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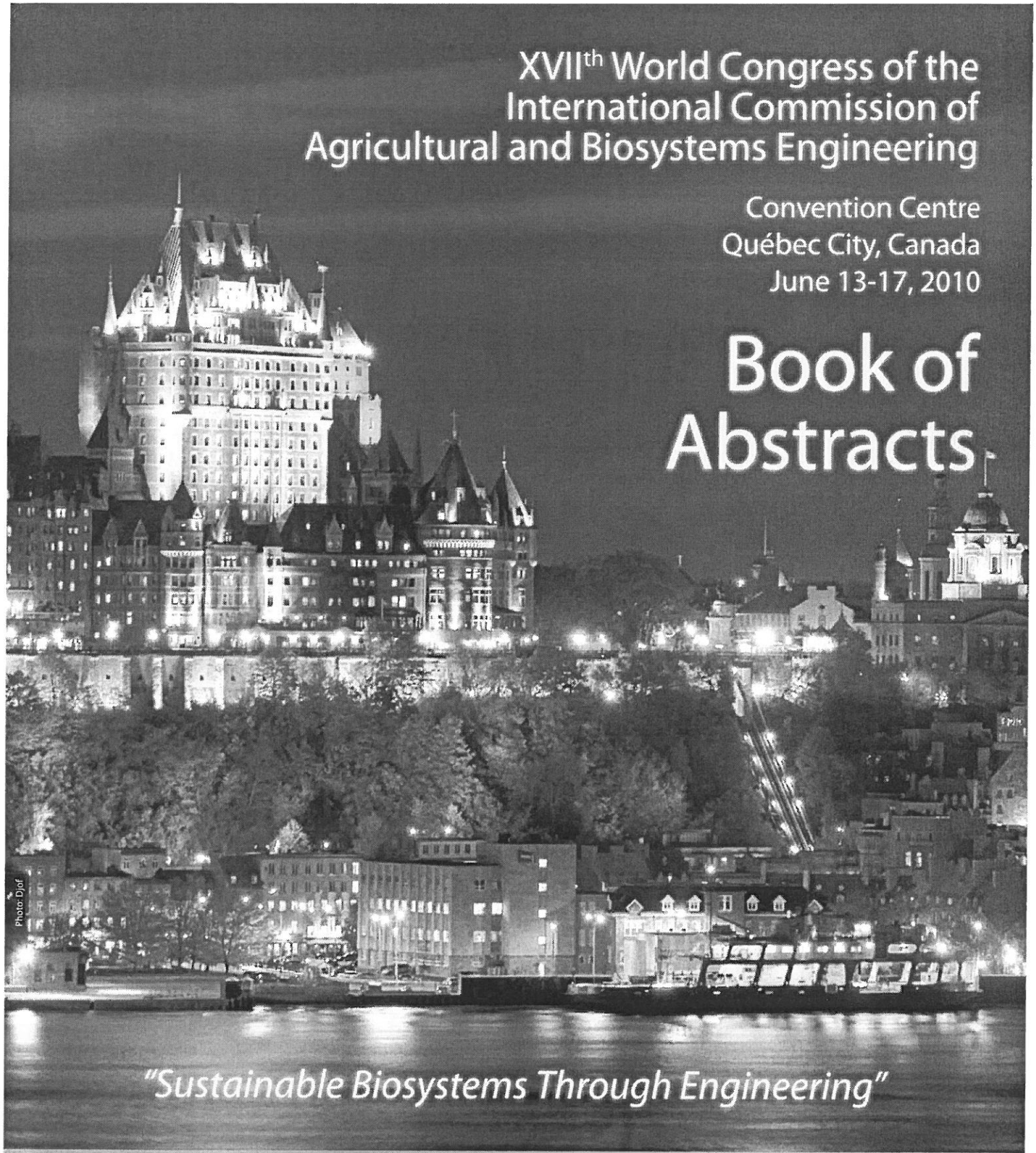

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NUMERICAL SIMULATION OF A PIT EXHAUST SYSTEM FOR REDUCTION OF AMMONIA EMISSION FROM A NATURALLY VENTILATED CATTLE BUILDING

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CSBE100696 – Restrictions on ammonia emission from animal production are a growing challenge for farmers in many countries. Effective but still costly technologies for removal of ammonia from ventilation exhaust exits are limited to mechanical ventilation systems. Studies in mechanically ventilated pig units with slatted floor have shown that evacuation of a minor part of the exhaust air, beneath the slats, makes it possible to collect a relatively large share of the entire ammonia emission. And, in addition, cleaning of this minor part of the total air change is often sufficient to fulfill requirements for ammonia emission reduction. In this work CFD (Computational Fluid Dynamics) methods were used to investigate the potentials of transferring the experience from pig units to naturally ventilated cattle buildings. The analyses were based on a 2-dimensional cross section of a proposal for a 72 m wide well insulated milking cow barn. The developed CFD model included ammonia evaporation from slurry pits and from slatted floor, and it aimed to quantify the emission through the pit exhausts and through the openings in the building (in walls, roof and ridge) depending on outdoor temperature, wind speed and different adjustment of wall, roof and ridge openings. On a yearly basis under Danish weather conditions the results indicated that a pit exhaust system, treating 80 m3h-1HPU-1, has the potential to reduce ammonia emission about one third assuming fixed ventilation openings, and with controllable openings this figure will probably be above 50 percent.

WIRELESS SENSOR NETWORKS FOR ENVIRONMENTAL MONITORING IN PRECISION VITICULTURE

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CSBE1009698 – A Wireless Sensor Network (WSN) can be successfully used for environmental monitoring. WSNs represent nowadays one of the most exciting technologies. Data acquisition of environmental parameters by means of processing of satellite images to be used in Geographic Information Systems (GIS) and image analysis software is a time consuming process. The use of WSN currently promises to shorten time to acceptable margins. This paper shows the results of a research project developed in a vineyard of Castilla-La Mancha, Spain, where an experimental network was set up, consisting of 12 nodes with up to four different sensors measuring ambient temperature and humidity, soil moisture (water content and potential), soil temperature, photosynthetically active radiation. Data transmission follows the wireless ZigBee standard, due to its low power needs and simple networking configuration. The nodes can communicate with a gateway unit, which can transmit the information to other computers via LAN, WLAN or Internet. The results achieved in this project could help farmers use this new technology in modern grapevine growing. One key milestone was the development of a computer-based information system: a high-valued decision tool for the grapewine grower. The ultimate aim is to develop a full operational prototype for data acquisition and processing enabling the easy analysis of the data by the farmer. A better choice of grapes, leading to better wines, is the first step that wine-producers should consider, but an important constraint is the ease with which the systems can be deployed in an open field. [...].