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Stress at slaughter in cattle: role of reactivity profile and environmental factors

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Abstract

During slaughter, cattle may be exposed to many potentially stress-inducing factors, of emotional and physical nature. A series of studies aimed to identify factors that may contribute to slaughter stress. During reactivity tests testing emotional stressors, Blond d'Aquitaine bulls were more reactive than Angus and Limousin bulls. However, no breed differences were found for stress indicators at slaughter. Indicators of post mortem (PM) muscle metabolism were correlated with stress reactions at slaughter, and with behavioural reactions and heart rates during the reactivity tests, including a sudden event and handling. Similarly, in Normand cull cows, stronger behavioural and physiological reactions during the slaughter procedure were associated with faster PM muscle metabolism. Reactions during the reactivity tests were also correlated with stress indicators at slaughter. A Principal Component Analysis indicated that the first and second axes were correlated with reactions to non-familiarity and to social isolation, respectively. Both axes were correlated with stress indicators at slaughter, suggesting that these two aspects contribute significantly to the emotional stress at slaughter. These experiments indicate that stress reactivity at slaughter may be predicted from behavioural and emotional stress reactions during reactivity tests. A third experiment found that compared with normally fed cows, 30-h food-deprived cows showed stronger startle and fear responses in response to a sudden event. Within a group subjected to a physical-effort treatment, compared to normally fed heifers, food-deprived heifers were more reactive to human exposure. This shows that the reactions to a given stressor may increase due to the presence of other stressors. Thus, in cattle, novelty, social disturbances and sudden events may contribute to slaughter stress and the simultaneous presence of several stressors during the slaughter period may exacerbate stress reactions.

Keywords: animal welfare, cattle, emotional stress, meat quality, physiology, slaughter