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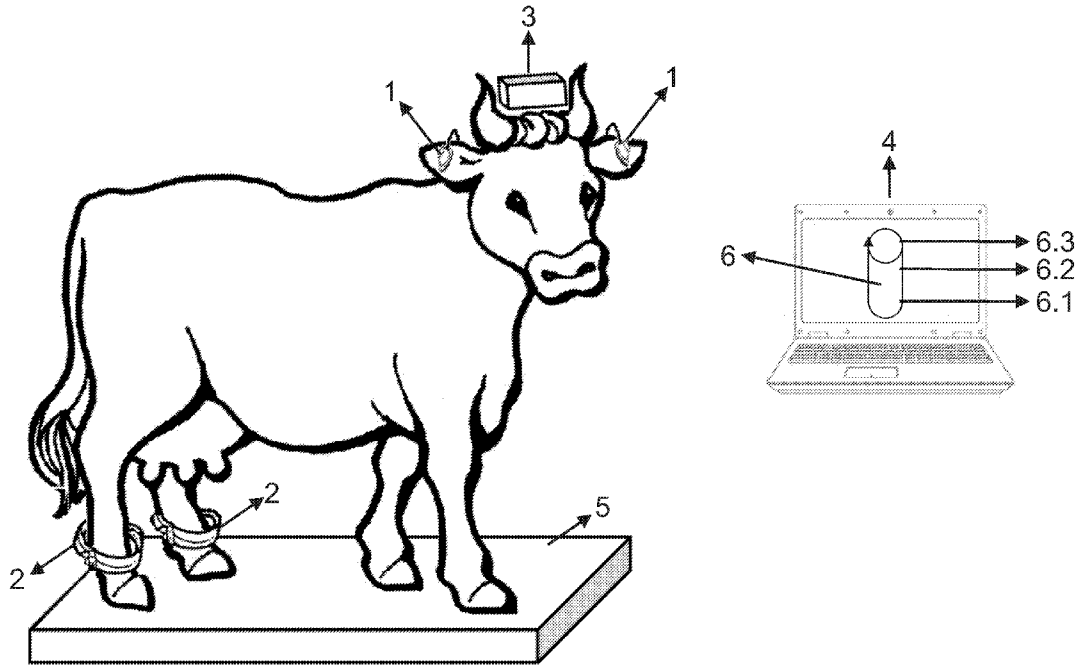


FIGURE 1

(57) Abstract: The related invention relates to the measurement device in the breeding of ruminant class animals, the monitoring of the development of which tissue type caused by dairy cattle rations in the body and determination of the percentage of tissue types such as protein, fat, water, and bone that make of body composition.



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## BODY COMPOSITION MEASUREMENT METHOD IN RUMINANT CLASS ANIMALS

### 5 TECHNICAL FIELD

The related invention relates to the measurement device in the breeding of ruminant class animals, the monitoring of the development of which tissue type caused by dairy cattle rations in the body and determination of the percentage of tissue types such as protein, fat, water, and bone that make of body composition.

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### PREVIOUS TECHNICQUE

A ruminant is the general name given to animals that ruminate. Cattle, buffalo, sheep, and goats are the main ones. Cattle breeding is the activity carried out with the aim of bringing animals to slaughtering maturity to obtain high quantity and quality meat by proper care and feeding. The purpose of breeding is to reach the highest live weight in the shortest time and most economical way. Live weight gain and feed utilization rate are stated as 'Breeding Performance'. The performance in question varies according to race. Each race has a unique growth curve. Because of the limits of genetics, the best care and feeding should be provided. While rations are aimed to bring the animals to the ideal weight or milk yield in the shortest and most economical way, it is also important that the quality of the product taken is not deteriorated. In today's practices, rations are prepared according to general rules-based on races and geographical conditions and feeding is done based on these rations. Since animal specific measurements cannot be made in the feeds made with general rations, undesirable results may occur. For example, if the unsaturation in the muscle is increased with roughage or preserved fat, the shelf life decreases and the flesh color can quickly turn from red to brown, and the smell and taste may deteriorate. In addition, following the rate of feed utilization in the given ration, following the achievement of maximum daily live weight increase, and the stopping point of muscle development in animals and the inability to establish the point of formation of fat tissue without economic value starting from the development of fat tissue are the fundamental technical problems.

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## BRIEF DESCRIPTION OF THE INVENTION

The invention uses the data received by the algorithm to measure the resistance of the four electrode points, two ear electrodes in large ruminants, two electrode points in contact with the skin of the distal parts of the metatarsal bone of the back two feet, and the resistance received by the given low voltage electric current and the evaluation algorithm. It consists of a measuring device consisting of software that converts it into a meaningful report and a tong with a chip to be used to insert the chip into the ear.

