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THE USE OF HOMEOPATHY IN THE TREATMENT OF MASTITIS IN DAIRY COWS

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ABSTRACT

The treatment of mastitis is based mainly on the use of antibiotics. However, in recent times, an increase in resistance phenomena and the presence of residues in milk and their derivatives has been reported. Few studies have focused on the treatment of mastitis by homeopathy elsewhere or in Algeria. The objective of this current study aimed to clarify in particular the interest of homeopathy in the treatment of mastitis. The work was carried out in two dairy farms on a total of 14 cows located in Laghouat region (South of Algeria). Before the start of the experiment, a tolerance test was performed on two cull cows free from any apparent infection [except mastitis]. Local and general reactions were noted at specific times. A total of 31 mammitous districts received 4 intramammary injections of a homeopathic preparation containing several natural products every 12h over 48h. A clinical examination and an analysis of the milk samples on D0, D7 and D14 were realized on all the cows and the decision was made on the 14th day. Data showed a very good tolerance to the homeopathic preparation and a cure of 75% of clinical mastitis. An improvement with a decrease in CMT score was also noted. In addition, healing rate of 51.85% for subclinical mastitis on D7 and 59.29% on D14 were also reported. At the end, homeotherapy could, in some cases, represent an alternative to antibiotic therapy and bring an advantage to breeders. Further investigations should be performed in the future.

Keywords: Homeopathy; mastitis; cow; treatment; injections; milk; Algeria.

INTRODUCTION

Mastitis represents a dominant pathological condition in dairy farming, and their treatment is usually based on the administration of antibiotics [1,2]. However, several black spots hinder the use of this type of medication, especially those related to the resistance phenomena and the presence of residues in milk which constitute a huge danger for the consumer, and the emergence of so-called [biological] farms, which limit the use of these drugs and recommend homeopathy or phytotherapy [3,4].

Many studies on the treatment of mastitis with aromatherapy "herbal products" showed unfavorable data and sometimes interesting perspectives have been reported. Moreover, few works have focused on the treatment of this disease by homeopathy, which is based on a global approach of stimulating the animal's immune system. There are very few such ready-to-use drugs [5] and there is limited experimental results on the veterinary use of homeopathy. Some controlled experiments were nevertheless carried out, but they were not published or were published in journals with difficult access. In human medicine, there are more

informations on the effectiveness of the two therapies in the treatment of various infectious diseases [6,7], but these references were limited in the case of mastitis. In addition, the use of such substances in veterinary therapy implies not only that the product is effective, less expensive but also that it is not a source of residues potentially dangerous for the health of the consumer. In Algeria, no study has been published on the effectiveness of the two approaches in the field. The objective of this study is to get rid of the use of antibiotics in the treatment of mastitis. Faced with this situation and the lack of solid references, it was decided to carry out therapeutic trials in the field, in order to specify in particular the interest of homeopathy in the treatment of mastitis. Other objectives aimed to observe the clinical effects of a homeopathic treatment applied to at least ten cows. This preparation being administered alone in order to be able to attribute the results to it and to note and follow the clinical and paraclinical evolution of the district by clinical examination of the udder and analysis of milk samples.

MATERIALS AND METHODS

Selected Farms

The work was carried out on two dairy farms in the Laghouat region of Algeria. Each of the two voluntary farms was the subject of an investigation prior to the first clinical trials, with the aim of identifying possible features that could influence the nature of mastitis and the therapeutic results to come. The visits were therefore performed according to an epidemiological questionnaire conventionally used to detect the origin of mastitis in a herd.

This questionnaire concerned the farming environment, animal cleanliness and milking conditions. It highlighted the great homogeneity of the two operating systems. They practically all corresponded to the following model:

- A herd of prim'holstein and montbeliard;
- It was housed in a building of the type [straw area with an exercise area];
- During milking, the udders were prepared by washing with a shower with water.
- In addition, no teat dip product was used. Cows were generally lightly soiled.
- The differences observed were, with minimal and related to the milking technique.

