

Predicting Mass and Heat Transfer of Pollutant Gas Mixtures: Transient Air Quality in Poultry Close House Cage

Air quality in chicken farms significantly impacts the stress levels, health, and mortality of livestock. It is crucial to maintain the stability of airflow velocity, temperature, and humidity in the close house cage to prevent sudden deaths in chickens. To achieve a uniform airflow pattern inside the cage, farmers can install a wetted Evaporative Cooling Pad (ECP) on the inlet side. Insufficient air can lead to heat stroke and the buildup of harmful gases. This study aims to numerically simulate the airflow using the CFD multicomponent method. The ECPs are moistened by water dripping at 0.5 liters per hour. The simulation considers heat transfer and evaporation effect due to heat from walls and chickens. The results will be presented through contours of velocity, RH, and temperature on various iso-surfaces. The simulation results show the time required for the exhaust fan to cool the room and remove pollutants from the room.

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Session Classification: Parallel Session

Track Classification: Environmental, Conservation and Biodiversity