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Investigating the Effects of Bedding Cleanliness on Sleep-like Posture of Japanese Black Fattening Cattle

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When cattle are lying with their heads touching their bodies or ground, it is considered as sleep-like posture. Sleep-like posture can be observed when cattle are well accustomed to the surrounding environment. This posture might be an indicator of comfort for cattle. Bed cleaning makes comfortable resting place for cattle in indoor housing. The present study aimed to investigate the effects of bedding cleanliness on a sleep-like posture of cattle.

Two batches of experiments were carried out at Kawatabi Field Science Center of Tohoku University in April and in May, 2021. In each batch, eight Japanese Black fattening cattle were used in the experiment. Four cattle were assigned to the treatment group (GT), and the other four cattle to the control group (GC). The bedding materials were replaced once during the experiment as a cleaning treatment in GT. No cleaning treatment was conducted in GC during the experiment. In the next batch, the cattle in GT previously were assigned to GC and *vice versa*. Cattle sleep-like posture and bedding cleanliness were measured twice within one week before the cleaning treatment and twice after the treatment. Two types of sleep-like postures (SP1: Cattle bent its neck and rested head against the body; SP2: Cattle lied completely flat on the ground with neck stretched) were measured using accelerometer and video recording, and the duration, bout number, and bout length per day were quantified. The sum of the duration of SP1 and SP2 was calculated. To quantify bedding cleanliness, the ammonia concentration in the air and moisture content in the bedding materials were measured. The effects of treatment (GT, GC), period (before cleaning, after cleaning), and their interactions on sleep-like posture and bedding cleanliness were tested using the generalized linear mixed model.

Both ammonia concentration in the air and moisture content in the bedding materials significantly decreased after cleaning treatment in GT compared with GC ($P < 0.01$). Interaction between treatment and period on each sleep-like posture was significant ($P < 0.05$, respectively). The duration ($P < 0.05$) and bout number ($P < 0.01$) of SP1 increased after cleaning in GC compared with GT. On the contrary, the duration ($P < 0.1$) and bout number ($P < 0.01$) of SP2 tended to increase after cleaning in GT compared with GC. However, there was no effect of treatment and period on the sum duration of SP1 and SP2. The present results suggest that cattle might prefer to take a more relaxing sleep-like posture (SP2) when they are kept in cleaned bedding. The switch of sleep-like posture might indicate the comfort of cattle in indoor housing.