

Effects of quantity and quality of space on hair cortisol, hair dehydroepiandrosterone (sulphate) and their ratio in growing-finishing pigs

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Pig husbandry systems across the world can differ greatly in characteristics such as the pig breed used, type of feed and the quantity and quality of space (i.e., enrichment) provided to the pig. These differences may have impact on (chronic) stress indicators like cortisol.

Within the H2020 project *mEATquality* (No.101000344), we studied whether more space and better quality of space leads to changes in hair cortisol (HC), hair dehydroepiandrosterone (sulphate) (HDHEA(S)) and their ratio in husbandry systems with varying extensification levels in Poland, Denmark and Italy.

In Poland, quantity of space (1 (control) vs 2 m²/pig) was evaluated on two intensive commercial farms (n=132). In Denmark, quantity of space (0.7 (control) vs 1.4 vs 2.1 m²/pig) and quality of space (straw (control) vs straw, wood logs, feed bags and ropes, and vs straw with roughage) was evaluated (n=410) on an intensive experimental farm.

In Italy, quantity of space (1 vs 3 m²/pig or 2.4 vs 7.2 m²/pig) and quality of space (access to shade and branches or not (control)) was evaluated (n=312) on three extensive commercial farms with outdoor access.

Hair samples were collected for all pigs prior to slaughter and HC and HDHEA(S) were measured by an in-house ELISA. In most experiments both HC and HDHEA(S) were lower in pigs housed with more space than pigs housed with less space regardless of the extensification level, indicating that more space per pig resulted in a lower allostatic load during the growing-finishing period than when less space per pig was provided. Quality of space did not result in differences between HC, HDHEA(S) and HC/HDHEA(S) ratio, likely due to relatively small differences in quality of space between the treatment and control groups.

Overall, sufficient quantity of space was important in reducing the allostatic load in pigs in husbandry systems with different extensification levels, but quality of space did not seem to affect their allostatic load in any of the tested systems.

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