Indeed, in one farm milking was carried out in a milking parlor while in the other, it was done using a milking cart.

Formulation of the intra-mammary preparation

The intra-mammary injection contained the following mixture:

Phytolaca decandra 30CH, Hepar sulfur 30CH, Siliceae 30CH, Sepia officinalis 30CH, Thuya occidentalis 30CH, Calcarea phosphoric 30CH, Pulsatilla30CH, Iodum 30CH, Cantharis 9CH, Phosphorus 9CH, Baptisia tinctoria 9CH, Echinaceae angustifolia 9CHrium, Nitricum 9 Arnica Montana 9CH, Bryonia aa 9CH, Alginate of sodium 8 gr, Aqua qsp 1000 ml.

The mixture of these products was justified by their anti-inflammatory, anti-infectious, febrifuge, anti-suppurative, and anti-hemorrhagic properties which resulted from the pathogenesis of the substances. The products have been chosen for their complementarity, for their analgesic action, restorative fortifying and healing and to

cover all stages of mastitis [mammary congestion, acute mastitis with fever, subacute mastitis, chronic mastitis, gangrenous mastitis, mammary induration] [8].

Tolerance Test

Before the start of the experiment, a tolerance test for the product was carried out on two cull cows free from any apparent infection [except mastitis], belonging to one of the two farms and according to the planned treatment methods. Local and general reactions were noted at specific times.

Included Cows

The aim was to treat clinical and subclinical mastitis. Therefore, any modification of the udder or milk decided the inclusion of the animal in the protocol. Following the diagnosis of mastitis, the farmer had the choice of opting for conventional veterinary care [antibiotic therapy] or homeopathy. It was by no means possible to impose random treatment in situations which required effective and early treatment. For this reason, the animals studied showed only minor but mostly functional general symptoms. The inclusion in the protocol of cows with affected general condition had been advised against breeders. The population studied was therefore very homogeneous on this criterion. In order to obtain optimal efficiency, we had only included in the protocol animals that were free from any other treatment.

Mastitis Monitoring and Treatment Modalities

The diagnosis of clinical mastitis and the screening of subclinical mastitis being established, the decision to start the protocol belonged to us knowing that it was strongly advised to treat only light mastitis in order not to endanger the health of the cows. After detection of mastitis, we emptied the area and performed the first injection according to usual good cleanliness practices. This administration was done every twelve hours for 48 hours, or 4 injections in total for each teat. The effectiveness of the treatment was then evaluated by a clinical diagnosis and by the CMT (Californian Mastitis Test) seven and 14 days after the last injection. For the follow-up of the evolution of the cases, a clinical file was filled in to assess the health of each animal during the treatment, 3 times [at the time of the discovery of mastitis, 7 and 14 days after the last treatment]. The final response to any treatment was given during the third visit. The criteria described corresponded to the general state of animal health [body temperature, rumination, feeding, duration of the animal's sleeping time] and to criteria of description of the udder [color, pain, volume and injury] and milk [color, appearance, consistency, smell and quantity].

California Mastitis Test

The first few jets of milk were discarded and small quantity was used to realize the CMT (Raidex, Milt-04-10112009, Cyclovet, 2003 uncolored, Germany). A qualitative measurement of the SCC in milk is a screening test for subclinical mastitis that can be used easily at the cow side [2, 3]. Quarter milk samples and surf solution were then mixed in equal quantities in Petri-dishes separately for each quarter. The change in consistency of milk indicated mastitis, while no change in consistency of milk indicated healthy samples. The CMT reaction was graded from 0 to 4. The scores were ranked according to an increase in viscosity. Animals were considered positive

for mastitis when CMT score was ≥1+ and SCC value was ≥2×105/ml of milk (threshold value).