## 10 LIST OF FIGURES

- Figure 1. Device overview  
Figure 2. Algorithm flow chart

Index of the parts given in Figures:

- 15 1. Source Electrode  
2. Detector Electrode  
3. Data Collection Unit  
4. Computer  
5. Scale  
20 6. Software  
6.1. Measurement Module  
6.2. Calculation Module  
6.3. Reporting Module

## 25 DETAILED DESCRIPTION OF THE INVENTION

The invention consists of source electrode (1), detector electrode (2), data collection unit (3), Computer (4), Scale (5) and software (6) consisting of measurement module (6.1), calculation module (6.2), reporting module (6.3) sections. At least one source electrode (1) in the two ears of the animal and at least one detector electrode (2) that is in contact with the skin at the level of the distal part of the metatarsal bone of its two hind feet are placed. It is possible that the source electrode (1) and the detector electrode (2) can be placed under the skin in cases where the skin contact is not fully achieved, and the skin does not pass the current

sufficiently. The data collection unit (3) is placed so that it is not disturbing for the animal and fixed between the horn where the device will not be damaged. Data collection unit (3) consists of power supply to be given the animal, current control, ADC microcontroller, communication protocols and RFID card. Since analog values are continuous (uninterrupted) over time, there is an analog voltage value corresponding to all time periods. Creating a digital value for each analog value will be impossibly complicated and costly. For this reason, samples are taken at specified intervals over analog value. For each sample, a digital value coded according to its level is generated. We can summarize the operation of ADC circuits as “sample, compare, code digitally”.

If we describe the operation of the device with an example scenario; The device is started. In the data acquisition unit (3), the current is sent from the source electrodes (1) to the animal's body, with a maximum of 70 amps from the power source under the control of the ADC-enabled microcontroller. The current passing through the animal's body is detected by the detector electrodes (2). The acquired data set is transmitted to the data collection unit (3). The signal is isolated by the ADC-enabled microcontroller. In the meantime, the weight measured in the scale (5) by the microcontroller is read. The created data set is transferred to the software (6) on the computer (4) by wired / wireless communication protocols in the data collection unit (3). In the measurement module (4.1) of the software (4), the isolated current signal data received from the data collection unit (3), the animal weight and the identification number of the animal on the RFID tag are recorded. This information is transferred to the calculation module (4.2). The body mass index of the animal is calculated by the calculation module (4.2). Information on the muscle / fat development level, economic feeding stage and feed ration corresponding to the body mass index of the animal is arranged in a clear way and sent to the user by the reporting module (4.3) via screen / sms / e-mail / other wired and wireless protocols. Thus, health / economic problems arising from the inability to determine the level of economic nutrition experienced in the current state and due to feeding rations prepared with general recipes will be eliminated.

## CLAIMS

1. The body composition measurement method in ruminant class animals is characterized by the steps below:

- 5
- Placing at least one source electrode (1) in the two ears of the animal and at least one detector electrode (2) in contact with the skin of the distal parts of the metatarsal bone of the back two feet,
  - Placing the data collection unit (3) so that it is not disturbing for the animal and fixed between the horn where the device will not be damaged,

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  - In the data acquisition unit (3), sending current from the source electrodes (1) to the animal's body with a maximum of 70 amps from the power source under the control of ADC-enabled microcontroller,
  - Detection of the current passing through the body of the animal by the detector electrodes (2),

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  - Transmitting the data set created from the perceived current to the collection unit (3),
  - Signal isolation by ADC-enabled microcontroller,
  - Meanwhile, reading the weight measured in the scale (5) by the microcontroller,

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  - Recording the isolated current signal data received from the data collection unit (3), the animal weight and the identification number of the animal on the RFID tag in the measurement module (4.1) of the software (4),
  - Transferring the recorded information to the calculation module (4.2),

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  - Calculation of the body mass index by the calculation module (4.2),
  - Arranging information on the muscle/fat development level, economic feeding stage and feed ration corresponding to the body mass index of the animal in clear way and sending to the user by the reporting module (4.3) via screen / sms / e-mail / other wired and wireless protocols.

