

# Alternative treatment of bovine mastitis



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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 study was carried out on two dairy farms on a total of 14 cows located in Laghouat region (southern 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 mammary quarters 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 performed on all cows and the conclusion was made on the day 14. Data showed a very good tolerance to the homeopathic preparation and a 75% cure rate of the clinical mastitis. An improvement with a decrease in CMT score was also noted. In addition, healing rates of 51.85% for subclinical mastitis on D7 and 59.29% on D14 were also reported. Ultimately, homeopathy could, in some cases, represent an alternative to antibiotic therapy and bring an advantage to breeders. Further investigations should be performed in the future.

**Key words:** *homeopathy; mastitis; cow; treatment; injections*

## Introduction

Mastitis represents a dominant pathological condition in dairy farming (Turk et al., 2012; Cvetnić et al., 2016a; Turk et al., 2017; Kovačić et al., 2019; Nedić et al., 2019) and their treatment is usually based on the administration of antibiotics (Gračner et al., 2006; Cvetnić et al., 2016b;

Kleczkowski et al., 2017; Burović, 2020; Saidi et al., 2021a). However, there are several issues that hinder the use of this type of medication, especially those related to resistance phenomena and the presence of residues in milk, which constitute a substantial danger for the

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consumer. In recent years, biological farms have appeared, which limit the use of these drugs and instead recommend treatments based on homeopathy or phytotherapy (Benić et al., 2018; Saidi et al., 2021b).

Many studies on the treatment of mastitis with aromatherapy “herbal products” have shown unfavourable data, while some studies have reported interesting perspectives. Few studies have focused on the treatment of this disease by homeopathy, which is based on a holistic approach of stimulating the animal’s immune system. There are very few such ready-to-use drugs (Kammerer and Pinault, 2006) and there are limited experimental results in the veterinary use of homeopathy. Several controlled experiments have been carried out, but they were not published or were published in journals that are difficult to access. In human medicine, there is more information on the effectiveness of the two therapies in the treatment of various infectious diseases (Goncalves et al., 2008; Tufeccki et al., 2014), though these references are limited concerning mastitis. Additionally, the use of such substances in veterinary therapy implies not only that the product is effective and less expensive, but also that it is not a source of residues that are potentially dangerous for consumer health. In Algeria, no studies have yet been published on the effectiveness of these two approaches in the field. The objective of this study was to find an alternative to antibiotics in the treatment of mastitis. Faced with this situation and the lack of solid references, the decision was made to conduct therapeutic trials in the field, in order to specify the interest of homeopathy in the treatment of mastitis. Other objectives aimed to observe the clinical effects of homeopathic treatment applied to at least ten cows. This preparation was administered alone to enable the results to be solely attributed

to their use, and to note and follow the clinical and paraclinical evolution of the quarter by clinical examination of the udder and analysis of milk samples.

## Materials and methods

### Selected farms

The study was conducted on two dairy farms in the Laghouat region of Algeria. The farms that volunteered to participate were also the subject of a prior investigation to identify possible features that could influence the nature of mastitis and the outcome of therapy. Visits were performed according to an epidemiological questionnaire conventionally used to detect the origin of mastitis in a herd.

This questionnaire concerned the farming environment, animal hygiene and milking conditions, and the results highlighted the homogeneity of both operating systems. They both corresponded to the following model:

- herd of Prim’Holstein and Montbeliard;
- housed in a building [with straw area and exercise area];
- during milking, udders were prepared by washing with a shower with water.
- no teat dip product was used, and cows were generally lightly soiled.

The differences observed were minimal and related to milking technique: milking on one farm was conducted in a milking parlour while on 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,

Pulsatilla 30CH, Iodum 30CH, Cantharis 9CH, Phosphorus 9CH, Baptisia tinctoria 9CH, Echinaceae angustifolia 9CH, Nitricum 9CH, Arnica Montana 9CH, Bryonia aa 9CH, Alginate of sodium 8 gr, Aqua qsp 1000 mL.

The mixture of these products was selected due to their anti-inflammatory, anti-infectious, febrifuge, anti-suppurative, and anti-haemorrhagic properties resulting from the pathogenesis of substances. The products were also selected for their complementarity, for their analgesic action, restorative fortifying and healing properties, and their applicability to all stages of mastitis (mammary congestion, acute mastitis with fever, subacute mastitis, chronic mastitis, gangrenous mastitis, mammary induration).

