciences, Brusselsesteenweg 370, 9090 Melle, Belgium
²Institute for Agricultural and Fisheries Research (ILVO), Animal Sciences, Scheldeweg 68, 9090 Melle, Belgium
³University of Glasgow, Faculty of Veterinary Medicine, 464 Bearsden Road, Glasgow G61 1QH, Scotland, United Kingdom
⁴Institut National de la Recherche Agronomique (INRA), UR83 Recherches Avicole, 37380 Nouzilly, France
⁵Laboratory of Food Microbiology, Katholieke Universiteit Leuven, Kasteelpark Arenberg 22, 3001 Heverlee, Belgium
⁶Department of Biosystems, Katholieke Universiteit Leuven, Kasteelpark Arenberg 30, 3001 Heverlee, Belgium

Eggs have been implicated as leading sources of human salmonellosis caused by *Salmonella enteric* serovar Enteritidis (SE). Although SE is not often deposited directly inside the yolks of naturally contaminated eggs, penetration through the vitelline membrane to reach the yolk contents could result in rapid bacterial multiplication. This study was conducted to determine whether the penetration of SE through the vitelline membrane is affected by the vitelline membrane strength (VMS). The VMS and penetration were determined for successive eggs. At the beginning, middle and end of lay, five series of successive eggs were collected of 24 hens from one laying flock. For the penetration study, an *in vitro* egg contamination model was used enabling sampling of the yolk contents as a function of egg storage (up to three weeks). The VMS decreased from the beginning to the middle of lay, but subsequently stayed constant until the end of lay. The proportion of vitelline membrane samples that were penetrated, was not affected by the laying period. Combining all results, only a slight but significant correlation (R=0.1692 ; p=0.011) was found between the VMS and the moment of penetration.