

**INNOVATIVE TECHNOLOGIC EQUIPMENT AND TOOLS  
IN ANIMAL HUSBANDRY**

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**Abstract.** The article deals with the innovative technologic equipment and tools used in animal husbandry. Various types of sensors and data technologies are described.

**Keywords:** livestock technology, sensors, electronic devices, automation systems, ID technologies.

Technology is disrupting all industries in our modern age, and agriculture is no exception. Livestock technology can enhance or improve the productivity capacity, welfare, or management of animals and livestock. Automatic technologic equipment and tools make animal husbandry easier and comfortable.

Sensor and data technologies have huge benefits for the current livestock industry. It can improve the productivity and welfare of livestock by detecting sick animals and intelligently recognizing room for improvement. Computer vision allows us to have all sorts of unbiased data that will get summarized into meaningful, actionable insights. Data-driven decision making leads to better, more efficient, and timely decisions that will advance the productivity of livestock herds.

Animal production starts at environment where animals live in. Many factors affect the sensitivity of animals to their surrounding environmental conditions. Latest technologies involve the use of sensors to collect data, followed by data analyses with the objective of enhancing the understanding of the system interactions, and developing control systems. There are many sensors for use at dairy barn environment. They help to control barn environment, measure temperature, humidity, solar radiation, and luminosity over a large cultivated surface. These sensor and automation systems planned as a capable of recording and adapting to environmental conditions inside the barn. Automation systems not only can automate for temperature, but also have wind and rain sensors.

Lighting is the most obvious change with the shift to automatize barn. Digitally controlled LEDs can extend the day, supplementing sun in autumn and winter. LEDs use less energy than traditional lamps, making artificial lighting

economical. The availability of specialist barn luminaires makes it possible to tune the color. New technology provided is a self-regulating, micro-climate controlled environment for optimal animal growth and production. New technologic tools can monitor nearly every aspect of animal barn indoor environment. Incorporating the environment-sensing capability of wireless sensor networks into mobile monitoring systems can provide convenient control of the barn microclimate anywhere, anytime for more productive animal production. Environmental sensors and other control facilities of the barn is first component of the barn automation. Secondly computerize system for monitoring and controlling for barn environment. And thirdly supports the communication between these two components.

Various systems for automated animal feeding is used in many big dairy farms to get better production. They comprise complete systems of feed preparation and animal feeding, mixing equipment and the installations for distributing feed. The simple automation systems consist of a control panel, a programmable command manager, a scale, a communication interface and finally all the needed equipment to organize the feeding process and feed provision to the animal of each age groups. These systems can be combined with automatic weighing and health observation system for animal welfare. Suitable objective measuring systems are needed in animal husbandry to quickly and safely recognize illness, normal estrus cycle, quiet heat or stress in animals.

An automatic milking system requires a completely different management system for milking, feeding, cow traffic, cow behavior and grazing, but also for safeguarding milk quality and animal health. Electronic devices or sensors are the tools that need to take over the human visual inspection for abnormality.

The milking robots equipped with sensors to detect signs of mastitis which measures the many characters of the abnormal milk pH, Somatic cell count, milk acidity, milk conductivity etc. systems also can be regarded milking specifications of the system such as parlor performances, milking efficiency, etc. Simple automatic cup removal devices monitor the milk flow rate from individual cows and at a threshold, the milking vacuum is shut off and the system is activated to withdraw the cups from the cow. Behavior meter also installed to the milking systems for animal monitoring. The behavior meter continuously records the lying time, lying bouts and the activity of the individual animals. The cow-behavior observations enable animal welfare assessment in different environmental conditions and stressful situations, as well as reproductive and health status.

The concept of the 'connected cow' is a result of more and more dairy herds being fitted with sensors to monitor health and increase productivity. Putting individual wearable sensors on cattle can keep track of daily activity and health-related issues while providing data-driven insights for the entire herd. All this

data generated is also being turned into meaningful, actionable insights where producers can look quickly and easily to make quick management decisions.

There are numerous animal ID technologies available to livestock producers. Radio frequency identification is used to identify cattle. These devices have an electronic number that will be unique for an individual animal and link that animal to the database. Electronic ear tags, injectable transponders and boluses with a transponder, inside in the reticulum are the latest technology for animal identification technology.

Another technology which is very useful for farmers is electronic weighing system. An easy and powerful electronic weighing system accurately measures cattle weight. Farmers can monitor cattle performance easily and continuously. These systems established on the road the waterer or cattle squeeze. Stored information sends to the main computer for evaluation.

The benefits of new technology are plentiful and include increased cost efficiency, improved animal welfare, improved working conditions, better production monitoring (e.g. remote monitoring, access to real-time data) and improved provision of important production data. The new technology means producers can work easier and improve cattle welfare, production efficiency, and profitability.

1. Livestock Farming Technology in Animal Agriculture [Electronic resource]. Mode of access: <https://www.pluginplaytechcenter.com/resources/livestock-farming-technology-animal-agriculture/> – Date of access: 27.04.2021.

2. The Innovative Techniques in Animal Husbandry [Electronic resource]. Mode of access: <https://www.intechopen.com/books/animal-husbandry-and-nutrition/the-innovative-techniques-in-animal-husbandry> – Date of access: 03.05.2021.

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## **HYDROGEN CARBON CLEAN: OPTIMIZING ENGINE PERFORMANCE**

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**Abstract.** The article describes the essence, causes and benefits of hydrogen carbon clean of internal combustion engines.

**Keywords:** engine, hydrogen, cleaning, carbon deposits, vehicle, fuel efficiency.