### **Tolerance test**

Before the start of the experiment, a tolerance test for the product was carried out on two cull cows free of any apparent infection (except mastitis), on one farm 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 was sufficient for 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 of cows with affected general condition in the protocol was advised against. The population studied was therefore very homogeneous for this criterion. In order to obtain

optimal efficiency, only animals free of any other treatment were included in the protocol.

### **Mastitis monitoring and treatment modalities**

Since the diagnosis of clinical mastitis and the screening of subclinical mastitis were established and in place, the decision to start the protocol was at the discretion of the researchers, and it was strongly advised to treat only light mastitis to prevent endangering the health of cows. After the detection of mastitis, we emptied the area and performed the first injection according to the usual good cleanliness practices. Administration of the preparation was repeated every twelve hours for 48 hours, or 4 injections in total for each teat. The effectiveness of the treatment was then evaluated by clinical diagnosis and by CMT (Californian Mastitis Test) on day 7 and day 14 after the last injection. For the follow-up of the evolution of the cases, a clinical file was completed to assess the health of each animal during the treatment, at three times (at the time of the discovery of mastitis, and on days 7 and 14 after the completion of 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 sleep) and to criteria of description of the udder (colour, pain, volume and injury) and milk (colour, appearance, consistency, smell and quantity).

### **California mastitis test**

The first few jets of milk were discarded and a small quantity was tested using CMT (Raidex, Milt-04-10112009, Cyclovet, 2003 uncoloured, Germany). A qualitative measurement of somatic cell count (SCC) in milk is a screening test for subclinical mastitis that can be used easily on site (Saidi et al., 2019, 2020).

Quarter milk samples and surf solution were 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 the CMT score was  $\geq 1+$  and the SCC value was  $\geq 2 \times 10^5$ /mL milk (threshold value).

### Experimental design

After detection of mastitis by clinical examination or by CMT, the infected quarter was emptied, the teat disinfected and the first injection of the mixture administered. This was repeated in the following 3 milkings and then the effectiveness of the treatment was evaluated. Clinical records were completed to assess the progress of mastitis in each treated cow: at the time of detection, and on days 7 and 14 after the completion of treatment. These records gave a description of the general condition of the animal, the udder and the milk. Bacteriological samples were eliminated since they were not 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 udder exam sheet (colour, volume, consistency) and milk (colour, smell, appearance and consistency) was completed. Then, the first 30 mL intramammary injection of the preparation was carried out. This was followed by three other administrations, after 12, 24 and 36 hours. A final clinical examination of the animal, the udder and the milk was carried out on days 7 and 14 after the last injection. All experiments were performed in compliance with the guidelines of the Institutional Animal Care Committee of the Algerian Higher Education and Scientific Research (Agreement Number 45/DGLPAG/DVA.SDA.14).

### Statistical analysis

Prevalence of mastitis was determined as the proportion of affected cows of the total examined. Statistical analysis was performed with the Statistica software (V. 6), ANOVA. The statistical analysis was based on the Chi-square test. The significance level was set at 5%.

## Results

### Tolerance test

No local or general adverse reactions were reported and therefore were not attributed to the administration of the product. On the contrary, a very good tolerance of the treatment was noted since none of the 14 animals with mastitis treated with the homeopathic product

**Table 1.** Distribution and number of cases with mastitis

Farm	Size of Herd (Dairy cattle)	Number of cows with CM	Number of cows with SCM	Quarter with CM	Quarter with SCM	Number of tested cows	Number of tested quarters
1	60	3	20	10	50	12	23
2	80	6	12	8	60	2	8

CM: Clinical mastitis, SCM: Subclinical mastitis.

showed aggravated symptoms, nor did the 2 cows on which the tolerance test was carried out. An improvement in the quality of milk was found.

## General assessment

### Distribution of cases

Table 1 shows the distribution and the number of cows and quarters with 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 poor hygiene in place at this farm led us to test the product on only two cows. Therefore, the remaining cows with mastitis treated with the product were all on farm 2.

