



ENERGY EFFICIENT VENTILATING SYSTEMS IN PIGGERIES

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ABSTRACT

For reduce production costs at agriculture, and wherewith costs for end product largely depend on consume of energy, how effective and useful it is used. Effective utilization of energy, sustainable agriculture and welfare of animals are interrelated activities.

Under the rules, in livestock housing the owner must provide optimal air exchange, ventilation, temperature, relative humidity of air, level of concentration of gases, dusts and odours, which are harmless and agree for physiology requirements of animals. One of indices of animal welfare and factors of influence to productivity is quality of air parameters.

Meteorology parameter of air – temperature, moisture content, relative humidity, velocity of air, and temperature of surfaces – determine the microclimate of livestock housing. It is one of the main animal productivity and farm cost-efficiency influence factor. It is proven that optimal microclimate in livestock housing provides output up to 30 %.

Study of heat-moisture balance at model pig farms revealed that consumption of energy in various air supply schemes depends on heat and mass transfer device working and kind, of heat transfer efficiency, intensity of moisture exchange.

In further study process necessary ventilating ratio for maximal load of shelters (m^3/h), heat balance of livestock housing regarding zoohygiene standards and heat loses through livestock building insulation constructions were estimated.

Most of energy loses at piggeries proceed through ventilating system for achieving the indoor temperature. The energy consumption in ventilating system will be much higher for achieving the specific moisture regime at piggeries. Using regenerative heat exchangers with effectiveness 50% provide heat and moisture regime, but energy consumption is reduce for 30-40 %, in comparison with tradition ventilating system. Energy consumption (kWh) for different ventilating systems can be calculated using the climatology data. This data enables to analyze different variants of ventilating systems for capital investment expedience.