Experimental Design

After detection of mastitis by clinical examination or by CMT, we emptied the infected quarter, disinfected the teat and carried out the first injection of the mixture. This was repeated on the following 3 milkings then the effectiveness of the treatment was evaluated. Clinical records were filled out to assess the progress of mastitis in each treated cow: at the time of detection, 7 days and 14 days after stopping treatment. These sheets gave a description of the general condition of the animal, the udder and the milk. Bacteriological samples were eliminated because they were too little usable due to contamination and the difficulty of keeping bacteria in the freezer. The trial involved two dairy farms. The treatment was carried out on all cases of clinical mastitis with local signs but without affecting the general condition and on cases of subclinical mastitis detected using a CMT test found positive when it showed a score greater than 1 on a scale from 0 to 4. Upon detection of mastitis, a standardized breast exam sheet [color, volume, consistency] and milk [color, smell, appearance and consistency] was completed. Then, the first 30 ml intra-mammary injection of the preparation was carried out. This was followed by three other administrations, on time [t] 12h, T24h and T36h. A final clinical examination of the animal, the udder and the milk was carried out 7 days and 14 days after the last injection.

Statistical Analysis

Prevalence of mastitis was determined as the proportion of affected cows out of the total examined. The statistical analysis was performed with the Statistica software (V. 6), ANOVA. The statistical analysis was based on the Chi-square test.

RESULTS

Tolerance Test

No local or general adverse reactions have been reported and could not be attributed to the administration of the product. On the contrary, a very good tolerance of the treatment was noted since, out of 14 animals with mastitis treated with the homeopathic product, no cow showed aggravated symptoms. In addition, on the 2 cows on which the tolerance test was carried out, we have recorded an improvement in the quality of their milk.

General Assessment

Distribution of cases

Table 1 presented the distribution and the number of cows and districts with mastitis.

Table 1. Distribution and number of cases with mastitis

Farms	Seize of Herd (Dairy cattle)	Number of cows with CM	Number of cows with SCM	District with CM	District with SCM	Number of tested cows	Number of tested districts
1	60	3	20	10	50	12	23
2	80	6	12	8	60	2	8

CM: Clinical mastitis, SCM: SubClinical mastitis

Although the operations appeared very similar, the distribution of the cases of mastitis treated was as follows: The experiment started on farm 1, but the lack of hygiene in this farm led us to test the product on only two cows. The other products were tested on mastitis cows belonging to the farm 2.

Respect of the protocol

The participation of breeders in the protocol was remarkable, both in terms of the precision of their comments and compliance with the study protocol. Almost no untreated processing or unusable information was to be deplored. It was above all on carrying out these experimental treatments that their interventions have proven to be rigorous.

Evaluation of the experimental treatment

The clinical evolutions at the end of these treatments were as follows: With regard to the influence of the experimental treatment on the clinical course of mastitis, there were clinical cures on all the clinical cases treated [4 quarters with CM] with a recurrence observed on the seventh day after the last treatment, a positive clinical effect of 75% [Table 2]. For cytological progress, 14 districts [out of a total of 27 districts with SCM] became healthy compared to 13 districts still infected at seven days after the last treatment. At fourteen days, in total 16 districts became healthy against 11 districts still infected at this date [two of them were sanitized on the seventh day], the efficiency was more than 50%, that was to say that the homeopathic product allowed us to cure 51.85% of SCM seven days after the last treatment and 59.25% of SCM fourteen after, a positive effect of more than 50%.

As for the evolution of CMT scores, there was an improvement with a decrease in the CMT score. Indeed, during the first control carried out at seven days after the last treatment with the homeopathic preparation, we noted that the CMT score went from 2 to 0 for 11.11% of the districts. It went from 1 to 0 for 33.33%. The score dropped from 2 to 1 for 03.70%. Finally, the score went from 3 to 1 for 29.62%. However, an aggravation of this score was noted for 03.70% going from score 1 to score 2. In addition, no improvement was noted for 11.11% of the districts [score fixed at 2 on D0 and 7 days later].