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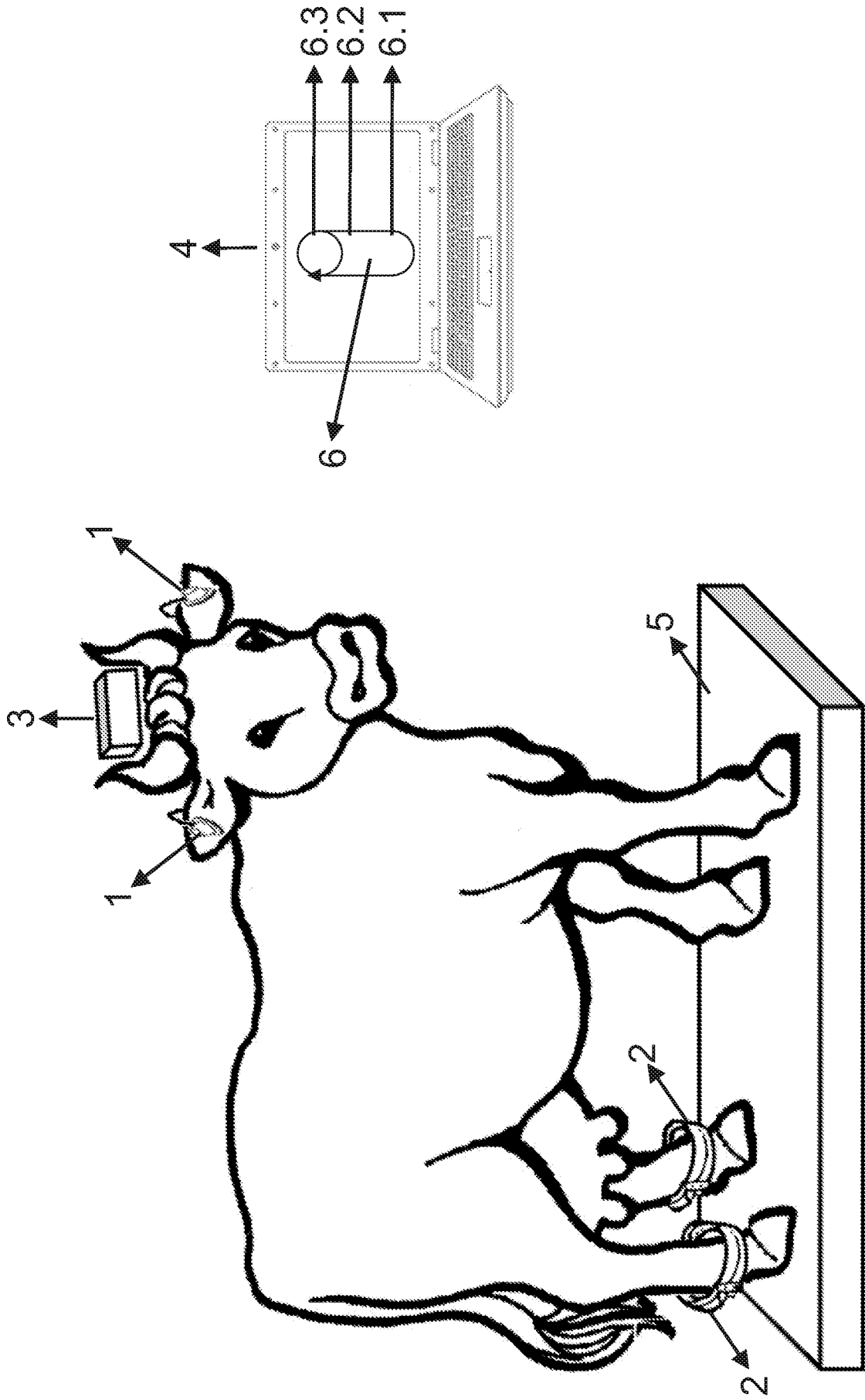
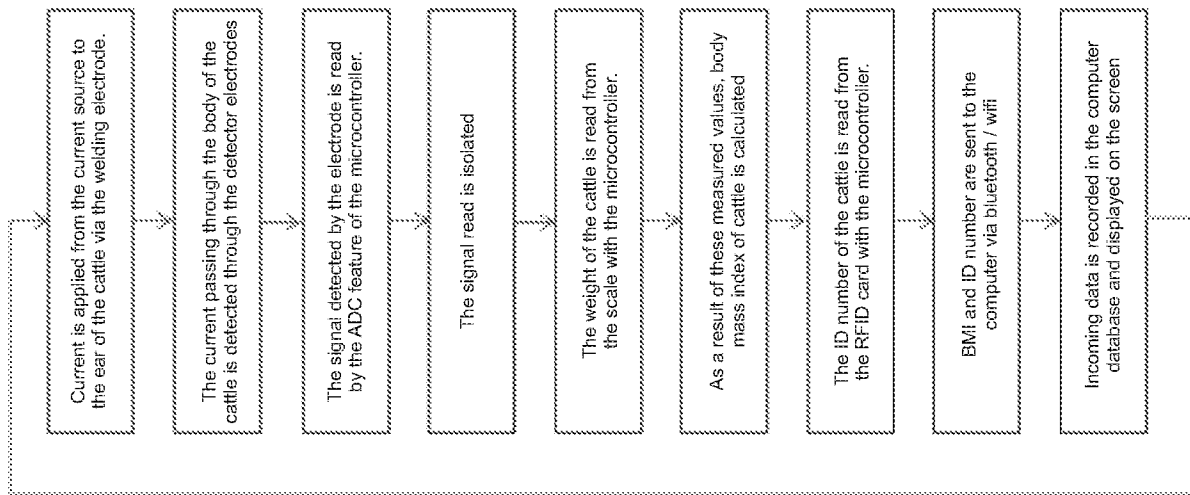


FIGURE 1



**FIGURE 2**