Broilers (*Gallus gallus*) are less stressed if they can smell a mother odorant

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Abstract

Performance, physiological and behavioural parameters of two groups of domestic chickens were compared. Chickens were raised in classical commercial conditions in buildings housing 12000 birds. One group acted as a control, while the environment of the other was perfused with MHUSA (Mother Hens' Uropygial Secretion Analogue), a synthetic analogue of a mother-hen odorant secretion which has shown its potential in reducing stress-related reactions in chickens. At the end of the rearing period the animals treated, appeared less stressed, as determined by a range of behavioural and physiological parameters. Even if there was no treatment effect on live weight, the carcasses of MHUSA treated animals were heavier and showed less scarring from fights. The influence of MHUSA was proven when it was removed from the atmosphere. Sex and age appeared to have an importance with regard to the action of MHUSA on the number of suffocated animals. There were no differences between the two groups in a variant of the tonic immobility test. Thus this semiochemical appears to have a positive effect on broiler welfare.

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Introduction

A secretion from the uropygial gland of mother hens has been isolated on poultry (*Gallus gallus*) in natural conditions (mother with her chicks). This secretion shows a chemical pattern comparable to the appeasing pheromones discovered in mammals (pigs, horses, dogs), which have an appeasing effect on their young (Moltz & Leet, 1981; Mc Glone & Anderson, 2002; Pageat & Gaultier, 2003). The native secretion, composing of fatty acids, is produced continuously from four days before hatching until separation occurs. A synthetic analogue called MHUSA (Mother Hen Uropygial Secretion Analogue; Pat. PCT/EP03/007144) has the same chemical composition as the native secretion. Therefore, MHUSA has the potential to reduce stress in domestic chickens, in particular under farming conditions (Madec *et al.*, 2006; 2008). In poultry, behavioural parameters related to stress have been widely studied to assess welfare. These parameters are either in relation with natural conditions (Maria *et al*., 2004) or with pure behaviour (Roden & Wechsler, 1997). The majority of these results come from small-scale studies. They allow the observer to take into account the large number of parameters but are very time consuming (Campo *et al*., 2000). It appeared to us that it would be of great interest to have criteria that characterize stress related behaviour in classical husbandries, but of an easy use, considering the large number of animals. It has been shown that correlations exist between behaviour in response to stress and physiological parameters such as the heterophil/lymphocyte ratio (HLR) (Puvaldolpriod & Thaxton, 2000) and corticosterone level (Post *et al*., 2003). Performance parameters are also related to stress. Lower growth curves may be observed (Tankson *et al*., 2001) and the number of downgraded animals (i.e. suffocated or marks on the body) could be higher (Buitenhuis *et al*., 2002). It appears that these parameters may be utilized to assess behaviour related to stress when a large number of animals has to be studied. The starting hypothesis is that MHUSA has an appeasing effect on chicks, and thus, that the impact of stress should be reduced when using MHUSA. A trial has been designed, firstly to evaluate the impact of MHUSA on stress parameters related to behaviour, and secondly to evaluate its possible use as a tool for further studies.

Materials and Methods

Two adjoining broiler production buildings of 1200 m² each were chosen because of their structure and constant production figures. A total of 24000 birds (2/3 males, 1/3 females, strain ROSS 308) were reared in each house. Birds were one day old upon arrival. Each building was separated into two sections: