

Effects of a Simulated Power Cut in Automatic Milking Systems on Dairy Cows Heart Activity

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Abstract : In view of the increasing quantity of 'green energy' from renewable raw materials and photovoltaic facilities, it is quite conceivable that power supply variations may occur, so that constantly working machines like automatic milking systems (AMS) may break down temporarily. The usage of farm-made energy is steadily increasing in order to keep energy costs as low as possible. As a result, power cuts are likely to happen more frequently. Current work in the framework of the project 'stable 4.0' focuses on possible stress reactions by simulating power cuts up to four hours in dairy farms. Based on heart activity it should be found out whether stress on dairy cows increases under these circumstances. In order to simulate a power cut, 12 random cows out of 2 herds were not admitted to the AMS for at least two hours on three consecutive days. The heart rates of the cows were measured and the collected data evaluated with HRV Program Kubios Version 2.1 on the basis of eight parameters (HR, RMSSD, pNN50, SD1, SD2, LF, HF and LF/HF). Furthermore, stress reactions were examined closely via video analysis, milk yield, ruminant activity, pedometer and measurements of cortisol metabolites. Concluding it turned out, that during the test only some animals were suffering from minor stress symptoms, when they tried to get into the AMS at their regular milking time, but couldn't be milked because the system was manipulated. However, the stress level during a regular "time-dependent milking rejection" was just as high. So the study comes to the conclusion, that the low psychological stress level in the case of a 2-4 hours failure of an AMS does not have any impact on animal welfare and health.

Keywords : dairy cow, heart activity, power cut, stable 4.0

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