Increase of welfare in pigs using positive anticipation

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Key words
Pig, Welfare, Reward System, Enrichment, Meat quality, Behaviour

Aim of the study
Repeated periods of positive emotions may lead to a positive emotional state and improved welfare. Anticipation was described to even increase the effects of positive emotions. Investigating the emotional state of animals is challenging and thus, the main object of this study was to investigate whether positive anticipation leads to a positive emotional state in pigs and whether such effects are reflected also in etho-physiological or neuro-physiological changes.

Material and methods
At first, weaned pigs were tained to expect a positive situation after a tone and a short anticipation period, and a negative situation after another tone. In the negative situation, pigs had to cross a ramp, while in the positive, they were allowed eat popcorn. Behaviour and heart rate were recorded. In the second experiment, it was tested whether access to a food ball filled with corn is a suitable enrichment for growing pigs, and whether they can learn to anticipate the ball. This supposed positive anticipation may influence their emotional state. Different treatments ('anticipated enrichment', 'enrichment alone' and 'control') were conducted. Pigs of 'anticipated enrichment' received the food ball after a tone followed by a 30 s anticipation period. Pigs of 'enrichment alone' also received the ball, but without anticipation. Control pigs could hear tones but never had contact with the ball. At the age of 14-15 weeks, a combined open-field and novel-object test was conducted. Saliva was collected in the home pen to analyse cortisol concentration. A slaughter, cortisol- as well as catecholamine in blood plasma, and dopamine, serotonin and their metabolites in three brain regions were analysed. Additionally, meat quality was measured.

Results and significance
In piglets, heart rate increased during the tone sequence and decreased during anticipation. Over all, it was highest at the end of the trial, reflecting physical activity. The probability for high-frequency vocalisation was significantly higher during anticipation of the negative situation. Pigs clearly avoided the ramp. High-frequency vocalization was the most promising indicator for emotional reactions of pigs during anticipation.

In growing pigs, we found increased activity during anticipation in the 'anticipated enrichment', showing that pigs anticipated the ball. Pigs "played" about five minutes with ball/corn, regardless of treatment. The probability for high-frequency vocalisation in the open-field test was highest for pigs of 'enrichment alone' and lowest for pigs of 'anticipated enrichment'. The DOPAC/dopamine ratio in the ventral tegmental area tended to be highest in pigs of 'anticipated enrichment' and lowest for controls. Pigs of 'anticipated enrichment' may thus have been able to cope better with stressful situations. Differences in treatments, however, were small and perhaps therefore, treatment effects were small either. Nevertheless, we conclude that vocalisation, cortisol and dopamine are promising indicators for emotions in pigs. Even if the effects were small, they indicate that regular periods of positive anticipation may lead to a positive emotional state and increased welfare in pigs.

Publications, posters and presentations
Imfeld-Mueller S, Van Wezemael L, Stauffacher M, Gygax L & Hillmann E (2011): Do pigs distinguish between situations of different emotional valences during anticipation? Appl. Anim. Behav. Sci. 131, 86-93

Müller S, Van Wezemael L, Gygax L, Stauffacher M & Hillmann E (2010): How do pigs react to situations of different emotional valence? 44th Congress of the International Society for Applied Ethology (ISAE)

Sabrina Imfeld-Müller, Edna Hillmann (2011): Kurze Phasen positiver Antizipation als wertvolle Anreicherung für Mastschweine. Internationale Tagung „Angewandte Ethologie" der DVG e.V.

Project 2.07.09

Project duration August 2008 – Mai 2011