

DEVELOPMENT OF AUTOMATED SPRAYING SYSTEM FOR PIGS TO NORMALIZE THEIR WELFARE

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Abstract

The mathematical model of automated spraying system can be used and integrated into the infrastructure of pig farms, providing constant monitoring of the microclimate and animal health, keep pigs clean, cool them effectively, reduce skin contamination and prevent infectious diseases. The following parameters were considered for mathematical analysis of an automated pig spraying system under different conditions: animal size, contamination level, volume of sprayed liquid and cleaning efficiency. The cleaning efficiency E can be represented as a function of the ratio of liquid volume to surface area and the contamination level, and E should be as close to unity as possible. The efficiency of spraying to reduce infectious diseases in pigs and improve their living conditions during climate change takes into account the factors: ambient temperature, relative humidity, optimal temperature for pigs, optimal relative humidity for pigs, growth rate of a bacterial population under certain ambient conditions, efficiency of cooling by spraying, infection risk index. The model shows that the reduction in the infection risk index directly affects animal welfare. The lower the level of stress and infection risk, the better the living conditions for pigs. The automated spraying system will significantly improve the conditions for pigs on farms and their welfare, and reduce the risk of disease providing the required temperature and humidity levels on the farm.

Key Words: Pig welfare, spraying system, mathematical model, stress level