### Abidance 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 was performed or unusable information given. In carrying out these experimental treatments, their interventions proved 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 in all clinical cases treated (4 quarters with CM) with a recurrence observed on day 7 after the last treatment, for a positive clinical effect of 75% (Table 2). For cytological progress, 14 quarters (of the total 27 quarters with SCM) became healthy compared to 13 quarters still infected on day 7 after the last treatment. On day 14, a total of 16 quarters became healthy as opposed to 11 quarters still infected on this date (two were sanitized on day 7), giving an efficacy of more than 50%. Therefore, the

homeopathic product cured 51.85% of SCM on day 7 after treatment and 59.25% of SCM on day 14, giving a positive effect of greater 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 on day 7 after the last treatment with the homeopathic preparation, the CMT score went from 2 to 0 for 11.11% of quarters, from 1 to 0 for 33.33% of quarters, and from 2 to 1 for 3.70% of quarters. The score dropped from 3 to 1 for 29.62% of quarters. However, an aggravation of this score was noted, with the score increasing from 1 to 2, for 3.70% of quarters. In addition, no improvement was noted for 11.11% of quarters (score remained at 2 on day 0 and again on day 7).

On day 14 post-treatment, an improvement in the CMT score was noted, with 11.11% of quarters dropping 2 to 0, 3.7% from 3 to 0, and 40.74% from 1 at 0. However, a worsening with an increase in the CMT score, including the score from 0 to 1, was found in 7.40% of quarters. 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 shows the results of the homeopathic preparation on cows with mastitis at different times

The administration of the product coincided with a healing rate of 75% of CM, obtained seven days after the last treatment and even 14 days after with a positive effect of 75%. That is to say that of 4 CM treated, 3 clinical cures and even subclinical cures were obtained (as confirmed by the CMT test with a score of 0), *i.e.* 75% success rate. This rate was explained by the self-healing phenomenon and by the anti-inflammatory properties of homeopathic preparation. Table 2 showed the number

**Table 2.** Results of homeopathic treatment on days 7 and 4

Mastitis	Diagnosis on day 0	Quarter	Animal	Clinical exam on day 7	CMT score on day 7	Clinical exam on day 14	CMT score on day 14
CM	Clinical Exam	4 quarters CM	4 animals with CM	1 CM	Macroscopic modification of milk	1 MC	Macroscopic modification of milk
				3 clinical cures	Negative quarter except PG1	3 clinical cures	Negative quarter except AG1
Score CMT [SCM if CMT $\geq$ 1	1	11	10 animals with SCM	Animals clinically healthy	11	Animals clinically healthy	7
	2	8			3		2
	3	8			0		0

CMT: California Mastitis Test

of mastitis cases treated and the number of cases with improvement, whether or not followed by a cure confirmed at the clinical examinations conducted on days 7 and 14 post-treatment.

There were three final clinical recoveries (out the total 4 cases) after exclusive administration of the preparation of homeopathic products, *i.e.* 75% clinical healing. Among these at seven days, no relapse was noted at 14 days post-treatment. For subclinical mastitis, a cure rate of 51.85% was obtained. Table 3 shows the distribution of the treated quarters and the evolution at different times.

To assess the effectiveness of treatment for SCM cases, the CMT test was performed on days 7 and 14 after the last injection. The 51.85% paraclinical cure rate for subclinical mastitis after receiving only the treatment based on homeopathic products and calculated 7 days post-treatment was therefore not significant, due to the small sample size. 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 spontaneous cure rate of around 20% (Goncalves et al., 2008). Mastitis responded favourably to

the product but relapsed after 14 days. If we consider that the udder was healed when the sample taken on the day 14 post-treatment no longer revealed the presence of the initial inflammation, sixteen udders were considered sterile following the homeopathic treatment. The effectiveness of the preparation appeared convincing, with favourable clinical developments explained by the very high number of paraclinical cures identified by the CMT test.