Fourteen days post-treatment, an improvement in the CMT score was noted indeed, 11.11% of the districts going from 2 to 0 for, 03.7% going from 3 to 0, and 40.74% going from 1 at 0. However, a worsening with increase in the CMT score was showed for 07.40% including the score 0 to 1.No change from the subclinical form to the clinical form was noted during the two checks carried out after the treatment.

Clinical Efficacy

Table 2 showed the results of the homeopathic preparation on mastitis cows at different times.

The administration of the product coincided with a healing of 75% of CM, obtained seven days after the last treatment and even 14 days after, a positive effect of 75%. That is to say that out of the 4 CM treated we obtained 3 clinical cures and even subclinical [confirmed by the CMT test with a score of 0], ie 75% of success. This rate was explained by the phenomenon of self-healing and by the anti-inflammatory properties of homeopathic preparation. Table 2 showed the number of mastitis treated and the number of cases with improvement, whether or not followed by a cure confirmed at the final clinical examination carried out 7 and 14 days post-treatment.

Table 2. Results of homeopathic treatment on D7 and D14

Mastitis	Diagnostic at D0	District	Animals	Clinical Exam at 7	Score CMT at D7	Clinical exam at D14	Score CMT at D14
CM	**Clinical Exam**	4 districts with CM	4 animals with CM	1 CM 3 clinical healings	Macroscopic Modification Of milk Negative district except PG1	1 MC 3 guérisons cliniques	Macroscopic Modification Of milk Negative district except AG1
Score CMT [SCM if CMT ≥1	**1** **2** **3**	11 8 8	10 animals with SCM	Animals clinically healthy	11 3 0	Animaux cliniquement sains	7 2 0

CMT: California Mastitis Test

There were therefore 3 final clinical recoveries [out of a total of 4 cases] after exclusive administration of the preparation of homeopathic products, ie 75% of clinical healing. Among these at seven days, no relapse was noted at 14 days post-treatment.

51.85% cures of subclinical mastitis.

Table 3 presented the distribution of the treated districts and the evolution at different times.

Table 3. Distribution of treated districts and their development 7 and 14 days after the last injection

Number of cow	1st test [1st control] [D0]	2nd control [7th D]	3rd control [14th D]
6913 [farm 2]	AG_3[SCM]	AG_1	AG_3
	AD[CM]	AD	AD_4
	PG_3[SCM]	PG_1	PG_1
	PD_3[SCM]	PD_1	PD_1
6914 [farm 2]	AG_3[SCM]	AG_3	AG_1
	AD_3 [SCM]	AD_2	AD_1
	PG_3[SCM]	PG_3	PG^1
	PD_3 [CM]	PD_2	PD_1
7590 [farm 1]	PD_2 -SCM]	PD_0	PD_0
2715 [farm 1]	AD_3[SCM]	AD_0	AD_0
7579 [farm 1]	PG_2[SCM]	PG_0	PG_0
	AD_1[SCM]	AD_0	AD_0
	AG [CM]	AG_0	AG_1
09024 [farm 1]	PD_1[SCM]	PD_0	PD_0
	PG_1[SCM]	PG_0	PG_0
06002 [farm 1]	AG_1[SCM]	AG_0	AG_0
	AD_1[SCM]	AD_0	AD_0
05049 [farm 1]	PG_1[SCM]	PG_1	PG_1
	AD_1[SCM]	AD_0	AD_0
05043 [farm 1]	PG [CM]	PG_1	PG_0
03019 [farm 1]	AG[CM]	AG_0	AG_0
	AD_1[SCM]	AD_0	AD_0
	PG_1[SCM]	PG_1	PG_0
	PD_1[SCM]	PD_2	PD_2
09002 [farm 1]	AG_1[SCM]	AG_0	AG_0
	AD_1[SCM]	AD_0	AD_0
08011[farm 1]	PD_2[SCM]	PD_2	PD_0
	PG_{1l}[SCM]	PG_2	PG_0
03024 [farm 1]	AG_2[SCM]	AG_1	AG_2
	PG_2[SCM]	PG_0	PG_0
03061[farm 1]	AG_2 [SCM]	AG_0	AG_1

