Influence of Alternative Methods in Treatment and Precaution of Cow Mastitis

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Abstract
The aim is to assess whether homeopathy or other unconventional methods could be used in the treatment or prevention of mastitis in cows and at the same time while measurement of basic microclimatic indicators to determine if a stable climate influences the incidence of mastitis.
Experiment is performed in a herd of about 120 pcs of cows. Cows with proven mastitis are divided into two groups –the control and experimental group. In the experimental group selected auxiliary means according to specific methodological instruction were given to cows according to specific methodological instruction to strengthen the immunity of their organism. Other husbandry and veterinary care was maintained in the same usual extent as in the control group. In both groups the occurrence of health disorders is recorded after a specified period of time describing the method used and the required treatment time. During the experiment basic microclimatic parameters (temperature, humidity, airflow, cooling value) are monitored continuously.

Keywords: cows, mastitis, microclima, nonconventional treatment

1. Introduction

The current situation in cattle breeding compared to the state of previous years puts a high emphasis on the production and quality of animal products. Due to the efforts to reduce constantly input costs and to increase productivity in parallel, the number of livestock is gradually reduced and its physiological level of performance is increased. Simultaneously with this, however, also their demands on housing conditions increase. A man keeps animals in a limited area, forcing them to live in an environment that creates them according to his subjective ideas [1].
Mastitis belongs currently to the most important diseases in dairy cattle, which cause huge economic losses. It is the cause of declining amount of milk in farms and the deterioration of the quality of milk ingredients, the lower valuation of milk and even culling of cows [2]. Their treatment and prevention have a significant economic impact. Mastitis remains a major challenge for the global dairy industry [3]. Therefore it is absolutely necessary to prevent these diseases in breeding and if possible to strive the maintaining optimal animal welfare [4]. Mastitis is the disease of many factors. It is the inflammatory disease of the mammary gland, in whose formation various types of microorganisms, various disruptions of physiological processes of the organism and the mammary gland and various physical and chemical traumas are involved. Economically the most important mastitis infections are caused by a microbial infects, which get into the udder via the teat canal, if due to effects of adverse environmental factors the balance between the natural defense mechanisms

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of the mammary gland and the number and pathogenicity of microorganisms is disturbed [5].
[3] identifies mastitis as an occupational disease, especially in highly efficient dairy cows. The incidence rises with the increasing milk yields. Milk production decreases both qualitatively and quantitatively. Dairy cows that overcame mastitis rarely reach the original production. The affected quarters have lower milk production until the end of lactation and more often succumb to relapses compared with unaffected quarters [4].
The main etiological agents of intra-mammary infections were bacteria *Streptococcus sp., Arcanobacterium pyogenes* and coagulase–negative staphylococci [6]. A big role in the mastitis disease plays cleanliness of the environment and the body of the cow, especially udder. To this conclusion came also [7], who confirmed in experiments that the purity of the udder affects the occurrence of mastitis in the herd, whereas the effect of leg´s cleanliness was not significant. The correlation coefficient between udder health and mastitis was 0.77 and between limb hygiene and limping 0.63. [8] concluded that, in contrast to the typical behavior of animals cow disease did not increase their time spent lying, but instead of it they were trying to avoid lying on the side of the inflamed udder quarters. New utilities for the detection of mastitis should be able to detect and combine automatically the changes in physiological parameters (e.g. fever) and complete patterns of behavior consisting of rest (lying down), standing and feed intake.
Quarter with the outdated clinical form of the infection produces only 8% of its potential ability and quarters with subclinical infections produce only 65% of its potential production. Mastitis diseases threaten also the human population, not only due to decreased milk quality and health safety, but also directly to their bacterial pathogens. Milk of the mammary glands suffering from inflammation contains large amounts of bacteria that release toxins which may be harmful to human health (e.g. Staphylococcus aureus is a cause of suppurative disease in humans, infection of the upper respiratory tract, etc.). Mastitis and antibiotics used to their treatment also contribute to the formation of resistant strains to antibiotics [9, 10].
Homeopathy is primarily a treatment method, which utilizes the phenomenon of clinical similarities [11, 12, 13] and uses the active substances in small quantities or in infinitesimal dilutions [14]. Homeopathy is according to the WHO (World Health Organization) the second most common type of treatment in the contemporary world, namely behind traditional Chinese and Indian medicine [15]. In homeopathy symptoms are not taken as negative symptoms of the disease, but as an attempt of the body to resist the disease. A substance that causes the same symptoms in a healthy person can be given at the minimum dose to balance and encourage the patient's self-healing mechanisms and thus enable them to fight against disease effectively [16]. Cost-effectiveness studies show that homeopathy offers savings compared with conventional medicine [11].
Maintaining optimal bioclimatic environmental conditions is next to care and nutrition one of the decisive factors affecting performance and health status of the animals [1].