## Discussion

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

On 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 (Combre, 2010). In the United



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

Cow number	1 <sup>st</sup> test [1 <sup>st</sup> control] [day 0]	2 <sup>nd</sup> control [day 7]	3 <sup>rd</sup> control [day 14]
6913 [farm 2]	AG <sub>3</sub> [SCM] AD [CM] PG <sub>3</sub> [SCM] PD <sub>3</sub> [SCM]	AG <sub>1</sub> AD PG <sub>1</sub> PD <sub>1</sub>	AG <sub>3</sub> AD <sub>4</sub> PG <sub>1</sub> PD <sub>1</sub>
6914 [farm 2]	AG <sub>3</sub> [SCM] AD <sub>3</sub> [SCM] PG <sub>3</sub> [SCM] PD <sub>3</sub> [CM]	AG <sub>3</sub> AD <sub>2</sub> PG <sub>3</sub> PD <sub>2</sub>	AG <sub>1</sub> AD <sub>1</sub> PG <sub>1</sub> PD <sub>1</sub>
7590 [farm 1]	PD <sub>2</sub> [SCM]	PD <sub>0</sub>	PD <sub>0</sub>
2715 [farm 1]	AD <sub>3</sub> [SCM]	AD <sub>0</sub>	AD <sub>0</sub>
7579 [farm 1]	PG <sub>2</sub> [SCM] AD <sub>1</sub> [SCM] AG [CM]	PG <sub>0</sub> AD <sub>0</sub> AG <sub>0</sub>	PG <sub>0</sub> AD <sub>0</sub> AG <sub>1</sub>
09024 [farm 1]	PD <sub>1</sub> [SCM] PG <sub>1</sub> [SCM]	PD <sub>0</sub> PG <sub>0</sub>	PD <sub>0</sub> PG <sub>0</sub>
06002 [farm 1]	AG <sub>1</sub> [SCM] AD <sub>1</sub> [SCM]	AG <sub>0</sub> AD <sub>0</sub>	AG <sub>0</sub> AD <sub>0</sub>
05049 [farm 1]	PG <sub>1</sub> [SCM] AD <sub>1</sub> [SCM]	PG <sub>1</sub> AD <sub>0</sub>	PG <sub>1</sub> AD <sub>0</sub>
05043 [farm 1]	PG [CM]	PG <sub>1</sub>	PG <sub>0</sub>
03019 [farm 1]	AG [CM] AD <sub>1</sub> [SCM] PG <sub>1</sub> [SCM] PD <sub>1</sub> [SCM]	AG <sub>0</sub> AD <sub>0</sub> PG <sub>1</sub> PD <sub>2</sub>	AG <sub>0</sub> AD <sub>0</sub> PG <sub>0</sub> PD <sub>2</sub>
09002 [farm 1]	AG <sub>1</sub> [SCM] AD <sub>1</sub> [SCM]	AG <sub>0</sub> AD <sub>0</sub>	AG <sub>0</sub> AD <sub>0</sub>
08011 [farm 1]	PD <sub>2</sub> [SCM] PG <sub>1</sub> [SCM]	PD <sub>2</sub> PG <sub>2</sub>	PD <sub>0</sub> PG <sub>0</sub>
03024 [farm 1]	AG <sub>2</sub> [SCM] PG <sub>2</sub> [SCM]	AG <sub>1</sub> PG <sub>0</sub>	AG <sub>2</sub> PG <sub>0</sub>
03061 [farm 1]	AG <sub>2</sub> [SCM]	AG <sub>0</sub>	AG <sub>1</sub>

AG: anterior left, AD: Anterior right, PG: Posterior left, PD: Posterior right. <sub>0,1,2,3,4</sub>: Scores of CMT. CM: Clinical mastitis, SCM: Subclinical mastitis

States, no antibiotic treatment is used in this farming; the treatments used are based on vitamin C, Aloe Vera and apple cider vinegar (Ruegg, and Reiman, 2002). 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 and published in 2000 (see Combre, 2010), reported a significant increase in the rate 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,

different treatments are used for drying up: where lactoserum is most frequently used, 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, homeopathic treatments used in breeding have not always proven their effectiveness scientifically, but remain nevertheless used by breeders (Ruegg and Reiman, 2002). However, studies continue to be conducted and published, especially in emerging countries such as India (Varshney and Naresh, 2004). The results of this study carried out in Algeria for the first time point in this direction and prove once again the reliability of this type of treatment. The studies carried out by Varshney and Naresh (2004) on the homeopathic management of clinical mastitis were 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, *Belladonna* 30CH, *Bryonia* 30CH, *Arnica* 30CH, *Conium* 30CH and *Ipecacuanha* 30CH. In their first study, the efficacy of this complex was evaluated, though without the inclusion of a control group receiving a placebo.