AG: anterior left, AD: Anterior right, PG: Posterior left, PD: Posterior right. $_{0, 1, 2, 3,4}$*: Scores of CMT. CM: Clinical mastitis, SCM: SubClinical mastitis*

To assess the effectiveness of treatment for SCM cases, a CMT test was performed on the seventh and fourteenth days after the last injection. The 51.85% paraclinical cure rate for subclinical mastitis having received only the treatment based on homeopathic products and calculated 7 days post-treatment was therefore not significant since it was calculated on a small number. Furthermore, this result was satisfactory if we compare it with the cure rate obtained from intra-mammary antibiotic treatment which ranged from 40 to 70%, and it is still satisfactory if we consider a rate of spontaneous cures of the around 20% [6]. Mastitis responded favorably to the product but relapsed after 14 days. If we consider that the udder was healed when the sample taken on the fourteenth day post-treatment no longer revealed the presence of the initial inflammation, there have been sixteen sterilizations of the udder following homeopathic treatments.The effectiveness of the preparation appeared convincing, the favorable clinical developments being explained by the very high number of paraclinical cures identified by the CMT test.

DISCUSSION

Mastitis is one of the most common pathology in dairy farming. . However, in these farms, the number of antibiotic therapy failures per year is clearly increasing, hence the need to search for new treatments to reduce the incidence of mastitis. In addition, resistance of Gram - pathogens to some antibiotics has been reported. Although few in number, these resistances partly justify the interest in homeopathic management of mastitis.

In biological farms in Europe, antibiotic therapy for mastitis represents only 41% of treatments, compared to 100% in conventional farming, with the use of homeopathy in 51% of non-antibiotic treatments [9]. In the United States, no antibiotic treatment is used in this farming; the treatments used are based on vitamin C, Aloie verra and apple cider [10]. In Africa, the concept of biological farming has not yet been adopted, hence the use of antibiotics in 100% of cases. To reduce the incidence of mastitis, drying antibiotic therapy is a very widespread practice, the effectiveness of which has been repeatedly demonstrated. In biological farms not following this practice, a study carried out in England by HOVI and RODERICK, published in 2000 [9], reported a significant increase in the number of mastitis in dry cows compared to the data reported in conventional farms.To ward off these pathologies, in the United States where breeders cannot use antibiotic therapy, the different treatments used for drying up are: lactoserum most frequently but also vitamin supplements, microbial supplements and vitamin C. Similarly a Gradual withdrawal without antibiotic treatment at drying up seems to bring good results.

Elsewhere, the homeopathic treatments used in breeding have not always proven scientifically their effectiveness but remain nevertheless used by the breeders [10]. However, studies continue to be conducted and published, especially in emerging countries like India [11]. The results of this study carried out in Algeria for the first time come in this direction and prove once again the reliability of this type of treatment. The studies carried out by these latter authors on the homeopathic management of clinical mastitis are particularly relevant. In two studies published in 2004 and 2005, the authors evaluated the effectiveness of a homeopathic complex containing Phytolacca 200CH, Calcarea fluorica 200CH, Silica 30CH, Belladona 30CH, Bryonia 30CH, Arnica 30CH, Conium 30CH and

Ipecacuanha 30CH. In their first study, the efficacy of this complex was evaluated without there being a control group receiving a placebo, however.

In fact, 104 districts were studied; the results showed 80% recovery during fibrosis, 96.77% recovery in non-fibrotic areas, 100% recovery in cases of breast edema and 100% resolution when blood was present in milk. The authors concluded that in view of these encouraging results, further studies were needed. According to the drugs used, the efficacy can be explained by the anti-inflammatory properties of Phytolacca on glandular and fibrous tissues, by the analgesic effect of Bryonia, by the absorbent effects of Silicea on fibrous and scar tissues, by the anti-inflammatory properties of Belladona, the anti-hemorrhagic and antiseptic properties of Arnica and the decongestant effects of Ipecacuanha and Calcarea fluorica.

