Establishment of wireless sensor network based system to improve the dairy farm management[1]

Szu-Han Wang [2] [3] Kuo-Hua Lee [2] Chun-Chieh Chiang [2] Fang-Chun Hsiao [2]
Wan-Jung Chang [2] and Chu-Li Chang [2]

Received: Dec. 23, 2013; Accepted: Jun. 4, 2014

The purpose of this study was to establish a wireless sensor network system of dairy farm in Taiwan. Those systems were composed of barn environment sensors and wireless cattle heat detector system. The environment sensor system can be used for detecting ambient temperature and relative humidity. The system starts the barn cooling facilities such as fans and water spray when the ambient temperature exceeds the maximum setting. According to the power consumption data in summer 2011, the environment sensor system reduced about 25% of electricity costs. The cattle estrus detection system of wireless sensor network was applied on two dairy farms in Taoyuan and Natou country to do field tests. The results showed that accuracy of cattle estrus detection sensors were between 87.5-95%. It seemed that accuracy of cattle estrus detection sensors was mainly effected by temperature in different season. Results proved that wireless sensor network can applied to dairy farms, not only can save costs but also reduce visual observation time and can improve the accuracy of estrus judgment. This wireless sensor network system had superior benefits on saving barn power and keeping cattle estrus detection accuracy, and further to improve farm management efficiency.

Key words: Dairy farm, Management, Wireless sensor network.

(1) Contribution No. 2120 from Livestock Research Institute, Council of Agriculture, Executive Yuan.
(2) Hsinchu Branch, COA-LRI, Shihwu 36841, Taiwan, R.O.C.
(3) Corresponding author, E-mail: shwang@mail.tlri.gov.tw.