2. Materials and methods

The experiment was carried out in a stable operating with 120 pieces of dairy cows mainly of Czech Pied breed, which were divided into three sections according to the stage of lactation. At the time of experiments paratuberculosis as a serious problem occurred in the herd. Milking took place in *autotandem* parlour (3x3). Cows with proven mastitis were divided into two groups–the control and experimental group. In the experimental group chosen supporting medicaments were given to cows according to specific methodological instruction to strengthen the immunity of their organism. Other husbandry and veterinary care was maintained in the same usual extent as in the control group. In both groups we recorded the occurrence of all health disorders in given time periods describing used methods and time of required treatment. During the experiment basic microclimatic parameters (temperature, humidity, airflow and cooling value) were monitored continuously.
Cows in the experimental group were applied in addition to antibiotic therapy extra 5 ml oral homeopathic support means *PVB mammites* once a day. At the same time microclimatic parameters (environmental temperature, relative humidity, dew point) were measured both by sensor *Comet* located in the barn and sensing values every hour,

and by manual devices. Environmental parameters were measured once a week regularly always around nine o'clock in the morning at six locations (two in the stable, two at the feeding place and four at different places outside the stable) about 1 m above the ground in the living zone of animals. Measurements were performed by Assmann´s aspiration psychrometer (current temperature and air humidity) and Hill's katathermometer (surrounding cooling value, airflow and barometric pressure). From the obtained values of stable microclimate the correlation with the occurrence of mastitis in cows in the herd was calculated. For statistical processing of results found of the homeopathic treatment effectiveness the program ANOVA was used.

3. Results and discussion

In the control and experimental groups of cows we monitored whether the mastitis in the treated cows repeated and how many times, how many times was the same quarter in the cow infected, and how many days the treatment required. In both groups monitored data were recorded at approximately same extent and differences between both groups were not statistically significant. Results are presented in Table 1.

Table 1. Mastitis by experimental and checkout group

	Checkout group (81 pcs)	Experimental group (61 pcs)
Repeated mastitis (pcs)	12	11
Same quarter (pcs)	7	6
Repeated mastitis (%)	14.81 %	18.03 %
Same quarter (%)	58.33 %	54.5 %
Number of medical days (pcs)	5.80	5.87

The collected results of experiments show that used homeopathic preparations did not show any significant effect on the incidence of mastitis. However the results may be distorted by many other factors such as nutrition, inadequate stable environment and the overall health status of the herd, where during the trial paratuberculosis as a serious problem occurred etc. In order that results were more significant the homeopathic preparations should be applied to animals not across the board, but each animal should be taken as an individual with specific problems and symptoms, and accordingly to it to apply the corresponding preparation, which states all the homeopathic literature [14, 16, 11].

Summary of average monthly temperatures obtained by averaging the measured values of the continuous and weekly measurements is presented in Table 2. Positive values and temperatures in the winter months indicate that winter was very mild.

Table 2. Average of monthly values in the year

month	Ø temperature [°C]	Ø relative humidity [%]	Ø speed of airflow [$m.s^{-1}$]	Ø H [$W. m^{-2}$] Ø Surrounding cooling value
March	6.93	85.87	0.312	472.14
April	10.50	81.94	0.278	443.72
May	16.15	78.23	0.269	343.70
June	18.5	74.22	0.372	328.68
July	21.49	70.84	0.313	264.23
August	16.50	78.23	0.559	402.29
September	17.40	76.58	0.408	352.78
October	12.33	87.88	0.304	417.64
November	9.18	84.53	0.352	488.57
December	5.54	84.61	0.303	488.72
January	7.83	75.84	0.429	532.49
February	6.38	78.93	0.207	445.48
March	8.00	77.36	0.394	519.85

In Table 3 we show the incidence of mastitis in separate months, where the highest incidence was found in April (20) and the lowest in September (6).

Table 3. Incidence of mastitis in particular months

Month	Number of mastitis
March	18
April	20
May	12
June	6
July	7
August	7
September	6
October	10
November	15
December	12
January	11
February	10
March	7

Table 4 presents the correlation between microclimatic indicators and the incidence of mastitis. Negative correlation was found in the herd between the environment temperature and inflammations (-0.538) and between airflow and inflammations (-0.4367). Positive correlation was counted between relative humidity and inflammations (0.631) and environment cooling value and inflammations (0.433).

Tab. 4: Correlation between particular microclimatic parameters and incidence of mastitis

Microclimatic parameters and mastitis	Correlation
Temperature x mastitis	-0.538
Relative humidity x mastitis	0.631
Airflow speed x mastitis	-0.437
Surrounding cooling value x mastitis	0.433

Results of microclimatic measurements demonstrate that the incidence of mastitis relies to climatic conditions in the stable, which corresponds to the findings of other authors (ŠOCH, 2005)[17].

4. Conclusions

From the obtained experiments we can claim that used homeopathic preparations did not show any significant effect on the incidence of mastitis. However the results may be distorted by many other factors of stable environment, especially zoo hygienic conditions. We proved the linkage between incidence of mastitis and microclimatic indicators of environment. The number of mastitis decreased with increasing ambient temperature (correlation -0.538) and cooling values of the environment (correlation 0.433) and on the other hand went up with increasing relative humidity (correlation 0.631) and airflow (correlation-0.4367). The most of inflammation was observed in the transitional seasons (spring and autumn), when temperatures are lower and oscillating, air flow was faster, relative air humidity and environment cooling value were higher. This was the mild winter probably contributed to an increase in the incidence of mastitis in the stable above the normal level for this period.

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