A total of 104 quarters were studied, and the results showed 80% recovery during fibrosis, 96.77% recovery in non-fibrotic areas, 100% recovery in cases of breast oedema 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 *Belladonna*, the anti-haemorrhagic and antiseptic properties of *Arnica*, and the decongestant effects of *Ipecacuanha* and *Calcarea fluorica*.

In their second study, mastitis in 96 quarters was treated with the homeopathic mixture, and mastitis in 96 other quarters was treated with different antibiotics by the intra-mammary route. The distribution of treatment was random. The results showed an efficiency of 86.6% in cases of mastitis without fibrosis of the quarter, 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 accompanying fibrosis, the homeopathic treatment appeared to be more effective than the antibiotic treatment (Varshney and Naresh, 2004). Merck et al. (1989) also obtained good results with 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 determine whether homeopathic treatment is a complementary solution to conventional treatments, or if it could one day even replace it.

The current study 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 favourable clinical evolution in a large number of animals, which was sometimes very rapid, likely



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% (Sandholm et al., 1989). The results obtained here were better, though remained significantly less compared to those obtained by other authors after administration of antibiotics (Deluyker et al., 1999; Durel and Blain, 2008).

The therapeutic interest of homeopathic products in the treatment of mastitis requires additional studies to meet the expectations of breeders who today have few validated therapeutic means at their disposal other than antibiotic therapy. Homeopathy is a possible approach, though its evaluation is difficult. Regulatory requirements in terms of analytical quality of veterinary drugs are not very compatible with the development of homeopathy, as it will be very difficult to develop drugs of this kind if their composition is not perfectly defined. On the other hand, it is a real alternative in certain pathological situations, not only in biological farming but also in conventional practice (Dahiya et al., 2006).

The use of antibiotics should be limited as much as possible to avoid the development of resistance that makes it ineffective, not only in veterinary medicine but in human medicine as well. 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 contribute to 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 reducing environmental, water and soil pollution by medicinal products (Lévy, 2006).

## Breeder opinions

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

## Conclusions

The aim of this study was to advance knowledge of homeopathic products by relying on stronger data concerning efficacy and safety, both for animals and for consumers. It supports the idea that homeopathy 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 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 homeopathy. This experiment showed an acceptable clinical success rate 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 scale.

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## Alternativno liječenje mastitisa krava

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Liječenje mastitisa uglavnom se temelji na uporabi antibiotika. Međutim, u novije vrijeme, postoje izvješća o povećanju fenomena otpornosti i o prisutnosti rezidua u mlijeku i mliječnim prerađevinama. Širom svijeta kao i u Alžiru nekoliko se studija usredotočilo na liječenje mastitisa pomoću homeopatije. Cilj je ove studije pojasniti primjenjivost homeopatije u liječenju mastitisa. Istraživanje je provedeno na dvije farme mlijeka na 14 krava u regiji Laghouat (jug Alžira). Prije početka istraživanja, obavljeno je ispitivanje tolerancije na dvije krave izdvojene za klanje bez ikakve očite infekcije [osim mastitisa]. U određeno vrijeme zamijećene su lokalne i opće reakcije. Ukupno 31 mamitska regija zaprimila je svakih 12 sati tijekom razdoblja od 48 sati 4 intramamarne

injekcije homeopatskog preparata koji sadrži nekoliko prirodnih proizvoda. Obavljen je klinički pregled i analiza uzoraka mlijeka na dan D0, D7 i D14 na svim kravama, a odluka je donesena 14. dan. Podatci su pokazali vrlo dobru toleranciju homeopatskog preparata i izlječenje 75 % kliničkih mastitisa. Zamijećeno je i poboljšanje sa smanjenjem CMT bodova. Uz to, prijavljena je i stopa ozdravljenja od 51,85 % za supklinički mastitis na dan D7 i od 59,29 % na dan D14. U konačnici, homeoterapija bi, u nekim slučajevima, mogla predstavljati alternativu antibiotskoj terapiji i osigurati prednosti za uzgajivače. U budućnosti je potrebno obaviti dodatna ispitivanja.

**Ključne riječi:** *homeopatija, mastitis, krava, liječenje, injekcije*