

## **Solar-assisted localized ventilation system for poultry brooding**

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### ABSTRACT

This research aims at investigating the efficiency and performance of a solar-assisted localized heating and ventilation system for chicken brooding in a prototype of 16-pens poultry house. Numerical 3-D simulations were carried out in order to model the heated space where a convective unit is employed to deliver the heating needs as well as fresh air requirement that maintain Ammonia (NH<sub>3</sub>) and Carbon Dioxide (CO<sub>2</sub>) concentrations at the micro environment of the chicken below 25 ppm and 2500 ppm, respectively, in accordance with published standards. The system performance was analyzed and compared to a conventional fuel-based fully mixed heating and ventilation system. The results show that the localized system has saved 74% of the energy demanded in the conventional fully mixed system. Moreover, a solar system that relies on parabolic concentrators has been able to cover 84% of the load required for a winter flock of six-weeks.