



ENERGY EFFICIENCY OF VENTILATION SYSTEMS OF LIVESTOCK FARMS

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ABSTRACT

The Council of the European Union has adopted Directive 2001/88/EC amending Directive 91/630/EEC laying down minimum standards for the protection of pigs in 2001. These directives provide requirements concerning breeding of pigs and their welfare. Latvia adopted law on welfare of pigs in 2004 transposing these directives. In order to ensure the optimal air parameters at piggeries according to the requirements of the normative acts, the analysis of ventilation systems' operation was done.

Traditional ventilation systems consume a lot of energy. In the scope of this study we analysed the possibilities for the reduction of energy consumption using regenerative heat exchange devices. For the purpose of the study the data on heat-moisture balance, monthly outdoor air temperature, relative humidity and solar radiation were analysed in order to choose the optimal heat exchange device.

The optimal indoor air parameters in piggeries pursuant zoo-hygienic requirements significantly depend on pigs' physiological condition, age and group. The indoor air temperature varies from 5 °C for rearing pigs to 32 °C for piglets until 3 week age, but relative humidity varies from 60 % to 85 %.

In the scope of the study it was found out that the amount of consumed energy depends on the type and operation of heat exchange devices: efficiency of heat exchange and intensity of humidity exchange.

The analysis of the operation of ventilation systems based on climatology dates gave possibility to evaluate the divergence periods from neutral air parameters in summer and winter.