Hair cortisol – a practical method for measuring chronic stress in cattle?

Problem

Hair cortisol is developing as an indicator of chronic stress because it is a simple and non-invasive method. Our question was: Can hair cortisol tell us something about stress caused by diseases or by management practice of cow-calf suckling and separation.

Solution

Hair samples from 49 cow-calf pairs of Holstein breed, separated and weaned in different ways at the University of Wageningen and Louis Bolk Institute. The hair samples were taken at birth, day 21, 56 and 84 after birth, and analysed for cortisol. Then we measure the stress between the last shaving and until 7 days before the next shaving. Differences of cortisol level due to age, diseases or separation method can be measured.

Impact

Stress measuring can be used to increase animal welfare and improve management

Practical recommendation

We recommend the last third of the tail for sample collection. Shave or cut an area of 3x5 cm on the tail at D0 and put the hair in an envelope with information of ID and date. Next time (DX) shave the same area and follow the same instructions. In this way we sample the hair growth and stress between D0 and D (X-7). The hair must be of same color.

For practical purposes, contact an accredited laboratory to do the analyzes.

Clinical symptoms can be scored on a scale from 1 to 5, for eyes, nose, ears, navel, joint, feces and dehydration, where we estimate 3 or more **or** 3x2 as an indicator of disease and stress.

We found no effect of separation methods.

There is a significant effect of disease on cortisol level of calves at 21 and 56 days after birth in our experiment, while we find no such effect on day 84. This can be explained by greater robustness against stressors in the oldest calves. High cortisol level of young calves in the herd may initiate precautions.

Applicability box

Theme
Animal welfare

Keywords
Stress, disease, indicator

Geographical coverage
Worldwide

Application time
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Required time
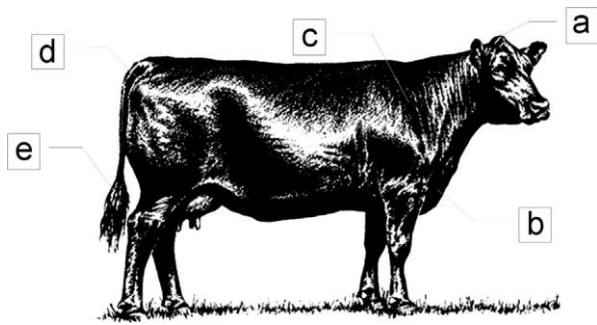Sampling – 5 minutes/per sample
Laboratory analysis: Depend on scale

Period of impact
-

**Equipment**
Scissors, electric shaver, lab. Equipment for cortisol analysis

Picture 1: Hair sampling locations:(a) head, hair from the "nuchal crest"; (b) neck, hair located in the brisket area, over the jugular area;(c) shoulder, hair located over the spine of the scapula;(d) hip, hair located over the Femur–Ischium junction; and(e)tail, hair from the last third of the tail and the switch.
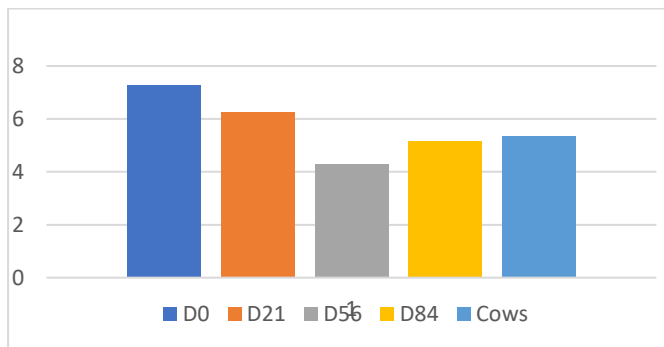
Picture 2: Cortisol level (ng/g) of calves at different ages (D0, D21, D56, D84)
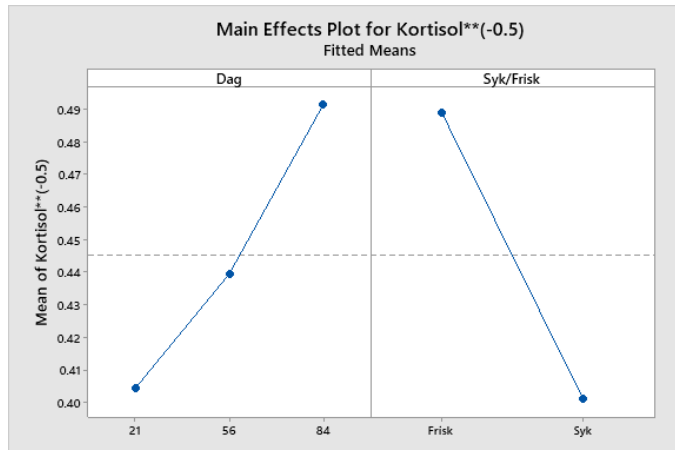
Picture 3: Mean of cortisol related to health score of calves (Turkeys Pairwise Comparisons)

About this practice abstract