In their second study, mastitis in 96 districts was treated with the homeopathic mixture and mastitis in 96 other districts treated with different antibiotics by the intra-mammary route, the distribution of treatment was carried out at random. The results showed in cases of mastitis without fibrosis of the district an efficiency of 86.6%, all dosages combined during homeopathic treatment, with an average recovery observed from 7 to 8 days. With allopathic treatment, the recovery rate was 59.2% with an average recovery period of 4 to 5 days. According to this study, homeopathic treatment for mastitis seems effective and indicated. In mastitis without neighborhood fibrosis, the homeopathic treatment appeared to be more effective according to the authors than the antibiotic treatment [11]. MERCK et al. [12] have obtained good results with the homeopathic treatment containing: Aconitum D4, phytolacca D1, bryonia D4.

All these studies reported in common that although animals seemed to respond to the homeopathic treatment administered, there was in no case scientifically satisfactory proof that this treatment is really effective or that its effectiveness does not depend in reality only on a placebo effect. It therefore seems essential to carry out other studies on a larger scale to find out whether or not homeopathic treatment is a complementary solution to conventional treatments or even if it could one day replace it.

The current work was a preliminary study, as it did not have a control group, but it represented an approach in the field of the therapeutic interest of homeopathic products. There was a favorable clinical evolution in a large part of the animals, sometimes very rapid, probably due to the anti-inflammatory properties of the preparation with a high cure rate [80%].

The spontaneous bacteriological cure rate for mastitis in dairy cows is usually estimated at around 20-25% [13]. The results obtained here were better, but remained significantly less compared to those obtained by other authors after administration of antibiotics [14,15].

Anyway, the therapeutic interest of homeopathic products in the treatment of mastitis requires to be the subject of additional studies to meet the expectations of breeders who today have at their disposal with the exception of antibiotic therapy few validated therapeutic means. Homeopathy is a possible approach, but its evaluation is difficult. Regulatory requirements in terms of analytical quality of veterinary drugs are not very compatible with the development of

homeopathy, because it will be very difficult to develop drugs of this kind if their composition is not perfectly defined but on the other hand, it is a real alternative in various pathological situations, not only in biological farming but also in conventional practice [16].

The use of antibiotics should be limited as much as possible, in order to avoid the development of resistance that makes it ineffective, not only in veterinary medicine but also in human medicine. Through the most advanced research, the development of new therapeutic means could therefore facilitate a more restricted and judicious use of these active ingredients, and thus participate in the protection of public health. In addition, medicinal products based on plant substances should appear a priori to be more rapidly biodegradable than artificial active principles, and therefore contribute to the new environmental problem, pollution of water and soil by medicinal products [17].

Breeders' Opinion

The participating breeders were not familiar with homeopathy and its anti-infectious application. After this test, the two breeders said they are ready to repeat the experience. They felt that the few recurrences that have occurred in their herd were linked to insufficiently repeated administration.

CONCLUSION

The aim of this study was to advance knowledge of homeopathic products by relying on more strong data in terms of efficacy and safety, both for animals and for consumers.It supports the idea that homeotherapy could in some cases represent an alternative to antibiotic therapy and bring an advantage to farmers, since it appears essential to limit the use of antibiotics in order to reduce the risks of antibiotic residues in the milk. To our knowledge, there is an absence of Algerian publications presenting therapeutic results from the use of homeotherapy. Our experiment showed an acceptable percentage of clinical success compared to conventional treatment, an encouraging result justifying the use of this type of medication instead of antibiotic therapy. The very good tolerance of the intra-mammary mixture and its encouraging results allow us to envisage new experiments on a much larger effective.

ETHICAL APPROVAL

All the experiments were carried out according to the guidelines of the Institutional Animal Care Committee of the Algerian Higher Education and Scientific Research (Agreement Number 45/DGLPAG/DVA.SDA.14).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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