Animal activity measured by pixel difference image in pig fattening houses under natural illumination conditions of Mediterranean area

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INTRODUCTION AND OBJECTIVE

The pig's activity and its behaviour influence on daily variation patterns of gas emission and dust concentration. Nowadays, the estimation of the animal's activity is carried out through automatic recording methods. The aim of this study was to register the pig's activity under intensive rearing and natural illumination conditions of Mediterranean area.

METHODS

Our study was based on a computer vision system that measured the activity by pixel difference image. This experiment was conducted during the Autumn 2009 (10 h L:14 h D) in a pig fattening farm located in South-East Spain. The pigs were fed ad libitum and monitored during the growing phase (30-60 kg BW). Two pens of 20 pigs and 20 m^2 were provided with a wireless infrared camera. Both cameras recorded scenes covering: concrete and slated floor, feeder and drinker areas. Images were analyzed in real-time by a computer software, based on the AForge.NET Framework and developed for this purpose. The image processor system measured the difference of pixel intensity between two consecutives frames (10 frames/s). The analyzed data, expressed as relative activity, were the hourly averages.

Figure 1. Software for estimation and storage of pig's activity

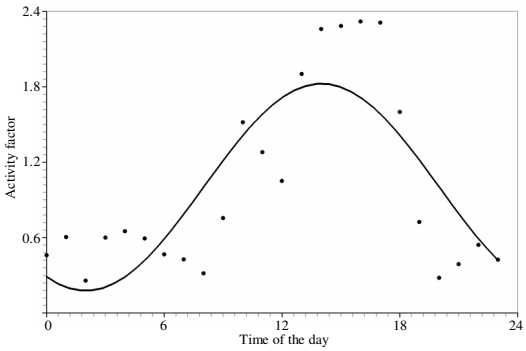

Figure 2. Dromedary model of pig's activity

RESULTS

The maximum period of activity was found from 10:00 to 18:00 h, getting down at the end of the afternoon. The minimum activity time was at 02:00 h. The relative activity data were adjusted on a sinusoidal model by the following equation:

$$1\text{-}0.823 \times \sin[(2 \times \pi/24) \times (h + 4)] \quad (R^2 = 0.66)$$

Our model estimated greater amplitude on the average relative activity in comparison with other activity models for pigs in Northern Europe.

CONCLUSIONS

These results suggest that the animal's activity should be specifically evaluated to obtain accurate information about its behaviour and the pollutants emission.

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