

## **Study finds LED lights can increase milk production**

*McClatchy/Tribune - MCT Information Services*

KANSAS CITY, Mo. \_ LED bulbs are already known for milking more light out of less electricity. But can they even get cows to give more milk?

This seemingly outlandish idea is getting serious attention. A study overseen by Oklahoma State University found that cows at one of the dairy farms in that state squeezed out 6 percent more milk when LED lights were used compared with cows under fluorescent lights.

One theory: LED lights reduce stress, making for more contented and productive cows.

The results astounded the study's authors and those backing the research, including the National Rural Electric Cooperative Association.

They were expecting further insights into the lights' energy savings and how they performed overall, including their durability on a working farm. Milk production was being tracked because of concerns the LED lights could harm the animals by, for instance, interfering with their feeding. A drop in milk production would signal a problem.

Instead, the average cow delivered an extra half gallon of milk per day.

"I was totally blindsided and shocked," said Brian Sloboda, a program manager for the cooperative association. "I still find it hard to believe, but I've seen the numbers."

LED technology, which stands for light-emitting diode, uses semiconductor chips to convert electricity and initially was used for indicator lights, including in the scoreboard at Kauffman Stadium. But the lights are increasingly in general use, and with the proper engineering and coatings can produce a white light comparable to incandescent or fluorescent lights. Compared with incandescent bulbs, they reduce electricity consumption by 85 percent. Even against fluorescent lights, which have been the main energy-efficient alternative for decades, an LED provides significant savings.

LED lights also last longer and are dropping in price but are still expensive upfront. To match a \$3 fluorescent's output, for instance, you need an LED that costs about \$30. An LED will last about 50,000 hours compared with 35,000 hours for a fluorescent and 1,000 hours for an incandescent bulb, according to

the U.S. Department of Energy.

Proving that LED lights can help increase milk production in dairy cows would transform the economics of LEDs. Recovering the cost of the lights through energy savings can take four or more years. But the payback for dairy farmers using LEDs could be slashed to a just a few months.

But do LED lights really increase milk production?

Other researchers need to confirm the study before it is widely accepted, and some involved hesitate to discuss the study's provocative findings publicly. The owner of the Oklahoma dairy farm where the test took place is afraid he could "lose face" if it turns out that the LEDs didn't cause the boost in production. So he prefers to remain anonymous for now.

But the study's authors believe what they found is promising and welcome the coming scrutiny.

The University of Missouri hopes to start a rigorous study later this year and has asked the U.S. Department of Agriculture for some financial support. The university is also sponsoring a conference next month in St. Louis, where roughly 100 people from across the country will gather to discuss energy-efficient lights on the farm.

Dairy cows and LEDs are on the agenda.

A large body of research already shows that light does make a difference in both human and animal behavior, ranging from how body rhythms are affected by light to how light helps an animal find food.

Students get better grades and employees are more productive in natural light. And baby pigs gain more weight when there is sufficient light for them to find and suck their mother's milk.

Chickens, which have excellent eyesight, are especially sensitive to light and can be easily riled. The University of Arkansas has been studying the relationship for nearly four years and believes LEDs are helping chickens gain slightly more weight.

Fluorescent lights, which are popular in poultry houses, can flicker, and that upsets chickens and causes them to spend calories. LEDs don't flicker, and that

helps chickens relax, said Susan Watkins, a professor and poultry specialist at the school.

"The birds are calmer," she said.

The Oklahoma dairy study involved tracking hundreds of cows who had ear tags or ankle bracelets that electronically transmitted their milk production. One group of cows was in the part of the barn lit with LEDs and an equal number in the part with the fluorescents.

"It was very clear there was an increase in milk production" for the animals under the LEDs, said Ronald Kensinger, a professor of animal science at Oklahoma State at the time of the study.

Kensinger has some theories about the LED boost. LEDs are directional, so more light could be focused on feeding troughs to encourage feeding. Less intense light directed at "loafing areas" in the barn allowed cows to relax.

"The reality is we just don't know, but it's possible that it's less stressful," said Kensinger, who is now head of the animal science department at Ohio State University.

Matthew Waldron, an assistant professor of animal science at the University of Missouri, is skeptical about the findings but would like to find out more. The school is waiting to see whether it will receive a government grant to study the effect of LED lights on dairy cows.

Waldron said a possible problem with the Oklahoma study is that fluorescents underlit certain areas of the dairy barn while the LEDs provided adequate illumination, which other lights can do as well if they are set up properly.

"My gut says that's what they saw in Oklahoma," he said, adding that using university facilities where things can be better controlled would result in a more rigorous followup study.

Waldron said if Missouri gets funding its study could begin later this year.

Sloboda said he welcomed the school's involvement and believes the school can deliver a definitive answer for what is now a serious question: Do LEDs cause cows to produce more milk?

"Everyone can put his cards on the table," he said.

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